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Future Network Security of Supply Requirements for New Zealand

CAENZ / EEA Workshop on Security of Supply, Auckland, 14 June 2007

A reliable and secure supply of electricity is a vital part of the energy supply needs of present and future generations. Assurance of an acceptable electricity supply is about managing customer expectations and supply vulnerabilities and making informed decisions for the future. We have a shared responsibility for creating the balance between multiple and at times competing goals and determining the price/quality trade-off based on consultation with customers.

The Workshop was seen as a valuable input into the revision of the EEA Guide by providing a suitable forum for collecting industry input and discussing supply options from a wide range of interested parties. Customer group representatives provided their views on supply issues in their own areas

Speakers

Three international experts presented papers at the Workshop. They provided experience from a global perspective and described the

security of supply situations in the UK, Australia and the USA. The regulatory regimes were reviewed to compare approaches in each country.

Local New Zealand speakers were drawn from generation, transmission and distribution companies. Customer representatives presented the large, medium and small as well as rural users' views on what constitutes for them a secure and reliable power supply.

Summary of the Workshop Panel Discussions

What is the Purpose of Security of Supply Guidelines?

Transpower produced their Grid Reliability Report that demonstrates the degree of compliance with the Grid Reliability Standard. The Panel discussed whether the Standard can be applied at the distribution level. This is not possible at present as the various network companies have different security standards. It was agreed that a set of guidelines should be available for use by

engineers in network companies and it is considered worthwhile to review and update these periodically.

Do we need an appropriate standard for distribution security?

Concern was expressed about regulating the distribution side as well as the transmission system. The threat of regulation and future decisions to spend large sums on the networks can cause suboptimal investment. The network must be robust to avoid cascade outages. There is a need for strategic engineering thinking for the benefit of all customers. It was generally agreed that there should be one distribution standard or guide for New Zealand.

What is the value of embedded/distributed generation to security?

Network security and supply adequacy should take DG into account but it can cause connection and operational issues. If it can be added in the proper way and meet operational requirements then it should be valued. Demand response/management is seen as an appropriate tool to reduce demand. DG can help with this and will work fine if it complies with the connection standards.

What are customer requirements for supply security?

The degree of customer intolerance to outages needs to be reviewed in terms of the relevance to supply security. It was suggested that the EEA should check on past surveys and accuracy of customer responses. Do customers in general know about supply security and quality? How can we measure this? Surveys should provide this information and we should consider

redoing/updating earlier surveys. Retailers are looking at their biggest customers and network companies should check if the latest technology (reclosers etc) can be fitted to appropriate lines/customers.

Are deterministic or probabilistic methodologies better?

Probabilistic methods will give separate outcomes for each category. Use probabilistic and economic analysis and then apply deterministic standards to reach a decision. This will depend on what data is available. A major concern is the High Impact Low Probability event. A risk-based approach should be used to analyse the consequences of long duration supply outages. There is a growing problem with obtaining consents for new projects and using probabilistic methods to justify the investment will cause confusion as most non-technical people will not understand them.

When to invest to ensure future security of supply?

Transpower are concerned that we are pushing the transmission system too hard. Meridian favours a longer term strategic approach with clear leadership in investment decisions. The market will benefit when investments are made on time or even earlier.

A Just-in-Time approach for distribution networks may be acceptable as the timeframe for these projects is quite short. This is not acceptable for transmission projects. The Grid Investment Test now requires a 20 year timeframe which is a positive development.

Presentations from the Workshop can be downloaded from www.caenz.com (click on the 'Conference Presentations' link)

Increased Efficiency of Residential Solar Energy Systems

Gaia Power Technologies, a provider of turnkey distributed energy management and storage systems, announced a partnership with Southern California Edison (SCE) and the California Energy Commission (CEC) designed to maximize the value of residential solar systems in California.

The recent passage of the California Solar Initiative is expected to drive an increase in photovoltaic (PV) installations across SCE's service territory, offering an opportunity to increase the SCE's utilisation of renewable energy sources. In an initiative to maximize the value of these PV installations, SCE sought a means to align the peak power output from the typical PV system to the peak power demand from its customers.

Gaia Power Technologies' energy storage expertise offers a scalable and cost-effective means of maximizing the value of residential PV installations. SCE will use Gaia's flagship product, the PowerTower, to store electricity generated from residential solar systems, and release that

electricity during periods of peak power demand to maximize the value of the electricity to the utility and the consumer.

The PowerTower will interface with SCE's SCADA (Supervisory Control and Data Acquisition) system, allowing full control of the PowerTowers by SCE, and creating a seamless and invisible experience for residents. Several PowerTowers will be installed during the summer of 2007 across SCE's service territory in an effort funded by the CEC.

Ib Olsen, Chief Technology Officer for Gaia Power Technologies said of the project, "Energy storage is the key to making renewable energy projects a reliable component of our energy infrastructure. Our PowerTower systems combine a turnkey, modular design practical for distributed installation with the level of control Southern California Edison needs to maximize the potential of residential PV systems."

DG Pricing for Network Companies



Roman Waespe, a student at the Swiss Federal Institute of Technology (Zurich), is currently working with CAENZ on a Masters thesis entitled 'Distributed Generation Pricing for Network Companies'. A summary of the project work is as follows.

Network companies are regulated to provide reliable distribution service to their customers at a gradually reducing real price. For the network company, the effect of DG is not so much to do with the value of the energy itself, but more to do with issues regarding its transport.

Most network companies in New Zealand have very sparse, geographically spread networks, which have significant transmission constraints. Distributed Generation (DG) will affect this situation.

The connection of DG to a network has costs and benefits for the network company. Costs include administration, safety compliance testing, possible upgrading of protective relay systems, and possible upgrading of distribution lines and transformers. Benefits include possible reduced loading on lines and transformers, and – if the network company has some control over the DG (and it is near a significant load) – possible reduction or elimination of transmission constraints on a feeder or transformer, which has the benefit of deferred investment in new equipment.

The charge (or payment) for connection to a point on the distribution network should reflect the associated costs and benefits.

At present in New Zealand there is no clear methodology in place for determining these charges. The aim of this project is to survey the international philosophy, experience and practise, and to select and justify what is suitable for the New Zealand situation. A case study will provide a useful demonstration of the chosen methodology.

The project is broken down into:

- International Experience:
 - Investigating similar network and DG situations in Switzerland/Europe; and
 - Obtaining guide documents and distributor methodologies for DG applications.
- Local Investigation:
 - Commercial considerations for connecting DG to the MainPower network;
 - Asset investment criteria for MainPower and typical network companies in NZ;
 - Accounting approaches and conventions for covering investment in DG;
 - Technical and operational characteristics of the MainPower network;
 - General technical issues/requirements for connecting DG to the MainPower network; and
 - Specific location issues associated with siting and connecting DG into network;
- A Case Study:
 - Possibilities for DG options in the Hanmer Springs area.

The work is being carried out at the University of Canterbury and is partly supported by CAENZ.

New Rules to Kerb Power of Generators

European Union officials say they believe they have the backing of governments to draft rules lessening the control power production companies have over the infrastructure that delivers supplies to customers.

The leaders of EU nations agreed at a summit last week that more work needed to be done to ensure energy infrastructure is 'independently run and adequately regulated' to guarantee open access to rival companies.

Though the agreement's language was vague, senior EU officials said they interpreted the summit statement as a green light to introduce new rules after the summer. The changes could force companies involved in the entire energy supply chain to sell off part of their business – a process known as ownership unbundling.

The officials spoke on condition of anonymity because the European Commission, the EU's executive body, has not yet formally set out its plans.

EU leaders last week did not specifically endorse or reject the view of EU regulators who would like to see control of infrastructure networks completely taken out of the hands of companies such as Germany's E.ON AG and RWE AG and France's EDF SA.

Ministers in EU member governments have asked for more information on what the commission has in mind and what impact that would have, saying they will discuss this in June.

Two months ago, the EU's executive office said consumers get a bad deal from what it called inefficient and expensive power suppliers. The commission also said that large energy companies dominate national markets and are raking in windfall profits that are not being used to improve the electricity grid and gas supply network.

Europe's energy network needs billions of euros to improve and upgrade it to prevent a repeat of two power shortages that blacked out homes across northern Europe last year.

CIGRE New Zealand News

The New Zealand National Committee (NZNC) of CIGRE is now an Incorporated Society with a formal set of Rules. This will provide tax exemption as a non-profit organisation and keep our accounting costs to a minimum. It will also safeguard the NZNC membership from public and professional liabilities.

Our main co-supported event this year was the Workshop on Network Security of Supply organised by CAENZ and the Electricity Engineers Association (EEA) of NZ and held on 14 June 2007 in Auckland, the day before the annual EEA Conference.

The NZNC arranged for the Convener of CIGRE AP C1, Phil Southwell, to give a Keynote Presentation at the Workshop and a Paper at the main Conference. A short summary of the Workshop and Panel discussions is given elsewhere in this Newsletter.

The NZNC's second co-supported event was hosting the CIGRE AP A2 Transformer Panel to an evening function after their Panel Meeting on 3 July 2007. This allowed a useful interchange of CIGRE information between Australian and New Zealand transformer engineers.

The event was arranged in conjunction with the Open Convention and Transformer



Workshop organised by the Electric Power Engineering Centre at the University of Canterbury to coincide with the CIGRE AP Meeting.

Everyone agreed that the events were very worthwhile and the numbers attending were well above expectation. The EPE Centre is to be congratulated on the success of these events. They are also to be thanked for allowing the NZNC to host a small stand at the Convention where the benefits of CIGRE membership were displayed.

The CIGRE Central Office in Paris has recently expanded the scope of their on-line publications website www.e-cigre.org. Members can now download for free most of the CIGRE Technical Brochures and many Electra articles and other useful information from this website. A valid CIGRE Member Number is needed for access.

It is pleasing to note that the NZNC has passed the 100 CIGRE Equivalent Member Points milestone and we hope to grow our membership still further with more of the local network companies and other industry organisations joining CIGRE.

Please check our New Zealand website at www.cigre.org.nz for details.

WADE Applauds G8's Call for Energy Efficiency and CHP

G8 leaders recently emerged from week-long talks and called for international cooperation in increasing energy efficiency. The World Alliance for Decentralized Energy (WADE) applauds these steps and the call by the G8 to "adopt instruments and measures to significantly increase the share of combined heat and power (CHP) in the generation of electricity".

Existing decentralized energy technology, including high-efficiency CHP, is a proven method to reduce the emission of greenhouse gases in a cost-effective manner.

"The leaders at the G8 Summit recognized what we already knew – that there is incredible potential to increase the efficiency with which we currently use energy," said David Sweet, Executive Director of WADE.

Recently, the UK took a lead in making decentralized energy a priority. The UK's Department of Trade and Industry (DTI) released an Energy White Paper that specifically cites WADE's work to illustrate the benefits of decentralized energy.

"The DTI White Paper can be a building block for other industrialized nations and a foundation for the G8 leaders to implement their mutual goals on energy efficiency," said Sweet.

The DTI's white paper states that a shift towards more investment in DE – as recommended by WADE – will make a significant contribution to meeting the UK's four energy policy goals, including: reducing carbon dioxide emissions by 60% by the year 2050; maintaining the reliability of its energy supplies; promoting competitive markets; and, ensuring that every home is safely, adequately heated at an affordable price.

Richard Brent, WADE's Chairman concluded, "The G8 meeting provides a perfect venue for some of the largest global economies to agree on the best way forward to tackle the common problem of climate change. We're encouraged by the recent announcement that the US is finally willing to engage and we hope that all the leaders present will reflect on the important role that decentralised energy must play in any intelligent consensus."

DOE To Provide Nearly \$60m For Solar Energy Research

US Department of Energy (DOE) Secretary Samuel W. Bodman recently announced that the DOE will make available nearly \$60m to increase the use of solar power across the country, building on the President's commitment to further the development of clean, renewable energy technologies. Secretary Bodman announced: up to \$2.5 million for Solar America Cities cooperative agreements, in which thirteen selected cities will receive awards to promote increased use of solar-powered technologies throughout each city; the issuance of a Funding Opportunity Announcement (FOA) for up to \$30 million for universities to research near-term improvements in solar products; and the competitive selection of ten cost-shared Photovoltaic (PV) Module Incubator projects that will receive up to \$27 million in DOE funding over 18 months.

"We believe these projects will stimulate activity in the marketplace and create a ripple effect that will boost the use of solar energy across the country," Secretary Bodman said. "Harnessing more of the sun's power is central to reaching the President's goal of increasing our nation's energy security by pushing forward clean, renewable technologies that will allow us to become less reliant on imported sources of energy."

Secretary Bodman made the announcements while delivering keynote remarks at the American Council on Renewable Energy (ACORE) Renewable Energy Finance Forum in New York. Secretary Bodman highlighted President Bush's Solar America Initiative (SAI), which seeks to make solar energy cost-competitive with conventional sources of electricity by 2015, and is integral to the President's Advanced Energy Initiative (AEI). The AEI seeks to change the way we power our homes, offices, and vehicles by increasing the use of clean, renewable energy technologies.

Subject to negotiation of final terms, DOE will provide a total of \$2.5 million in financial assistance to the thirteen competitively selected, cost-shared, two-year projects. Additionally, DOE will provide hands-on assistance from technical and policy experts to help cities integrate solar technologies into city energy planning, zoning, and facilities; to streamline city-level regulations and practices that affect solar adoption by residents and local businesses; and to promote solar technology through outreach, curriculum development, and incentive programs.

Solar America Cities have been identified as large cities with high electricity demand, and represent a diverse geography, population, and maturity of solar infrastructure. Cities were selected based on their plan and commitment to a comprehensive,

citywide approach to the deployment of solar technologies¹. Their efforts will improve the ability of citizens and businesses to adopt solar technology locally, and will provide a model that other cities across the country can follow. Subject to evaluation by DOE's Office of Energy Efficiency and Renewable Energy, as well as appropriations from Congress, DOE plans to select a new round of Solar America Cities in 2008.

Up To \$30 Million For University Research

In support of research and development that will lower costs, increase availability, and improve the efficiency of photovoltaic (PV) solar products, Secretary Bodman also announced the issuance of a \$30 million (FY 2008-2010)

Funding Opportunity Announcement (FOA). Over the next three years, this funding will support university work on materials and process research to yield near-term improvements in solar products. Funding is subject to Congressional appropriations.

Projects funded through this solicitation also further President Bush's American Competitiveness Initiative, which commits to investing in our next generation of scientists, engineers and educators so America can continue to successfully compete in the 21st century global marketplace. The FOA is available at www.Grants.gov.

Up To \$27 Million For Photovoltaic Module Incubator Projects

While delivering keynote remarks to ACORE's Renewable Energy Finance Forum, Secretary Bodman also announced the competitive selection of ten cost-shared Photovoltaic Module Incubator projects. In total, these projects, subject to negotiation of final terms and Congressional appropriations, will receive up to \$27 million in DOE funding over 18 months (Fiscal Years 2007-2009). With a minimum 20 percent cost share from industry, the total research investment is expected to reach \$71 million. In these projects, businesses will address the challenges related to reducing cost, improving performance, and expanding manufacturing capacity of innovative PV technologies to move from small-scale to pilot production.

Incubator project funding is structured so that companies receive funding from the Department only upon successful performance of pre-specified new hardware. This approach allows the



¹ The cities selected are: Ann Arbor, MI; Austin, TX; Berkeley, CA; Boston, MA; Madison, WI; New Orleans, LA; New York, NY; Pittsburgh, PA; Portland, OR; Salt Lake City, UT; San Diego, CA; San Francisco, CA; and Tucson, AZ.

Department to remove some administrative reviews and planning paperwork so early-stage companies can focus on technology development; taxpayers are also assured real value for their investment in these high-risk/high-return projects. Contingent on congressional appropriations, the Department will provide opportunities for new companies to enter this program every nine months.

The following companies have been selected to participate in the PV Incubator Projects: AVA Solar (CO); Blue Square Energy (MD); CaliSolar (CA); EnFocus Engineering (CA); MicroLink Devices (IL); Plextronics (PA); PrimeStar Solar (CO); Solaria (CA); SolFocus (CA); and SoloPower (CA).

Additional information on the awards, funding opportunities and the Solar America Initiative is

available at: www1.eere.energy.gov/solar.

The Energy Policy Act of 2005 (EPAct), signed by President Bush in August of 2005, provides incentives for purchasing and using solar equipment. Now extended through 2008, these incentives provide a credit equal to 30 percent of qualifying expenditures for purchase of commercial solar installations, with no cap on the total credit allowed. EPAct also provides a 30 percent tax credit for qualified PV property and solar water heating property. Private property owners of qualified property could be eligible for a credit up to \$2,000 for either property, with a maximum of \$4,000 allowed if both photovoltaic and solar hot water qualified properties are installed. Additional information is available on the incentives for solar installations.

Higher Power Wind Energy Systems for Chinese Market

American Superconductor Corporation, an energy technologies company, announced recently that its wholly owned subsidiary, Windtec, has signed a multi-million-dollar wind energy system joint development contract with Sinovel Wind Corporation Limited. AMSC also has a prior delivery right to sell future electrical components under the same conditions as other suppliers to Sinovel for the wind energy systems covered under the contract, creating a substantial follow-on business opportunity for AMSC. The order significantly expands Windtec's business with Sinovel. Since 2005, Sinovel has ordered electrical components from Windtec for 785 wind energy systems rated at 1.5 megawatts (MW).

Under the terms of the new contract, Windtec and Sinovel will design and jointly develop 3 and 5 MW wind energy systems that Sinovel plans to market and sell worldwide. Sinovel will have the exclusive ownership and complete industrial and intellectual property rights for large-scale onshore and offshore wind turbines developed under this contract, enabling the company to compete effectively with established leaders in the market. Based in Beijing, Sinovel plans to begin series production of 3 MW systems during 2009 and 5 MW systems the following year.

"AMSC's Windtec business enabled Sinovel to quickly establish itself in the wind power market," said Han Junliang, Chairman and President of Sinovel. "We believe the 3 and 5 MW systems we will jointly develop with Windtec will allow Sinovel to grow its market share and position us as a technology leader in the industry. We look forward to benefiting from our expanded relationship with Windtec as we continue to implement our plan to manufacture 500 wind energy systems in 2007, 800 in 2008 and reach an annual capacity of 1,000 wind energy systems in 2010."

By December 2006, Sinovel had already signed more than US\$1B in contracts to supply domestically made wind energy systems to help meet China's rising demand for clean energy. According to one of its customers and one of China's power generation companies, China Huaneng, up to US\$36B may be spent in China by 2020 to increase wind energy capacity to cut pollution. The Chinese government has mandated that at least 70 percent of equipment used in Chinese wind farms must be made in China.

"AMSC's business in the Asia-Pacific region continues to grow rapidly," said Greg Yurek, founder and chief executive officer of AMSC. "Sinovel has done a tremendous job of scaling its production capabilities and has emerged as a major wind system manufacturer. We are honored that it has chosen Windtec to aid in expanding its product offerings to 3 and 5 MW systems – a step that will help considerably to meet the renewable energy needs of China."

According to a recent report from the Global Wind Energy Council, China's installed base of wind generated electricity grew by 107% in 2006 alone to 2,600 MW. Li Junfeng of the Chinese Renewable Energy Industry Association (CREIA) stated: "Thanks to the Renewable Energy law, the Chinese market has grown substantially in 2006, and this growth is expected to continue and speed up. According to the list of approved projects and those under construction, more than 1,500 MW will be installed in 2007. The goal for wind power in China by the end of 2010 is 5,000 MW, which according to our estimations will already be reached well ahead of time."



Blown Over...

How high wind-power production in Germany one Saturday night helped extend a blackout across Europe

Concerns over wind power used to focus on whether enough wind would blow to keep wind generators busy and electric power grids supplied. Now, after a major power blackout in Europe in November that left 15 million households in the dark, concerns over wind power come from an entirely opposite direction – fear that wind power can unpredictably produce more power than a system can handle.

The blackout started late on a Saturday night during a spell of warm fall weather. Although consumer demand was low, wind-power production in northern Germany was very high, supplying about 14% of the total and flooding the northeast region of the European grid with unexpected volumes of power.

Meanwhile, most coal- and gas-fired generators, which can act to moderate erratic production elsewhere on a system, were either out of service or operating at a reduced output.

Grid operators then miscalculated the consequences of a routine grid manoeuvre: they disconnected a high-voltage line to let a ship pass through a canal. Overloaded power lines automatically disconnected, causing the blackout to sweep across Europe and forcing massive amounts of generation to automatically disconnect from the grid.

As operators attempted to restart the grid, wind generators, which are out of the direct control of the grid operators, automatically reconnected to the grid. They injected unwanted power and caused further disruption, extending the blackout in the areas with the most wind power.

To prevent a recurrence, the European agency responsible for power-grid reliability, the Union for the Co-ordination of Transmission of Electricity (UCTE), studied the blackout and recommended several remedies.

One recommendation would require upgrades to wind-power systems to allow grid operators to directly control these generators. This measure will increase the cost of connecting wind generators to the grid, but another

recommendation – massive investments in the transmission grid – would hit harder. Much of Europe's power grid was originally designed primarily for local generators serving mostly local customers. Now, moving large amounts of wind power vast distances during periods of high wind generation, which exceeds the needs of local customers, has overstretched the system. New high-voltage power lines that will be both controversial and costly are now on the cards.

Across the English Channel, the wind blows cold for other reasons.

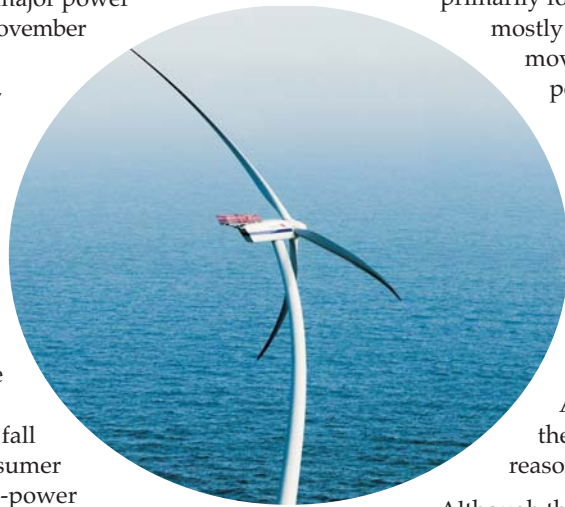
Although the UK has the highest wind-power productivity of any major wind-power country in Europe, its production falls short of the generally accepted minimum threshold for viability. A case in point can be seen in the UK government's five-year anniversary review of its renewable energy subsidisation programme, called Renewables Obligation (RO), which disproportionately supports wind power. Tellingly, it has heard from the Office of Gas and Electricity Markets (Ofgem), the regulator mandated to protect consumers with respect to rates and reliability. Ofgem has major concerns.

The Renewables Obligation was intended to promote technology, but the regulator observes that “there is little evidence so far that the RO is encouraging technological development.” As a result, consumers have been jolted. “The cost of the scheme to both business and domestic electricity customers has been very high – over £1.7 billion [\$3.8 billion] to date,” Ofgem states. Taking into account that the rate impact is growing rapidly from a relatively small initial cost, the regulator goes on to estimate that the ultimate cost may balloon to over £30 billion.

As for environmental benefits, the regulator observes that “there are currently much cheaper ways of reducing carbon emissions from the electricity sector than the RO scheme.”

Some environmental organisations are raising substantive concerns, too.

Two engineering analyses of the wind-power experience in the UK, commissioned by a prominent environmental organisation called the



Renewable Energy Foundation and released before Christmas, turned up problems producing practical electricity supplies from the wind.

The engineers found that windpower production is a mismatch to power needs – in winter at times of low temperatures, when the UK needs power more, wind speeds tend to be low; when temperatures are high and it needs less power, in contrast, wind speeds are high. Across Europe, the output of windpower facilities is generally lagging the originally forecasted output.

Canada's experience in wind production shows the same patterns. Worryingly, detailed production data from Ontario's largest wind farms in November, December and January also shows the same mismatch between the availability of wind power and our need for it.

Canada's experience with wind power has

likewise been disappointing. Of the 14 wind farms receiving federal subsidies that have operated long enough to reveal a clear picture of their productivity, 12 have failed to achieve their forecasted production. Two of the federally supported wind farms have failed to match half of their forecasted production. Overall, the 14 wind farms have produced 18% less power than expected. Likewise, provincially subsidised windmills have also been failures.

Yet wind also has had successes. When sited properly, they can be contributors to the country's grid system, and with more knowledge about how the wind works, we doubtless will one day see wind systems that are both economical and reliable. Until then, the answers are blowing in the wind.

Based on an article by Tom Adams, executive director of Energy Probe, a Toronto-based energy think-tank.

CHP/DHC Collaborative Effort Kick-off Meeting

Background

On 2 March, over 50 representatives from Asia, Europe, North America and the Middle East convened at the International Energy Agency (IEA) Secretariat to commence a new IEA effort designed to analyse and report on the prospects for increased use of combined heat and power (CHP) and district heating and cooling (DHC).

CHP and DHC are important near-term clean energy technologies offering increased energy conversion efficiency (more than double current separate heat and power options), related greenhouse gas emissions reductions, and enhanced energy system security and stability.

To date, IEA has not performed work to analyse these technologies, with the exception of the 2004 publication *Coming in from the Cold* (and related workshops), which highlighted district heating system retrofit opportunities in the Economies in Transition of the Former Soviet Union.

Participants learned about IEA's history and current G8 programme of work, and offered ideas on how new IEA CHP and DHC analysis and outreach can offer insights and increased visibility to these technologies.

Meeting Outcomes

Participants agreed to a two-year plan of work outlining three key tasks: data collection and analysis, publication of CHP/DHC scenarios and strategies as part of the G8 Programme of Work, and workshops and other outreach events to share results and lessons learned.

This new work will be supported through voluntary contributions (VCs), with Partner organizations agreeing to provide 15,000 Euros

to support the first year of work for this two-year effort. To date, the following organizations have agreed to provide voluntary contributions to support this effort:

- ExxonMobil, USA;
- Solar Turbines/Caterpillar, Inc., USA;
- International District Energy Association; and
- Swedish District Energy Association, Sweden.

Next Steps

IEA will continue to recruit additional VC contributors to fund the first year of this effort. Organizations that are likely to provide VC funding include:

- The Dalkia Group, France;
- GE Energy, France;
- Tokyo Gas Company, Japan;
- METI, Japan;
- Korea District Heating Corporation, Korea;
- Palm District Cooling, UAE;
- Dow Chemical Co., Switzerland; and
- Chevron, USA.

Assuming receipt of sufficient funding, in late March/early April, IEA will form working groups focusing on data, analysis, and outreach/events. These working groups will develop work plans with the goal of reporting to Partners and Collaborators in the fall of this year.

Back issues of *Energy21 News* are available for download from www.caenz.com (click the link under 'Current Newsletters').

Solar power and fuel cell technologies research

Singapore will spend \$NZ327.54 million on research into clean forms of energy over the next five years to meet soaring energy demand in the region, the government announced recently.

The tropical city-state will focus on solar power and fuel cell technologies research, the Economic Development Board (EDB) said, adding that the sector could create some 7000 jobs and make up 0.6 percent of gross domestic product by 2015.

Located close to the equator, Singapore is well-placed to conduct research into how solar energy can be harnessed for the benefit of some one billion people in South and Southeast Asia who do not have access to electricity, according to EDB officials.

"The clean energy industry is experiencing robust global growth due to rising energy demand, climate change concerns and technological advances," said EDB chairman, Lim Siong Guan.

Singapore is keen to design and produce clean energy technologies such as solar panels, and to attract energy firms that want to enter the Asian market. Energy firms that already have research facilities in Singapore include German solar firm Conergy and Vestas, the world's biggest wind turbine maker.

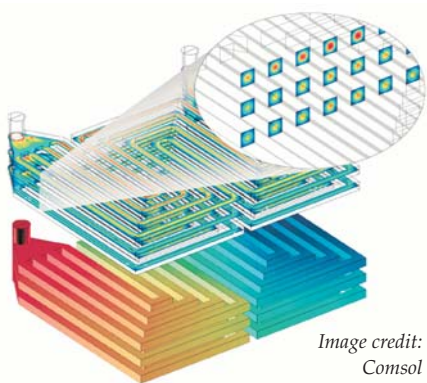


Image credit:
Comsol

TADG First Meeting

The Transmission Access for Distributed Generators group in the UK (TADG) held its first meeting in July 2006. It was prompted by National Grid's concerns that there was not a contractual route for recovering money from embedded generators who cause an export from the Distribution System onto the Transmission Grid. NGT thought this might get increasingly common with greater volumes of DG connecting.

More fundamentally NGC have questioned the justification of allowing non-licensed embedded generators to net off demand and stated that they should pay transmission charges on their gross generation, i.e. that so called 'embedded benefits' are discriminatory and should be abolished.

It therefore proposed to move to gross charging (charging all DG the full costs of TNUoS – which does away with the main component of embedded benefits). At the four dissemination meetings, which were held in November 2006, and at an update held on 23 April this year, Tim Russell of the Renewable Energy Association explained how this proposal is neither logical, nor in line with Government aspirations.

Over a total of eight meetings, these arguments were repeatedly rehearsed – the script changing little – until a final flurry of e-mail 'voting' took place, which neatly illustrated the complete polarisation of views between National Grid and industry on this issue.

Over the months, NGC has in fact alternated between saying that the current arrangements (netting of embedded generation and demand) is wrong in principle and that netting would be all right providing you changed the basis of charging for demand, which it is not prepared to face up to.

Ofgem's summing up report is now awaited, which is expected in July / August.

It will merely report the views of the group. It will then be up to individual parties to propose any change from the current arrangements.

1500 MW PV already in the German Power System and much more to come ...

- What is the field experience with network integration of PV?
- What can be learnt from wind power integration into power systems for PV?
- What is the impact of increasing PV on power system operation?
- How can we include the relevant models in power system modelling software?
- What new tools, e.g. virtual power plants, are needed to integrate large amounts of solar power into power systems?

All the above questions and probably much more are to be discussed on Friday October 12, 2007 during a workshop in Marburg, Germany. The workshop will focus mainly on concentrating photovoltaic power plants (see www.concentrating-pv.org) but parallel sessions are planned for Friday, October 12, to discuss those questions.

This workshop aims to connect project managers, engineers and power system experts. Bridging the gaps of knowledge by the exchange of academic research results and experiences in the field moves us closer to understanding the issues in the area of network integration of PV. This workshop brings together selected academic and

business professionals for intensive discussions in the medieval city of Marburg, one hour north of Frankfurt, Germany.

We are looking for possible contributors to the network integration sessions, so if you are interested, please see our call for papers and submit a half-page abstract by 31 July 2007.

Contact

The workshop is organized by the Philipps-Universität, Marburg, Germany, in cooperation with Energynautics GmbH, Germany.

For general information, ideas, etc. concerning the network integration part of the workshop, please send an e-mail to Dr. Thomas Ackermann, via info@energynautics.com.

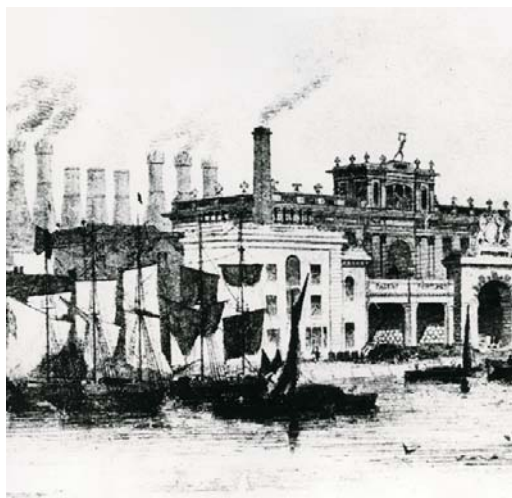
WADE Issues Report on the Potential of Onsite Power in the Cement Industry

The World Alliance for Decentralized Energy (WADE), an international non-profit organization, recently released a major new study examining the potential of onsite power in the cement sector. The report concludes that major cost savings and globally significant CO₂ reductions are possible if more cement plants generate their own electricity onsite.

Cement manufacturing is a significant contributor to climate change, responsible for around 5% of total global CO₂ emissions. The report estimates that onsite power in cement plants has the potential to meet more than 0.4% of total global electricity demand. It is estimated that if the full potential of bottom cycle cogeneration alone were realized global annual emissions could be reduced by some 68.3MT CO₂.

Potential exists for both waste heat recovery and top cycle cogeneration. Over 2,900MW of installed electric generating capacity in cement plants worldwide is documented in the report.

David Sweet, WADE Executive Director, said "this pioneering work highlights that an industry



As it once was: the Gateshead Cement Works (UK), photographed circa 1860

can use decentralised energy technology to improve the environment and the bottom line." WADE Chairman, Richard Brent, added "this report proves once again WADE's ability to contribute timely and relevant research to issues of global importance."

The report is available at no charge from: www.localpower.org/documents_pub/report_cement.pdf.

Only Renewables can fill the energy gap

Jonathan Porrit, chairman of the UK Sustainable Development Commission, projected his belief that only renewable energy can 'fill the gap' to reduce emissions by 80% by 2050 in the *Financial Times* on Tuesday 17 July. In his view there is a mismatch between climate change science evidence and the way politicians and energy institutions consider the future role of renewables. In response John Morley, special professor at the University of Nottingham Business School, wrote in a letter to the FT on Friday 20 July. He believes that the EU's 20% renewable energy target is understated and the real target should be a 20-fold increase.

Renewable Energy benefits rural communities

A new study by the Economic and Social Research Council has highlighted the benefits of community renewable energy projects in the UK. The study has found that projects are largely based in the countryside, some in quite remote areas. These small-scale renewable energy projects can bring people together, revitalise local economies and help alleviate poverty, alongside fighting climate change.

Ten-point plan focuses on Heat & Cooling

The UK Living Environmental Systems Division (LES) of Mitsubishi Electric have launched the Company's 10-point action plan, the Green Gateway Initiative, which includes technological developments and simple behavioural changes to help change the way we heat and cool our commercial and residential buildings in order to reduce carbon emissions.

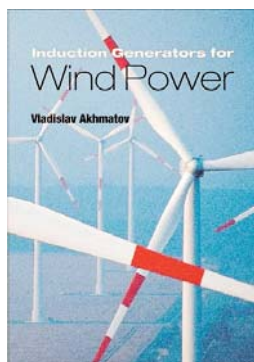
Nationwide energy saving experiment

40,000 households in the UK are to be involved in a Nationwide energy saving experiment. The energy saving trials, using smart metering, are a bid to cut household bills and help tackle climate change. EDF Energy, E.ON UK, Scottish and Southern Energy, and Scottish Power have all signed contacts to conduct the trials and the scheme is funded by £10m from Government, matched by a similar amount from the companies involved.

Book Review:

Induction Generators for Wind Power

Vladislav Akhmatov, published June 2007, 258pp, £52.50 (UK)



This book is concerned with understanding and modelling grid-connection and fault ride-through capability in the context of electricity generated from wind turbines. It is very timely due to the rapid incorporation of wind power into power systems across the

globe; meeting the challenge of maintaining reliable operation of those systems while using a new electricity source, is essential.

Electrical power supply technology is well known, and is based on the generation and controllability of conventional power plants and their synchronous generators. Such conventional power plants provide power-frequency and voltage control. This well-known power supply technology is giving way to the less-well understood technology of electrical power supply from the wind.

This book focuses on the development of dynamic models of different wind turbine concepts and the understanding of the interaction between wind turbines and transmission power grids. As about 85% of the wind turbine market comprises wind turbines equipped with either fixed-speed or variable-speed, converter-controlled induction generators, this book concentrates on induction generator-based wind turbines. As the power rating of wind turbines rapidly increases and power electronics converters become commonplace in generator control, this book presents details about power electronics converters' modelling with regard to short-term voltage stability, control, protection and fault ride-through capability.

This book is primarily appropriate for:

- postgraduates and academics interested in electrical power supply and grid connection of wind turbines;
- electrical power engineers working on the grid connection of windfarms and modelling of wind turbines;
- electrical power companies and transmission systems operators technical and research departments; and
- wind turbines manufacturers.

You can order the book at:

www.multi-science.co.uk/wind-power.htm, or via Amazon (www.amazon.com).

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What is an Innovation Relay Centre?

In 1995, the European Commission established the IRC network, aiming to create a pan-European platform to stimulate transnational technology transfer and promote innovation services.

From April 2004, it has consisted of 71 Innovation Relay Centres (IRCs) throughout Europe including the EU, Chile, Iceland, Israel, Norway, Switzerland and Turkey – a total of 33 countries including 27 EU Member States.

These centres have been created in order to facilitate the transfer of innovative technologies to and from European companies or research departments.

As a mover and shaker in innovation, the IRC network has become a leading European network for the promotion of technology partnerships and transfer, mainly between small and medium-sized companies.

The IRCs are innovation support service providers mainly hosted by public organisations such as

university technology centres, chambers of commerce, regional development agencies or national innovation agencies. Most IRCs are set up as consortia. Each centre is staffed by personnel who have extensive knowledge of the technological and economic profile of the companies and regions they serve. In the last year alone, the IRCs have facilitated over 65,000 customers.

The IRC internal network with a total of nearly 1,000 experienced specialists has facilitated more than 1,000 transnational transfers of

technology – signed agreements for the sale, licensing, distribution or joint development of new technologies. Today the IRC Network is the largest association of its kind worldwide.

More can be found on the IRC Website at <http://irc.cordis.lu>, including an extensive section of downloadable material.



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Contact Information

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