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Transmission System Upgrades

The Electricity Commission is currently considering the rules to be applied in assessing the merits and approving transmission system upgrades. This may involve the application of a Grid Investment Test, GIT, to determine whether transmission upgrade is economically efficient compared to alternatives such as generation, demand side management initiatives, etc.

This is a difficult assessment to make as the core grid is shared by consumers with very diverse needs with respect to reliability, security, and emergency supply. One approach is to survey the perceived cost consumers of various types attach to unplanned loss of supply and then attempt to derive a weighted average economic value of unserved energy on a per \$/kWh basis.

The term "Value of Lost Load", or VoLL, is frequently applied to this figure. This term itself is as open for debate as the process used to derive it.

CAE has recently undertaken an exercise of calculating a VoLL figure for application to a Grid Investment Test for the Electricity Commission. This essentially was an attempt to update an assessment made by CAE as part of earlier study on reliability.

The model is based on a similar methodology that has been applied by VENCORP in Australia. This has enabled CAE to calibrate its model by normalizing the differences between New Zealand and Australian datasets.

The key inputs to the model are:

- Transmission system outage and duration probabilities (taken from annual disclosures).
- Numbers, consumption and demand statistics for load groups within New Zealand's consumer base (taken from the Energy Data File).
- The costs consumers associate with an outage of a given duration based on consumer surveys.

It may interest readers that any consumer or network company can apply their data to determine a VoLL relevant specifically to them and able to be applied to their own investment decisions.

In New Zealand's case the answer is about \$17/kWh qualified by the fact that result is only as good as the quality and the validity of the sampling during survey. When there is extreme divergence in the consumer base



there is tendency for averages to suit no one.

An insight into New Zealand's consumer base is that we have large number of small users who are in the habit of enjoying a very well supported power supply while the small number of major users have addressed their own specific business needs, and operating in low margin high volume commodity markets, are very sensitive to increased costs that over investment in transmission would bring to them. MEUG members tended to place a low value on impact of outages

compared to their Australian counterparts.

CAE believes this is related to issues around the high performance of our transmission system and their relative independence from grid provisions

which are designed primarily to serve the largest number of consumers (or those with political voting power).

Since the previous CAE survey of consumers it would appear that:

- Our homes and lives are more dependent on electricity particularly technology and its high demand for supply quality.
- With increased technology in our businesses we are doing a better job of managing business continuity risks.
- More of our population is living in high density urban environments which is changing our load demographics and the power supply service standards demanded.
- Even farming with irrigation and increased dairying is intensifying energy demand.

*Ken Mitchell,
DG Programme Manager*

Viewpoint

Do you hold a specific position on distributed energy? Is there something you don't understand or don't agree with? Do you require more information on a certain aspect of DG?

Energy21 would like to hear from you. See the contact details on page 12.

E21 Advisory Group Meets

The industry advisory group formed last year to assist CAE in progressing a wider understanding and an appreciation for the opportunities for DG throughout New Zealand, met in Wellington in February.

A strong endorsement was given to the E21 communication channel set up by CAE in 2004. This has a regular publication of DG information from around the world, and a dedicated web site, which was providing a much needed service to the Electricity Industry. So too was the annual DG programme activity, which has been expanded this year (for details see page 7 in this issue).

Industry players with commercial interests in DG applications were supporting CAE's efforts to research and publish specific resource-based guidelines. The first to be published is on the business case for diesel generator sets.

Others will follow as the portfolio of case studies is expanded. A strong emphasis is to be given to renewable energy forms.

The guidelines will be publicly released with others in preparation at the E21 Symposium at the pre-conference day of the Electricity Engineers'

Annual Conference, "Implementing New Zealand's Energy Options".

EECA and MED saw a positive advantage to CAE's research proposal for a region by region energy resource analysis for DG, taking into account the current grid exit points of each region.

Participants at the meeting were:

- Alan Jenkins (ENA),
- Gareth Wilson & Miranda Jenkin (MED),
- Peter Watt (EECA),
- Peter Whitehouse (Business NZ),
- Ralph Matthes (MEUG),
- Brian Tolley.

(Absent: Peter Berry (EEA))

Links

To keep yourself up-to-date on the E21 programme, visit the DG page on the CAE website (www.caenz.com, see the listing under "Special Links"). Back copies of *Energy21* are also available (select "Newsletters" on the Quicklinks menu).

General News

Wind Power Interconnection

The US Federal Energy Regulatory Commission (FERC) recently proposed regulations that would remove barriers to wind-generated electricity while helping to ensure continued reliability of the national power grid.

Wind-generated power is a growing source of electric generation in the United States, but unique technical characteristics may impede the interconnection of wind facilities with the nation's grid system.

In 2003, the Commission adopted standard procedures for the interconnection of generation facilities larger than 20 megawatts (Order No. 2003). The rule sets uniform procedures that a transmission provider and an interconnection requester must follow throughout the interconnection process, including legal rights and obligations of the parties, cost responsibility, milestones for the project's completion and a process for resolving disputes.

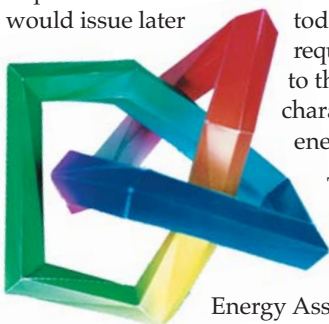
Employing standard procedures and interconnection agreements reduces interconnection time and costs, helps preserve reliability and lowers wholesale prices for the nations' customers. The interconnection procedures adopted in Order No. 2003 were tailored to more traditional power generation sources. The new proposal would include certain technical requirements that transmission providers must apply to interconnection service for wind generation plants.

The Commission is proposing to require wind plants to demonstrate the ability to continue operation even if a low voltage condition is experienced on the grid, to stabilize voltage levels and help the transmission grid stay in balance. Wind-powered facilities further would be required to have supervisory control and data acquisition (SCADA) capability to ensure real-time communication with transmission providers. The Commission also is seeking comment on whether there are other generating technologies that should comply with these technical requirements.

In Order No. 2003-A, the Commission recognized that the standard procedures adopted in Order No. 2003 were designed around the needs of traditional synchronous generation facilities. The Commission exempted wind plants from certain requirements in that order and said it would issue later

today's proposed requirements adapted to the special characteristics of wind energy.

The proposal responds to a request by the American Wind Energy Association (AWEA)



that the Commission set specific standards applicable to the unique characteristics of wind generation plants. The AWEA petition was discussed at a Commission technical conference in September 2004.

Source: FERC

ThermoEnergy Integrated Power System (TIPS)

ThermoEnergy Corporation (OTCBB:TMEN) announced the authorization of \$2.3 million in Federal funding for the rapid development and commercialization of the Company's patented new zero air emission power plant technology known as the TIPS process. TIPS eliminates the atmospheric emissions of mercury, acid gases and particulates from fossil fuel burning power plants. In addition, TIPS captures and recovers carbon dioxide (CO₂) in liquid form ready for sequestration or beneficial reuse.

TIPS produces steam and/or synthesis gas from a diverse mix of energy resources, including coal, natural gas, oil, biomass or various 'opportunity fuels' such as petroleum coke, waste oils, etc. Although TIPS represents a totally new thermodynamic approach to generating power from fossil fuels, all of its process components consist of proven, off the shelf equipment currently being used in other industries worldwide.

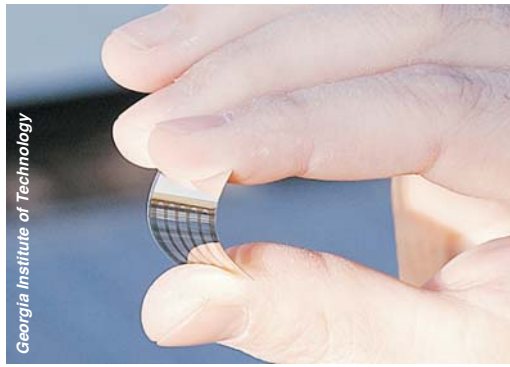
An additional economic factor relates to TIPS' ability to generate a variety of emission credits for its operators. Buying and selling of NO_x and SO_x emission credits is expected to greatly increase over the next five years.

Founded in 1988, ThermoEnergy is an integrated technologies company engaged in the worldwide commercialization of patented and/or proprietary municipal and industrial wastewater treatment and power generation technologies. Additional information on the Company and its technologies can be found on its website at: www.thermoenergy.com.

Organic Solar Cell

As the price of energy continues to rise, businesses are looking to renewable energy for cheaper sources of power. Making electricity from the most plentiful of these sources - the sun - can be expensive due to the high price of producing traditional silicon-based solar cells. Enter organic solar cells. Made from cheaper materials, their flexibility and feather-weight construction promise to open up new markets for solar energy, potentially powering everything from Radio-Frequency Identification (RFID) tags to iPods and laptop computers.

Researchers at the Georgia Institute of Technology have developed a new approach to creating lightweight organic solar cells. By using pentacene, a crystalline organic film, researchers



Organic Solar Cell

have been able to convert sunlight to electricity with high efficiency.

Once fully developed, organic solar cells could revolutionize the power industry. Their flexibility and minimal weight will allow them to be placed on almost anything from tents that would provide power to those inside, to clothing that would power personal electronic devices.

European Network for Integration of RES +DG

Distributed Generation (DG) is emerging as a promising electricity generating technology for a number of reasons. Three independent trends are currently laying the groundwork for the possible widespread adoption of DG:

- utility industry restructuring;
- the political will to increase the use of RES (Renewable Energy Sources); and
- technology advancements.

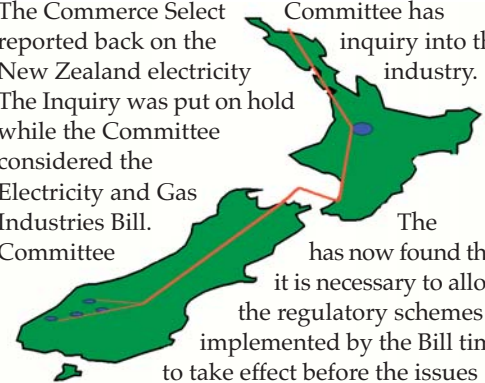
DG strategically applies relatively small generating units (typically less than 20 MWe) at, or near, consumer sites to meet specific customer needs, to support economic operation of the existing power distribution grid, or both. The convergence of competition in the electric industry with the arrival of environmental friendly microturbines, fuel cells, photovoltaics, small wind turbines and other advanced distributed power technologies, has sparked strong interest in distributed power, particularly in on-site generation. Reliability of service and power quality are enhanced by proximity to the customer, and efficiency is improved in on-site CHP applications by using the heat from power generation.

Distributed generation complements central power by providing a relatively low capital cost response to incremental increases in power demand, by avoiding transmission & distribution capacity upgrades, by locating power where it is most needed and by having the flexibility to put power back into the grid at user sites. On the other hand, there are social needs for cheaper, less polluting, safer and more reliable and sustainable energy for all stakeholders: consumers, suppliers, generators and policy makers. The distributed generation, including RES integration, is a promising solution to solve those needs.

This process will be achieved through the setting up of a "European Network for Integration of RES +DG" - ENIRDGnet - involving main stakeholders. This network proposal has been the consequence of the merging of several initiatives (networks and accompanying measures) around the same topic in order to increase the European added value of the proposal in terms of complementarity, transnationality and critical mass.

Select Committee Inquiry into the New Zealand Electricity Industry

The Commerce Select Committee has reported back on the inquiry into the New Zealand electricity industry. The Inquiry was put on hold while the Committee considered the Electricity and Gas Industries Bill. The Committee has now found that it is necessary to allow the regulatory schemes implemented by the Bill to take effect before the issues identified are addressed again. The full report is available at: www.clerk.parliament.govt.nz/Content/SelectCommitteeReports/cminqelectricity.pdf



Teams To Host DER Laboratory Testing Sites

The Electricity Innovation Institute, an affiliate of the Electric Power Research Institute (EPRI), is seeking laboratory teams to voluntarily host the testing of draft object models or information templates for two types of distributed energy resources (DER) — diesel generators and fuel cells.

The templates will then be updated based on the test results and made available to one of several International Electrotechnical Commission (IEC) working groups developing international standards for DER object models. The open, consensus-based standards are supported by E2I's Consortium for an Electric Infrastructure to Support a Digital Society (CEIDS).

"Distributed energy is rapidly coming of age. Connecting a distributed power system to the complex electricity grid has potential impacts on the safety and reliability of the grid," E2I President and CEO T.J. Glauthier said. "These lab tests are key to establishing open information model standards that are complete, correct, and compatible with the larger body of IEC open communication architecture standards for the whole power system."

E2I, a non-profit scientific institute, requested technical proposals by November 17, 2004 from individual, or teams of, organizations, businesses and universities volunteering their capabilities to (1) work with DER vendors and provide DER test units, (2) implement the draft object models



in software for these DER units, and (3) provide laboratory facilities and support services to host the object model testing. The CEIDS team will stage the developmental testing of the DER object models for diesel engines and fuel cells, use the information to refine the draft models, and report on the results.

Teams can propose either indoor or outdoor laboratory environments as host facilities for the testing that the CEIDS team will perform. A Notice of Opportunity and test plan document containing more information (including the split of responsibility between the CEIDS test team and the proposer's host team) are available at www.e2i.org.

After the laboratory testing, E2I may also conduct some object model testing in actual utility systems. The details and timing of field tests will be determined in part by the outcome of the laboratory testing.

This total effort lays the groundwork for interoperability of a variety of DER equipment types in the electric distribution system of the future. It is anticipated that proposers who respond to the Notice of Opportunity are entities who wish to make a contribution to the development of this body of international standards.

The Electricity Innovation Institute's mission is to stimulate innovation in strategic electricity technologies through public/private partnerships. The non-profit public benefit organization is an EPRI affiliate based in Palo Alto, Calif. E2I's focus is to develop strategic technology innovations with the potential to transform the value of electricity to customers and society and provide great public benefits. Visit E2I at www.e2i.org.

Electric Power Research Institute (EPRI), headquartered in Palo Alto, Calif., was established in 1973 as a non-profit center for public interest energy and environmental research. EPRI's collaborative science and technology development program now spans nearly every area of power generation, delivery and use. More than 1,000 energy organizations and public institutions in 40 countries draw on EPRI's global network of technical and business expertise. Visit EPRI at www.epri.com.

Hot Dry Rocks

Renewable energy company Geodynamics reported the venting of steam generated by geothermal energy for the first time. The recent release of the steam from its Habanero 2 site at the Cooper Basin in South Australia was a first for the company, which is involved in the development of geothermal energy generation from hot dry rocks. ABN Amro Morgan resources analyst Roger Leaning said seeing steam for the first time was encouraging. "It's something tangible for people to see this thing generating some thermal energy. The next stage is how they can capture that thermal energy," he said. (Industry Search)

EU-DEEP

In January 2003 a large integrated European project started aimed at helping the large-scale integration of distributed energy resources in Europe. The project is known under the acronym EU-DEEP. The 39 project partners will design, develop and validate an innovative approach to identify promising business models based on market requirements, which will amplify, from 2010, the large scale penetration of distributed energy resources in Europe.

As part of workshop collect the knowledge that are success of and market



this project a was organised to existing on two subjects essential for the the project: grid integration; and local-trading strategies. The proceedings of this workshop including the discussions during and even after the meeting, are available on the website of the integrated project: www.eu-deep.com.

This website also gives further information on the project and on the project partners.

State Of Pennsylvania Includes Demand Side Management In Renewable Portfolio Standard

An Act passed December 14 2004 enables Electric City's Virtual 'Negawatt' Power Plan (VNPP®) to directly compete with wind, solar and fuel cell generation.

The Act requires electric distribution companies

and electric generation suppliers to sell a certain percentage of electricity to Pennsylvania electricity customers in the form of alternative energy sources. The Act will enable Electric City to develop multiple Virtual 'Negawatt' Power (VNPP) systems in Pennsylvania over the next several years.

The State of Pennsylvania becomes the first state in the nation to include Demand Side Management in its Renewable Portfolio Standard, thereby leveling the playing field between renewable generation such as wind, solar, geothermal, hydropower and fuel cells with Demand Response systems like Electric City's Virtual 'Negawatt' Power Plan (VNPP) system.

The Act became effective on February 28, 2005 and calls for at least 18% of the State's electricity to come from renewable sources within the next 15 years. Currently, seventeen other states have a Renewable Portfolio Standard, but none until now have included Demand Side Management as an alternative to traditional gas and coal power generation.

"This is a very important and significant development for Electric City" stated John Mitola, Electric City CEO. "Demand Response like our Virtual 'Negawatt' Power Plan is the cleanest

form of green technology because it reduces instead of produces - using no natural resources and does not disturb local environments in any manner. We have been very active in lobbying regulators and policy makers for Demand Response to be included in states' Renewable Portfolio Standards and are very happy to see Pennsylvania become the first to adopt this measure. We fully expect other states will pass similar standards to their Renewable Portfolios in the future."

The legislation opens the door for Electric City to work with Pennsylvania utilities to develop a VNPP system that will be able to supply 'Negawatts' or negative power into their energy market. Utilities buying these systems will now be able to recover invested capital directly from electricity consumers in the state. State utilities will now be able to choose Electric City's VNPP system that can be installed at the lowest capital cost for any traditional generation or renewable resource - thereby making VNPP the most competitive resource available to the market.

"Our ability to sell our VNPP offering to utilities in states who adopt these measures is greatly enhanced because of our significant cost advantage over other forms of renewable generation," added Anna Baluyot, Electric City's Vice President of Utility Development. "We are planning to actively work with Pennsylvania-based utilities in 2005 to begin development of large-scale VNPP projects and this legislation will greatly accelerate those efforts. We want our customers to know that we will be offering our VNPP system in Pennsylvania."

Electric City's system, called VNPP, will allow utilities like ComEd in Chicago, Xcel in Denver and PacifiCorp in Utah, to remotely control a wide range of commercial, industrial and government lighting systems over a managed and secure IP network. Through the use of the EnergySaver™/GlobalCommander® system, any participating utility will be able to reduce electric capacity requirements during periods of peak demand, providing instantaneous control, measurement and verification of load reduction.

The 50 MW system in Chicago and the 27 MW system in Utah represent two of the largest deployments of demand control technology in the nation and are expected to incorporate roughly 2,000 to 2,500 EnergySaver(TM) systems.

EERE Staff Appointments

Douglas Kaempfer is returning as programme manager for the Biomass Programme at DOE's Office of Energy Efficiency and Renewable Energy (EERE) Three people are taking on positions as acting programme managers: David Rodgers for the Industrial Technologies, Patricia Hoffman for the Federal Energy Management, and Deborah Haight for the Distributed Energy.

For more information about EERE, see www.eere.energy.gov.

About Electric City

Electric City® is a leading developer, manufacturer and integrator of energy savings technologies and building automation systems.

The Company currently markets the EnergySaver™, the GlobalCommander® and a full line of energy retrofit technologies, as well as its independent development of scalable, negative power systems under the trade name Virtual 'Negawatt' Power Plan "VNPP"®. The Company is developing its first VNPP® development - a 50-Megawatt negative power system for ComEd in Northern Illinois, a second system in the Denver area for Xcel Energy, an initial program in Ontario, Canada with Enersource and a 27-Megawatt fourth system with PacifiCorp in the St. Lake City area.

Electric City® is based in Elk Grove Village, Illinois and is traded on the American Stock Exchange under the symbol ELC. Additional information is available at the Company's website www.elccorp.com.



E21 Programme for 2005

Education & Awareness Raising

The production of DG Application Guides for:

- Diesel/Gas Engines
- Hydro integrated with Irrigation
- Geothermal
- Biomass
- CHP
- Solar
- Wind
- Energy from Waste

Supported with real case studies using mainstream currently available technology. Focusing on opportunities that exist on the demand side i.e. network companies and consumers and how these parties can develop value maximizing partnerships. Application guides will identify the range of opportunities, describe the commercial characteristics of the niche in which they exist, and provide a methodology for assessing opportunity size and value.

A range of case studies will be produced for each application to cover the range of opportunities e.g. a network example, a industrial example, community development.

The output will be a series of publications and the objective is to introduce DG into the business planning strategies of companies.

Industry Support

Regulatory Policy Input e.g. The VoLL Study for the Electricity Commission

Strengthen the consumer representation in industry development process.

Hold an E21 Symposium at the EEA Conference. This is to cover Energy Management Training and present the DG Application Guides and case studies completed.

Develop Regional Energy Strategies and Plans incorporating the knowledge gained above.

Research Programme

This project will identify each regions energy resources, supply issues and DG opportunities with regard to aggregate load presented to the national grid. The study will investigate each GXP building block by building block to develop an understanding of the total supply.

The objective is the identify the strongest DG opportunities in each region, analyse the quantity of each type of DG and the combination in which they can be optimally systems engineered/integrated at distribution network level.

Networking & Communication

Continue the development of E21 which is the communication through which the DG Programme is being delivered.

This includes this newsletter and DG website.

If you have any comment or query to make on this programme, we would like to hear from you. E-mail us at: energy21@caenz.com, or contact us by phone (03 364 2478) or fax (03 364 2069).



Published Articles

People and Energy - How do we Reduce Demand?

Comment by Royal Society Policy Analyst, Dr Jez Weston

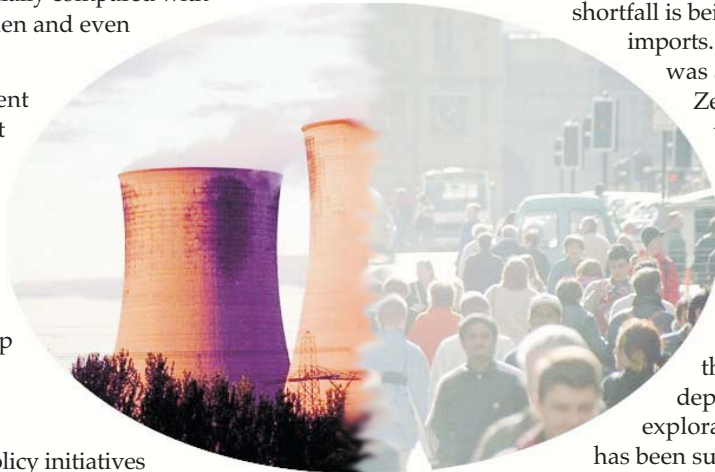
The United States is more efficient at using energy than New Zealand. Taking into account our respective GDPs, the U.S. uses less energy per unit of production than we do.

The government's Sustainable Energy discussion document proposes that supplying energy is only half of the issue, and only half of the solution. How we use energy, the demand side, is just as important. Energy efficiency has had a very low profile here, especially compared with the Canada, Sweden and even the UK.

We are so inefficient in energy use that it's going to be relatively easy for us to do better. We don't need any new technologies, we just need to take up solutions where technologies are already in use internationally. Policy initiatives in place include assistance to poor households to retrofit insulation. However, other countries use much stronger policies, such as high incentives for more efficient vehicles, subsidies for hybrids, much stricter building standards and requirements for the use of solar water heating.

As well as just efficiency, we need to look at how and when we decide what energy to use. If prices could change on an hourly basis to reflect both demand and supply issues, then we would have more incentives to use energy more carefully. Market reforms already allow pricing signals to influence the consumption of large industrial users. Domestically, this kind of smarter demand could be implemented through household hot water tank controllers that look at the price as it changes through the day, and turn off when the price reaches a certain level. This would let consumers control their energy costs and make more informed decisions about buying electricity.

EECA is targeting a 20% increase in energy efficiency over the next eight years and this would reduce our emissions, reduce the pressure on supply and save us money. Demand-side management should also play a big part in this. However, if our efficiency increases by 20% while the total size of our economy grows at 2.5% for the next eight years, then our total energy use remains the same. Pete Hodgson said last year that "many people think that if we really are to get serious about this it will mean cuts of 50 to 60 per cent [of energy use]." We've got a long



way to go.

Comment by Royal Society Policy Analyst, Dr Kathleen Logan

In New Zealand we are increasingly reliant on imported oil, which now makes up half of our total energy consumed. Most of this is used for transport, but the proportion of electricity produced from fossil fuel, rather than renewable energy sources, doubled from 1995 to 2003 (from approx 15% to 30%). Industrial electricity use is increasing about three times faster than domestic use (which is due mainly to population growth). So, we are definitely experiencing increased demand in electricity, and our supply shortfall is being made up by oil imports. The Maui gas field was a great New Zealand discovery that produced electricity reliably for the past 25 years, but if we are to maintain the relatively clean, gas-fired power stations then Maui's depletion means more exploration is needed. It has been suggested that we import liquid natural gas but we don't know the future cost of imported oil or gas; we only know that it can be very variable. It will never be as secure as a domestic source, so it seems prudent to reduce our reliance on imports to fire up our extra electricity demand.

The alternative ways to generate power include more wind power and more hydroelectric power. While hydroelectric generating capacity may be limited by available river valley systems, wind power in NZ is virtually unlimited. Currently, wind produces 0.5% of our energy. It could economically produce 23% of our electricity by 2015, according to a report by the Energy Efficiency and Conservation Authority. Those who say wind is unreliable should check the facts: power output is variable but predictable, both in the short term and seasonally. Hydroelectricity is unpredictable (seasonally) but controllable, so the two work in a wonderful harmony, with hydro being quickly available to compensate for low or excessive winds when wind farms shut off. Our electricity supply needs to be more secure with fewer greenhouse gas emissions and wind power fulfils both of these needs.

People and Energy - Our Future

Comment by Royal Society Policy Analyst, Dr Jez Weston

A naïve economic analysis should suggest that the real price of oil should rise over time as the most easily extractable reserves are used up. As

the price of oil increases, then a point will be reached when renewable energy sources become cheaper than oil and, by the magic of the market, we transition into a shining green future.

However, over the last 50 years, crude oil prices have been affected more by supply shocks than on the supposedly increasing marginal cost of production. It is not clear that the cost of production is rising at all. It may well be, as some commentators suggest, that our technical ability to find and extract oil is growing faster than our reserves are being exhausted. We can profitably extract oil from deeper, smaller, weaker and more difficult oil fields than ever before. Once we have extracted all the feasible crude oil reserves, there are many more sources of fossil fuels: oil shales, tar sands, methane ices beneath the ocean, each source potentially larger than crude oil. Currently they are too expensive, but their production costs have been falling and continue to fall as we learn more about using them.

Renewables too are coming down in cost. The price of wind power has dropped by 90% over the last 20 years and is still decreasing. However, the money being spent on research into making renewables cheaper is still tiny compared with the money being spent on research into making fossil fuels cheaper.

It's entirely possible that energy from renewable sources will always be more expensive to produce than energy from fossil fuels. In a responsible world, excess carbon dioxide emissions from burning fossil fuels would be the limiting factor on fossil-fuel use, rather than the cost of production. We are starting this, with carbon taxes beginning in many countries around the world including New Zealand. However, despite the rigorous scientific evidence available to justify big changes, change is happening very slowly.

A Step Towards National Security

"Distributed generation" -- the use of smaller, regional or local electricity generating facilities as an adjunct to major, centralised plants -- offers the potential to relieve some of the energy vulnerabilities North America and Europe face in this era of terrorism and politically unstable oil producers.

ABI Research's study, "Distributed Generation" explores the technological issues involved, and explains the business and regulatory landscape in the DG sector. It analyses markets by technology, and contains regional forecasts.

Distributed generation won't fix the problems faced by countries with aged and outdated electrical distribution systems, but it will help to reduce risks in a number of ways.

Consider the bluntest threat: a direct attack on a major regional power generation or distribution facility. Given the resulting chaos, we can assume that the grid would be out of action for quite some time. The resulting cost of lost production could be incalculable not to mention the social upheaval.

The United States consumes an estimated 2.5 million barrels of oil daily, and the price of it continues to rise. Since distributed generation can use a variety of energy sources, it can also be seen as reducing dependence on imported oil from volatile regions.

Those energy sources are also part of DG's longer-term rationale: it helps incorporate renewable and alternative energy sources into the mainstream economy, gradually and at moderate cost. Solar, wind, gas microturbines and fuel cells can all make a contribution, packaged to match location, available fuel sources, and economic considerations.

Founded in 1990 and headquartered in New York, ABI Research maintains global operations that support annual research programs, quarterly intelligence services and market reports in wireless, automotive, semiconductors, broadband, and energy. Its market research products can be found on the web at www.abiresearch.com.

Focus On New Home Construction Key to Onsite Residential Power Systems Market Expansion

North American households' increasing dependence on electrical and electronic devices in daily routines has made the supply of uninterrupted and good quality power a necessity.

Onsite residential power systems are gaining in popularity as reliable alternatives to utility power due to increased support from the government as well as growing instances of power outages. Most builders are standardizing the use of onsite power systems in the construction of new homes, propelling growth.

New analysis from Frost & Sullivan (www.energy.frost.com), North American Onsite Residential Power Systems Markets, reveals that revenue in this market totaled \$458.1 million in 2004 and projects to reach \$949.7 million in 2011.

If you are interested in an analysis which provides manufacturers, end users, and other industry participants with an overview, summary, challenges, and latest coverage of the North American Onsite Residential Power Systems Markets -- then send an e-mail to Natalie Benavides -- North American Corporate Communications at natalie.benavides@frost.com with the following information: Full name, Company Name, Title, Contact Tel Number, Contact Fax Number, E-mail. Upon receipt of the above information, an overview will be e-mailed to you.

"The spotlight of the onsite residential power market is moving from the retrofit market to the new home construction sector, persuading participants to choose one or focus on both," explains Frost & Sullivan Research Director Roberto Torres. "Each category would require a unique marketing strategy to effectively capture the relevant markets."

For the new home construction market,

manufacturers need to forge partnerships with homebuilders, providing evidence of demand for onsite power and explaining its benefits and how onsite power could give the builder a competitive advantage over rival developers. For instance, large savings on utility bills and contributions to a green environment are obvious selling points in the case of photovoltaics, whereas security, peace of mind, and convenience are key selling points for generator sets for emergency power.

However, there are many factors working in favor of utilities. A forthcoming energy bill passing is expected to increase investment in the transmission grid and improve the quality of utility-supplied power. Efforts are also on to upgrade and expand the network through flexible alternating current (AC) transmission technologies, superconducting cables, and next-generation grid-control and operation systems.

“The expected price decline for natural gas and oil and breakthroughs in clean coal technology bode well for utilities,” notes Torres. “Utilities might be able to fulfill all end-user demands at lower costs as soon as they add more solar and wind energy to the generation mix by means of renewable portfolio standards.”

To overcome the threat posed by utility supplied power, participants in the onsite backup power market need to work toward reducing the cost of units. Most onsite residential power systems are considered expensive options.

The centralized power system is under threat from market forces, technical innovations, and regulatory trends, offering onsite power systems a chance to gain a foothold in the market. Moreover, the high costs of utility power in certain states, such as California, are propelling homeowners to seek alternative power sources.

Market participants must work toward improved onsite residential systems power quality. Homeowners are increasingly reliant on power-fueled equipment such as computers and other similar devices and power from onsite systems is not of the same quality as utility power. This could negate the benefits of backup power, zero fuel costs, and no utility bills.

“Research and development must focus not just on lower cost designs but also on system performance in terms of voltage sags and swells, flicker, harmonics, and DC power components,” observes Torres. “The problem is more complicated with grid-interconnected systems, where disturbances on the power grid can impact the home power system. Participants must also solve the problem of balance of system components such as inverters.”

North American Onsite Residential Power Systems Markets, part of the Power Generation Equipment and Services Subscription, examines the various segments of the residential power systems market – generator set-based systems, photovoltaics-based systems, emerging technology-based systems, and continuous power

and backup power applications. The research service also looks at market drivers and industry challenges. Executive summaries and analyst interviews are available to the press.

Frost & Sullivan, a global growth consulting company founded in 1961, partners with clients to create value through innovative growth strategies. The foundation of this partnership approach is our Growth Partnership Services platform, whereby we provide industry research, marketing strategies, consulting and training to our clients to help grow their business. A key benefit that Frost & Sullivan brings to its clients is a global perspective on a broad range of industries, markets, technologies, econometrics, and demographics. With a client list that includes Global 1000 companies, emerging companies, as well as the investment community, Frost & Sullivan has evolved into one of the premier growth consulting companies in the world. For more information please visit www.frost.com

Source: Frost and Sullivan

Clear Policy Objectives Required

Pre-privatisation, New Zealand operated an implicit energy policy towards electricity generation based on the twin pillars of hydro with some geothermal, supported by coal (Huntley) and natural gas (New Plymouth). Most other western countries operated similarly. In the UK for example, the twin pillars were indigenous coal with a substantial element of nuclear. Stations were brought onto, and taken off line according to a strict merit order of operating costs.

Privatisation in both countries swept away the old energy policy assumptions, without resolving the central issue of the appropriate role of government in a liberalised market. Was electricity to be treated as just another product, like baked beans, whose availability and price is subject to market forces (if supply is plentiful prices are low; if supply is scarce prices are high), or is a dependable electricity supply so inextricably linked to quality of life and national survival that government direction is simply unavoidable?

Is New Zealand moving towards a solution with the Electricity Commission to provide advice to the government of the day? Has the UK got the answer in its Office of Gas and Electricity Markets (OFGEM) and the newly launched Institute of Energy Research and Policy at Birmingham University? Either way, it is now clear that the unfettered hand of market forces cannot be guaranteed to deliver a safe and secure supply of electricity at all times.

As Professor Sterling, vice-chancellor of Birmingham, said: “We want to provide the definitive voice (for the industry) based on facts and not spin.”

Activity Notices

Ofgem

UK's Ofgem has published the following documents recently:

- 170/04 GB Consultation for Connection and Use of System Code (CUSC) Amendment Proposal CAP070
- 173/04 BETTA consultation on draft licence condition to implement a proposed interim charging measure for small, transmission connected generators
- 183/04 Structure of Electricity Distribution Charges: Open letter consultation on DNO draft charging methodologies for demand customers and generators (The purpose of this document is to seek views from suppliers, generators and other interested parties on the development of the DNO charging methodologies.)
- 186/04 Transmission charging related conditions and the requirement to offer terms – arrangements under BETTA. An Ofgem/DTI conclusions document
- 217 /04 Security of supply, October 2003 to March 2004: six month retrospective report
- 224a /04 Planning and operating standards under British Electricity Trading and Transmission Arrangements: Volume 1
- 224b/04 Planning and operating standards under BETTA: Volume 2
- 07/05 Grid Code Changes to Incorporate New Generation Technologies and DC Inter-connectors (Generic Provisions)

To access Ofgem documents, go to www.ofgem.gov.uk.

IEA

The International Energy Agency (IEA) has published the following documents recently:

- Newsletter of the IEA DSM Task XIII Project, Volume 1, Issue 2
- Newsletter of the IEA DSM Task XIII Project, Volume 1, Issue 3
- Newsletter of the IEA DSM Task XV Project - Network-Driven DSM, #1
- *Spotlight*, newsletter of the IEA DSM Programme, August 2004.

To access IEA documents, go to www.iea.org

Energy Policy Poll

A recent poll on www.stuff.co.nz asked the question "Come election day, how important will a party's energy policies be to you?"

The results shown in the graph indicate that two-thirds of respondents rate energy policy to be an important issue.



Events Calendar

Distribution Europe 2005: New Solutions for European Energy Grids, 26-28 April, Berlin

Distribution Europe is a forum that identifies, discusses and forecasts developments in the industry. Top-level speakers from key industry segments will present their views using case studies, in-depth sessions and interactive panels. Registration details and further information can be found at www.synergy-events.com and the conference brochure can be downloaded from www.distribution-europe.com.

Implementing New Zealand's Distributed Generation Options, 16 June, Sky City Convention Centre, Auckland

CAE Symposium held prior to the EEA Annual Conference and Trade Exhibition, *Implementing New Zealand's Energy Options* (17-18 June).

More information will be posted on the CAE website (see the link under 'Seminars/Workshops').

2nd International Conference, Power Electronics, Distributed & Co-Generation, 27 – 29 June, Detroit, Michigan

This three-day international conference will serve an audience of decision makers who are interested in learning about and contributing to the latest commercial advancements and anticipated future developments related to power electronics for DCG systems. More information can be found at <http://pedac.darnell.com/pedac/> or on the State of Michigan website (www.michigan.gov/mpsc)

Postscript

Parliamentary Commissioner for the Environment

"Providing ever more [electricity] to deliver qualities of life is not a sustainable option. In energy, investment in megawatts (electricity savings) is clearly more cost effective and environmentally sustainable than generating more megawatts"

Dr J. Morgan Williams
pce@pce.govt.nz

Dr Williams has urged the Electricity Commission to widen its grounds for deciding whether Transpower's controversial high-voltage power line from Waikato to Auckland is the best option for meeting Aucklanders' energy needs. Transpower received 21 submissions on a consultation paper about its criteria for making a decision on the \$500 million line.

Dr Williams wrote to the commission saying problems could arise from a narrow market-based assessment of the economic benefits, and that an analysis of the costs of transmission to the wider economy would be incomplete. The criteria could also hinder the uptake of alternatives to transmission, and a threshold test which requires that only projects valued at more than \$1 million be considered could exclude small cost-effective projects and put up a barrier to emerging players. Dr Williams' letter, which was reported in the *NZ Herald*, can be found at:
www.electricitycommission.govt.nz/develop/retail/submissions-received.html.

Electricity Commission assessed

New Zealanders will know early this year whether the Electricity Commission is on the right track in exercising the wide powers it has been given under the 2002 Electricity Act.

The commission was set up in March last year after the electricity industry's failure to self regulate. The PCE is looking at the commission's role within the big energy picture, and running the rule over the first four months of its operation with a report due at Parliament by March 2005.

The report will assess how well the commission's rules, data collection, advisory group structures and personnel, and its relationships to other organisations measure up against the government's environmental policies.

Scorecard

An annual 'sustainability scorecard' would be one way of measuring our progress towards becoming a sustainable nation, says Environment Commissioner Dr Williams. The idea is raised in his vision for a sustainable New Zealand outlined in a two-page opinion piece in the Nov-Dec 2004 *New Zealand Geographic* magazine.

Today we measure our progress almost totally by economic indicators, with the occasional Olympic or World Cup sporting index thrown in, he says.

In a future that honours sustainable values, a 'sustainability scorecard' listing 20 key social, economic, environmental, and cultural measures 'would attract more attention from politicians and stockmarkets than the Reserve Bank's interest rate pronouncements'.

If you want more info (and other items) please visit www.pce.govt.nz/news/pce_news.shtml for the latest news from the Parliamentary Commissioner for the Environment.

WADE - Changing the way the world makes electricity

As one of the fastest growing economies in the world, China has maintained an annual growth rate of over 7% in the past decade whilst its electricity demand has also experienced an unprecedented growth of 10% per year in the same period.

WADE (World Alliance for Decentralised Energy) and its partner in China, the Cogeneration Study Committee of the Chinese Society of Electrical Engineers (CSCC), believe that DE can meet electricity demand at lower overall cost as well as with a smaller environmental impact than central generation (CG) and set out to test this view for China with the help of The Renewable Energy and Energy Efficiency Partnership (REEEP) and The Foreign and Commonwealth Office, UK.

WADE has just published the findings of an extensive modelling exercise with the WADE Economic Model. This can be downloaded from: www.localpower.org/pdf/WADE_Model_China_report.pdf.

The analysis confirms the view that DE can meet demand growth at lower cost than central generation due to its reduced requirement for T&D. This aspect is particularly noticeable in China, where T&D costs are relatively high due to the country's size. Combining this factor with DE generation's lower fuel consumption offers the prospect of cost-effectively reducing CO₂ emissions in China.

For more information, please contact us at info@localpower.org or visit our website at www.localpower.org.

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