



# Clean Energy Outlook™

News, Analysis, and Perspectives on the Clean Energy Business

North American Edition

November, 2003

## Analysis: U.S. Energy Bill Mired in Debate

As we go to press this month, the Energy Bill is mired in debate over several contentious issues, with tax subsidies for ethanol being the latest obstacle. The clean energy provisions in the latest draft version are outlined in the Legislative & Regulatory Roundup. Most of the proposed tax credits for clean energy survived the latest round of drafting of tax code provisions. We have suggested for several months now that the renewable portfolio standard proposed in the Senate-passed bill would be a long shot for passage. Unfortunately, the RPS appears completely off the table at

this point. Nevertheless, in our judgment the current draft does provide significant incentives

that will accelerate the pace of development of wind, solar, biomass, and fuel cell projects. In question at the moment, however, is the fate of the entire bill.

### **CEO 5-Second Summary**

- ▶ U.S. Energy Bill still up in the air; Clean energy tax credits in latest draft
- ▶ Wind projects/proposals continue at fevered pitch
- ▶ Quiet month for new funding solicitations
- ▶ CEO Stock Index rises again, up 9.6%

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## CEO Special Topic: The Houston-Galveston NOx Market: A Case Study in Regional Emissions Trading

Amid increasing restrictions on air emissions, industrial facilities and electric utilities are spending a great deal of effort to develop long-term strategies that ensure emissions compliance and minimize compliance costs. Emissions allowance trading often plays a major role in these plans. The Houston-

***The HGA NOx market also provides opportunities for deployment of advanced clean energy technologies. Determining the environmental value of these technologies is no longer a guessing game - their economic viability can be measured against the established market value of emissions reduction.***

Galveston Area (HGA) nitrogen oxide (NOx) trading program has become a focal point for analyzing the role such market-based mechanisms can play in achieving regional emissions compliance.

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## Industry News



### Wind Industry Proposes Major Transmission Expansion

The American Wind Energy Association (AWEA) has released a proposal it believes would alleviate transmission bottlenecks that currently stand as obstacles to long-term development of wind power. The plan involves construction of two major electric transmission "pipelines" - one carrying power from wind farms in the Dakotas to Chicago, Milwaukee, and St. Louis; and the other from Montana and Wyoming to Denver, Salt Lake City, Seattle, and Portland.

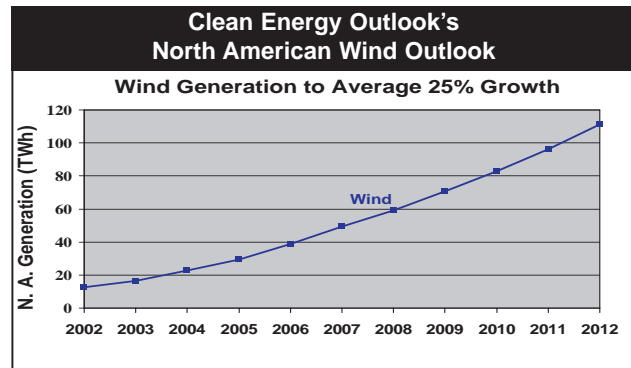
The AWEA proposes a phased approach:

| Transmission "Pipeline" Proposal |   |                   |                                 |
|----------------------------------|---|-------------------|---------------------------------|
|                                  | Scope   | Estimated Cost    | Estimated Wind Capacity Enabled |
| Phase I                          | Tariff Reform   | \$0               | 4,000 MW                        |
| Phase II                         | New local transmission upgrades   | ~ \$1.0 billion   | ~ 26,000 MW                     |
| Phase III                        | Two new high-voltage lines connecting northern plains to East and West population centers | ~ \$10-20 billion | 30,000 - 60,000 MW              |

Source: American Wind Energy Association

The rationale for the proposal is that it would act as a mechanism to hedge the nation's reliance on natural gas, enhance overall reliability of the electric system, and provide economic development and jobs in the affected regions. Wind industry advocates estimate the new lines would spur substantial increases in wind project development, bringing wind into the "mainstream" of power generation. Key questions such as who will build the lines and who would pay for them must be addressed before the proposal can be implemented.

As shown in the graph, *CEO's* long-term outlook (published in the August 2003 edition) calls for wind generation to grow at an annual rate of approximately 25% over the next ten years - from 4,600 megawatts in 2002 to 35,000 megawatts in 2012. This forecast is predicated on signifi-



cant investments in transmission upgrades to facilitate moving power from the isolated areas where some of the best wind resources are located to metropolitan areas where the demand exists. The proposed transmission corridors would go a long way toward alleviating constraints in the upper Midwest and open up power hungry markets for wind energy. Already, however, some opposition to the proposal has arisen on the basis of cost-benefit economics - i.e. that the cost will ultimately be paid by ratepayers and is not justified for an intermittent generation source. *CEO* expects the debate will go on for some time, but ultimately lead to a transmission expansion plan that maximizes delivery capacity for both wind and conventional sources.

### Wind Turbines To Receive Capacity Credits

The PJM Interconnection has adopted rules to allow wind power to compete on an equal basis with more traditional electric generators. Wind generators will now be eligible to receive capacity credits based on actual historical performance of a particular facility - a 3-year rolling average of a unit's output during PJM peak periods. A

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**Industry News** (continued from p. 2)

"class average" will serve as a proxy for those units less than three years old.

**AEP Envisions "Zero Emission" Coal Plant**

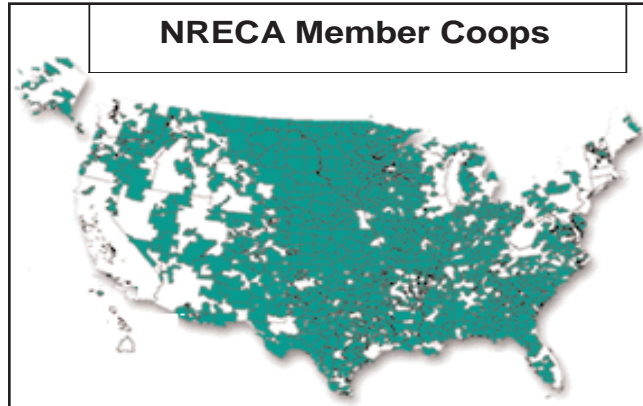
Columbus, Ohio based American Electric Power Co. (AEP) has announced its intention to not build any more "conventional" coal-fired power plants. Dale Heydlauff, Sr. Vice President for Environmental Affairs, made the announcement at the West Virginia Environmental Institute's annual Conference on the Environment. Heydlauff indicated the company "is convinced that coal is going to stay in the energy picture." AEP's plan is to invest in the FutureGen project proposed by the Bush Administration. Under the program, approximately \$1 billion in public and private funds would go toward development of a zero-emissions coal-fired power plant. The plant would achieve its zero emissions through a combination of pollution controls and injecting carbon dioxide into an underground storage area. The FutureGen program was announced by the U.S. Department of Energy in February 2003. Basic elements of the program are described in the accompanying table.

| U.S. DoE Proposed FutureGen Program |   |
|-------------------------------------|---|
| Goal                                | Produce electricity and hydrogen from coal with virtually no emissions of pollutants or greenhouse gases and at an economically viable cost   |
| Participants                        | U.S. Department of Energy; major coal producers; electric utilities; advanced technology companies  |
| Estimated Program Cost              | \$1.0 billion (20% cost share from industry participants)   |
| Prototype Plant Size                | 275 MW  |
| Timetable                           | 10 years  |
| Technologies Employed               | Integrated Gasification Combined Cycles (IGCC); CO2 sequestration; fuel cells; membrane separation; hydrogen turbines; and advanced gasifiers |

**USDA to Team with Electric Coops on Clean Energy**

The U.S. Department of Agriculture (USDA) has signed an agreement with the National Rural Electric Cooperative Association (NRECA) to promote the deployment of clean energy and energy efficiency in rural areas. Under the memorandum of understanding, the parties will work jointly to remove technical and market barriers, conduct research, develop standards, and identify cost-effective opportunities to reduce greenhouse gases. The agreement

includes - but is not limited to - the use of biomass co-fired power plants, biomass gasification, animal waste-to-energy projects, landfill methane power, wind, and solar energy.



**Market & Company Briefs**

Clean Energy Markets

**FPL Commits to Reduce GHG Emissions...** FPL announced it will voluntarily reduce greenhouse gas emissions per unit of electricity produced by 18% by 2008.

**Group Forms to Promote Green Power in West...** Participants in the recent Western States Renewable Energy Summit have formed a non-profit group to promote deployment of clean energy in western states.

**Wisconsin Coal Plants Approved...** State regulators approved Wisconsin Energy Corp's request to construct two 600-MW coal-fired power plants at a cost of \$2.15 billion. A third proposed coal-to-syngas plant was deemed by the regulators as too costly.

**NREL / DuPont to Build "Biorefinery"...** The U.S. National Renewable Energy Laboratory and DuPont will invest \$7.7 million to develop the world's first such facility that uses the entire corn plant to produce ethanol, electricity, and advanced polymers.

**SoCal Edison Receives Renewable Power Proposals...** The company is reviewing 45 proposals totaling 5,000 MW submitted in response to its recent solicitation. Proposed sources include biomass, small hydro, and solar projects.

Wind

**Texas Opens State Lands for Wind Leases...** The sealed bid lease sale will commence in April 2004. More info at [www.glo.state.tx.us/wind](http://www.glo.state.tx.us/wind)

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## Market & Company Briefs (continued from p. 3)

**PPM and Shell Announce 162-MW Project...** The Colorado Green Wind Project was developed by GE Wind and scheduled for completion by the end of 2003. PPM and Shell, each 50% owners, plan to sell power to Xcel Energy under a long-term contract.

**PPM and Seawest Announce 22.2-MW Project...** The companies will jointly develop the Mountain View II project near Palm Springs using 660-kW Vestas turbines. Power will be sold to a CA utility under a 15-year contract.

**FPL Announces Dakota Projects...** The 40-MW North Dakota I and South Dakota I Wind Energy Centers came on-line in early Oct; 27-MW North Dakota II in late Oct.

**FPL to Acquire Enron Wind Assets...** The company will pay \$80 MM for a total of 130-MW in wind farm projects.

**New Mexico Wind Farm On-Line...** FPL's 204-MW New Mexico Wind Center is now delivering power to Public Service of New Mexico. Salt River Project has signed a 5-yr deal with PSNM for 61,600 MWh of electricity per yr.

**First Oklahoma Wind Farm On-Line...** FPL's 102-MW Oklahoma Wind Energy Center is producing power for delivery to Oklahoma Gas & Electric.

### Solar

**World's Largest University Solar Power System...** Slated for California State University in Hayward, the \$7.11 million, 1.05-MW system built by PowerLight Corp will provide 30% of the campus' peak demands.

**Shell Expands PV Production...** Shell Solar has opened a second manufacturing line at its facility in Germany, bringing annual output capacity to 25 MW. The new line will produce advanced poly-crystalline cells with an efficiency

of 15%. Shell's total investment in the facility which opened four years ago totals \$34 million.

**Sharp Solar Opens Plant in Memphis...** The plant is the company's first solar panel manufacturing facility outside Japan and has a capacity of 20 MW per year.

**BP Solar Unveils Newest Module...** The company's BP 3125 multicrystalline cell features the IntegraBus technology designed to achieve high reliability and high output.

**Lowe's Installs 370-kW Solar System...** The system installed at its West Hills, CA store is the largest solar power system at a U.S. retail store.

### Biomass

**New Hampshire coal plant to be converted to wood-fired unit...** Public Service of NH plans to replace the 50-MW Schiller Station in Portsmouth with a high-efficiency wood-fired boiler at a cost of \$70 million. PSNH expects to recoup the investment from proceeds from the sale of renewable energy credits in CN and/or MA REC markets.

### Hydrogen / Fuel Cells

**Study Says Fuel Cell Investment Yields Jobs...** The Breakthrough Technologies Institute issued the study which projects 200,000 new jobs in the next 20 years and concludes government investment is critical. (Study can be downloaded at [www.fuelcells.org](http://www.fuelcells.org))

**Fuel Cell Installed at Starwood Hotel...** FuelCell Energy and its distribution partner PPL Energy Plus announced installation of a 250-kW fuel cell at the Sheraton hotel in Parsippany, NJ. PPL will own, operate, and maintain the plant and hopes to install similar units in other hotels.


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## U.S. Energy Bill Mired in Debate

(cont'd from p. 1)

Also on the public policy front this month, the U.S. Senate defeated a proposal to create a regulatory framework around greenhouse gas emissions. The Federal Energy Regulatory Commission also took up the issue of ownership of renewable energy credits in a recent ruling. We predict we will be hearing much more on both of these topics in coming months.

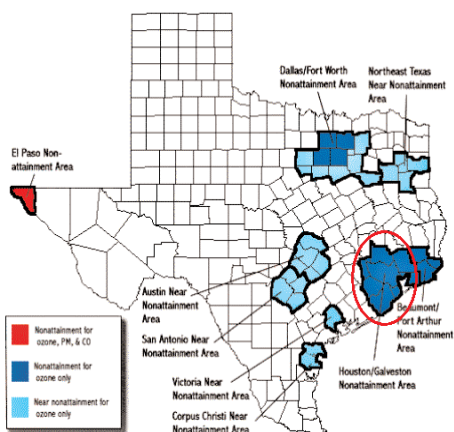
Wind dominated the industry news again this month: new projects totaling 291 MW; a \$20 billion proposal for transmission of wind power; capacity credits for wind in the PJM system; and opening of state lands to wind in Texas. We expect this level of activity will continue as wind power transitions to a "mainstream" generation technology. One critical wild card is passage of the Energy Bill that extends the 1.8¢ /kWh production tax credit on which the economics of most wind projects currently hinge. 

## The Houston-Galveston NOx Market (continued from p. 1)

### Background

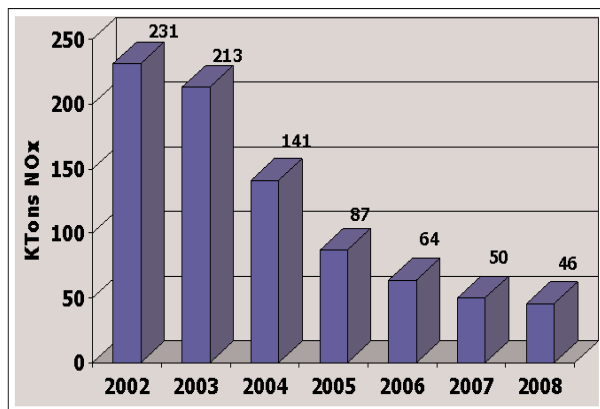
The HGA "Mass Emission Cap & Trade" (MECT) program commenced operation in January 2002. The HGA encompasses eight counties along the Gulf Coast (circled in red on the map). The goal of the program is to

### Texas Non-Attainment Zones



facilitate the efficient reduction of the area's NOx emissions to levels required to come into compliance with the federal Clean Air Act by the end of 2007. To achieve compliance, aggregate NOx emissions must be reduced by approximately **80%** from actual 2002 levels (see chart below). The Texas Commission on Environmental Quality administers the program.

### HGA MECT Program Allowances *Aggregate Annual NOx Caps*



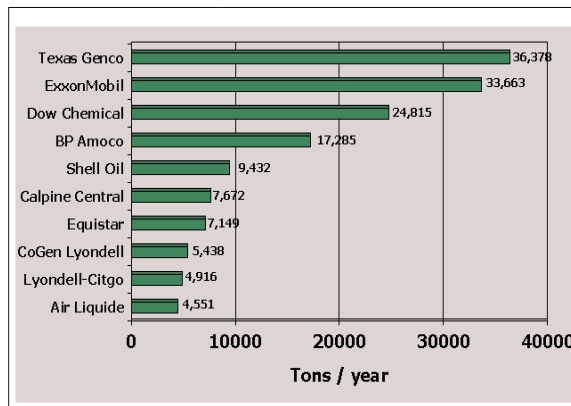
### Basic Mechanics

Patterned after the U.S. EPA's emissions trading platforms for SO<sub>2</sub> and NO<sub>x</sub>, the MECT program provides for an initial allocation of NO<sub>x</sub> emission allowances for major stationary sources within the eight-county HGA region. A single allowance is equivalent to 1 ton of NO<sub>x</sub> for a given year (vintage). Streams of multi-year vintages also trade as a discrete commodity. Facilities within the region are required to achieve predetermined reductions in NO<sub>x</sub> emissions in each year of the program. Allowances can be combined with actual reductions to achieve compliance in a given year. Facilities that achieve "over-compliance" can sell their allowances on the open market; those falling short, can buy allowances to make up the shortfall.

### The Players

The HGA market is comprised of more than 300 "naturals" - that is, owners of facilities that are allocated allowances and subject to the emissions caps. In addition, there are approximately 20 brokers that facilitate trades and an estimated 5-10 speculators that take positions in the market. At this point, traditional traders have not been attracted to the HGA market, presumably due to the relatively low transaction volume. As indicated on the graph, a small number of companies control a majority of allocated allowances.

### Largest NOx Generators in HGA *Four Companies Account for 53%*



### Trading to Date

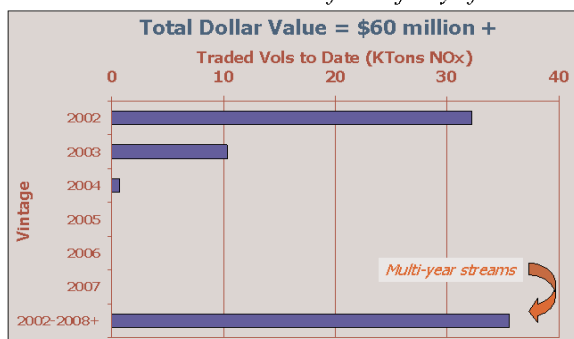
Allowances valued at more than \$60 million have traded since inception of the program. As indicated on the graph, the majority of these

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## The Houston-Galveston NOx Market (continued from p. 5)

trades have involved multi-year streams. Streams have traded across a wide range of prices of approximately \$30,000 - \$60,000 per ton per year, with current market prices hovering in the \$50,000 range. Trading volume is relatively low, with an average of 9-10 transactions per month thus far in 2003.

### HGA MECT Program: Trading Stats *Multi-Yr Streams Account for Majority of Volume*



### Commercial Implications


The most obvious commercial implication of the HGA emissions market is in the development of comprehensive emissions reduction strategies by companies with affected facilities. These companies now have a transparent market signal against which to evaluate the cost-effectiveness of installing emissions reduction measures. The market also allows companies to optimize emissions reduction from an aggregate "company" level instead of taking a source-by-source approach. A number of companies are taking a measured and deliberate approach to develop long-term compliance strategies that incorporate a mix of allowance trading, capital investment in control technologies, and modifications to facility operations. For example, Dow Chemical reports to have developed a plan covering its HGA facilities that will save the company an estimated \$60 million versus costs that would otherwise be incurred under a "command and control" approach.

The HGA NOx market also provides opportunities for deployment of advanced clean energy technologies. Determining the environmental value of these technologies is no longer a guessing game - their economic viability can be measured against the established market value of emissions reduction. Technologies such as fuel cells may now have a mechanism to monetize their

intrinsic emissions characteristics. For example, a fuel cell supplying electricity and heat in a baseload application would have an economic advantage over a simple cycle gas turbine of approximately \$550 per kilowatt based solely on the current market price per ton of NOx reduction.

### The Future?

The prescribed level of allowed NOx emissions in the HGA declines precipitously over the next four years - a more rapid decline than has ever been regionally imposed anywhere in the United States. Against the backdrop of these stringent requirements, CEO believes the marginal cost of achieving incremental reductions at many facilities could become very expensive indeed. A likely scenario in coming months is one of increasingly tight supplies and upward pressure on allowance prices, particularly if there is an up-tick in overall economic activity.

Irrespective of the future direction of prices, it is clear the HGA MECT program is providing an important market mechanism that will minimize the overall cost of emissions compliance. 

*The information in this article is a brief synopsis extracted from a recent report by Strategic Clean Energy. All details and data presented here are deemed to be non-proprietary and publicly available.*

*The actual study encompassed a much wider breadth and more in-depth look at the HGA emissions markets along with their relationship to potential monetary valuations of clean energy technologies and the methods on how to capture such value.*

*Strategic Clean Energy, publishers of **Clean Energy Outlook**, is currently available for other engagements concerning monetary valuations, market analyses, and general due diligence for all clean energy technologies / projects.*

*Please call Malcolm Jacobson at 281-356-4043 or David Glover at 281-292-9329 for more information.*

## CEO Spotlight: Energy Efficiency & Demand Response Programs Have Utilities and End Users Seeing Green

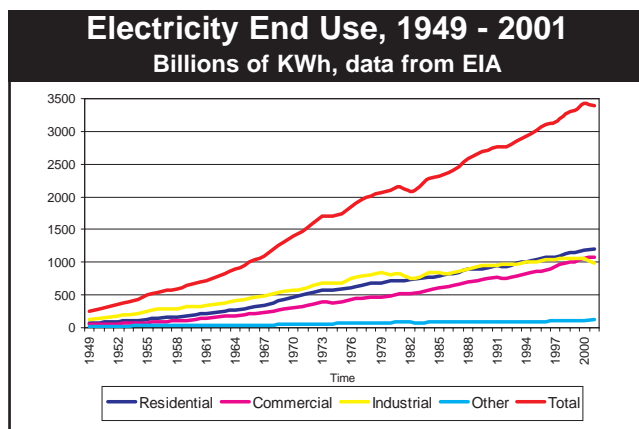
by John P. Mitola, Electric City

There is no argument that the "greenest" megawatt is the one not produced. Despite the monumental strides that are being made in the development and acceptance of clean power generation technologies, we are still many years away from the day that they account for the lion's share of electric power generation. In the meantime, each megawatt produced by traditional generation methods will have a negative environmental impact. It is in everyone's best interest to fulfill electricity demand with the fewest megawatts possible and reduce our nation's dependence upon foreign oil and its associated economic and environmental costs.

***There is no argument that the "greenest" megawatt is the one not produced.***

### Load Growing But Aging Infrastructure is Limited

Electricity load has grown significantly and the growth rate continues to accelerate. Total electricity usage grew from approximately 2.0 terawatt-hours in 1978 to 3.4 terawatt-hours in 2001 (see graph). Further, the Energy Information Administration projects that electricity use will increase an additional 22 percent by 2010.



Increasing electric power demand, coupled with a decreased focus on energy efficiency and conservation, has created added pressure to an aging transmission and distribution (T&D) infrastructure and has made it more vulnerable to failure, particularly during peak demand periods.

While load growth has been increasing rapidly, investments in the 70-year-old infrastructure have not kept pace. Lagging additions to the transmission infrastructure are not only due to a changing risk profile of the investment (in an era of deregulation), but these investments are also made increasingly difficult due to NIMBY (Not in My Back Yard) groups that often block transmission additions. No matter how electricity is generated, T&D grid limitations will be an ongoing concern until the infrastructure is overhauled.

### Demand Side Management Innovations

With the advent of new technology, it is time for the electric power industry and "green" energy advocates to recognize and embrace the vital role that demand side management, particularly energy efficiency and demand response programs, can and should play in preserving our environment while enhancing system reliability.

Demand Side Management - particularly new demand response technologies that are reliable, measurable, competitive, transparent to end-users and fully-dispatchable to a utility - is the quickest, most cost-effective and

reliable way to reduce our dependence on nuclear and fossil fuels and relieve pressure on our aging electrical infrastructure.

Very recent technological advancements have enabled the creation of new demand response and energy efficiency systems that meet all these criteria. Previously, a key drawback was that demand response programs were not able to dump large-scale, aggregated loads immediately and reliably. Additionally, electric energy savings and load reductions could not actually be measured by metering and had to be estimated. Verification was very difficult and time consuming. This history has led to deep suspicion of demand response on the part of utility and ISO operators.

Now, computer network-enabled automation and measurement allows various elements of electrical systems in facilities to be controlled and monitored remotely with the click of a mouse for measurable and verifiable steady state savings, as well as immediate, measurable and guaranteed load shed during peak demand periods.

One such technology that is being successfully implemented is Electric City's Virtual "Negawatt" Power Plan (VNPP®) which utilizes the proprietary EnergySaver™ and GlobalCommander® to effectively reduce demand and overcome the drawbacks of earlier demand-response systems. Electric City's first VNPP 50-megawatt deployment with Commonwealth Edison represents one of North America's largest and most cost-effective demand response programs. The EnergySaver™ is a lighting control, power reduction system that provides variable base load demand-side energy management. The EnergySaver increases or decreases the active power supplied to a ballasted lighting system without abrupt voltage changes or perceptible lighting degradation. It allows end

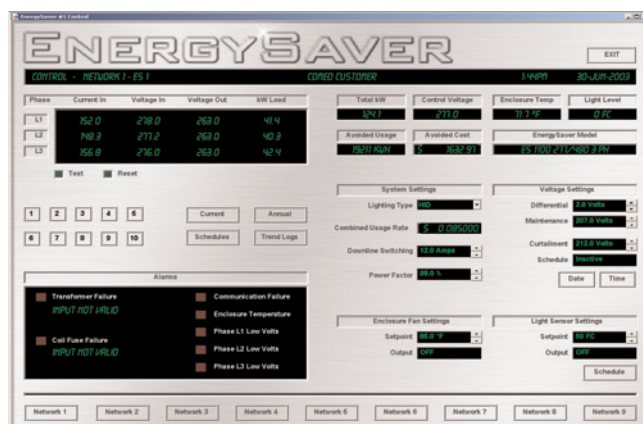
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## Energy Efficiency & Demand Response Programs (continued from p. 7)

users to curtail power to their lighting systems by as much as 30%, to provide steady-state energy savings, as well as real-time peak demand load control.

The GlobalCommander provides the EnergySaver with multiple communication capabilities and accurate micro-processor based "Measurement & Verification," on a real-time basis. It provides the ability to respond to market information by changing control set points, activating start/stop schedules, and altering other operating parameters to take full advantage of market rates and peak load conditions.



The VNPP system produces "Negawatts" in lieu of megawatts at a cost that is significantly lower than the wholesale cost of power. It enables utilities or Electric City to remotely control commercial, industrial and government lighting systems over a managed and secure IP network to reduce electric capacity requirements during peak demand periods, providing instantaneous control, measurement and verification of large-scale load reduction that is completely transparent to end users.

The result is "Green" for all involved:

- The technology effectively reduces the need to produce additional electricity. Remember, the greenest megawatt is the one not produced! and,
- It allows participants to enjoy more "greenbacks" from reduced electric bills.

### Incentives for Demand Side Management

Many DSM programs are viewed as resources because they capture cost-effective energy savings that would not otherwise be achieved. However, there is no legislative language that recognizes demand response or energy efficiency as a renewable resource - yet.


Demand response and energy efficiency programs are truly renewable resources, and should be recognized as such by

industry and government, particularly in light of the existing regulatory pressures regarding green energy. Given their ability to reduce the demand for additional electrical generation, demand-response and energy efficiency should be on equal footing with other renewable energy generation resources when it comes to funding, investment tax credits and accelerated depreciation.

To encourage adoption, demand response systems should be able to trade head-to-head against supply and be on an equal footing against wholesale supply prices. This would have a two-fold effect.

First, it would encourage end users to participate in the reduction of peak-period demand, possibly avoiding the need to build or use additional peaker power plants. There has always been a disconnect between the wholesale price of electricity and the retail price. If end users were hit with the real cost of peak period energy, they would be much more open to utilizing demand response systems to reduce peak period demand.

Secondly, the advanced demand response technologies that enable guaranteed, aggregated load shed would allow participants to take aggregated load reduction and trade it into the market - if no utility-sponsored program exists. The net effect is that peak demand would be reduced and participating companies could "see green" from the trade of aggregated load shed into the market. For open trading to occur, several barriers to entry would need to be removed at the utility, ISO and RTO levels. If the energy market were truly open to developers and traders of "Negative Power," technology growth, customer participation, and positive environmental impact would reach levels never seen before in the industry.

Recognizing that no single energy source or demand side management program can meet our nation's growing energy needs, energy efficiency and demand response technologies can give the nation time to fully develop alternative clean energy sources and modernize the electric transmission infrastructure for ongoing power reliability. 

**About the author:** John Mitola is CEO of Electric City, a leading developer, manufacturer and integrator of energy savings technologies and developer of "Negative" Power Systems. Formerly he was VP and General Manager at Exelon Thermal and prior to that Director of New Business Ventures for Commonwealth Edison. Electric City is backed by Cinergy, Morgan Stanley, CIT and several other industry-leading strategic investors.

Mitola has put Electric City at the forefront of innovative energy conservation efforts nationwide with its innovative Virtual Negawatt Power Plan, which will provide large-scale energy demand reduction for utilities and corporations. Illinois Governor Rod Blagojevich, recently appointed Mitola to the state's new Special Task Force on the Illinois Energy Infrastructure and as chair of the Illinois State Toll Highway Authority.



## Legislative & Regulatory Roundup



### U.S. Energy Bill Languishes

The pending U.S. Energy Bill remains stalled as conference negotiators continue to try to resolve differences between the Senate and House versions of the bill. Among the most contentious issues are: tax credits for ethanol, nuclear energy, and automobile fuel economy standards. Talks remained at an apparent impasse despite prodding from the White House for compromise and assurances from Congressional leaders that passage of a comprehensive energy bill before the end of the year is a top priority.

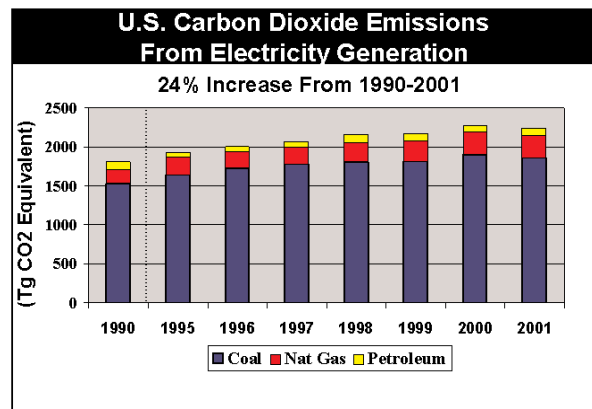
Since our report last month on the major clean energy provisions in the Second Draft Version of the bill, proposed tax provisions were released in draft form in late October. The latest information available to *CEO* as of press time on the tax provisions affecting clean energy is highlighted in red in the table below.

Over the past several months we have held out optimism that Congress would pass an energy bill before the November recess. We still believe the likelihood of a bill passing is greater than 50-50, but just barely! The more critical question at this point is what clean energy provisions will the final bill contain. In general the environmental community, including the Sierra Club and the Natural Resources Defense Council, views the pending versions of the bill as falling far short of what is needed in a sound national energy policy. We agree far more can be done to accelerate deployment of clean energy technologies - most notably a renewable portfolio standard. However, the proposed tax credits and federal procurement mandates will clearly have a significant positive impact on the wind, solar, and fuel cell segments of the industry.

### Senate Rejects Global Warming Plan

On October 30th, the Senate rejected 55-43 a plan proposed by Sens. John McCain (R-Arizona) and Joe Lieberman (D-Connecticut) to reduce emissions of greenhouse gases. The bill would have required industrial facilities to reduce emissions of carbon dioxide and other greenhouse gases to 2000 levels by 2010. Under the proposal a nationwide "cap and trade" program, similar to that currently used to trade sulfur dioxide emissions, would have been implemented. The Bush Administration and Senate Republicans were opposed to the plan on the basis that the cost and bureaucracy it would impose is not justified.

| 2003 Energy Bill:<br>Major Clean Energy Provisions |  |   |
|--|--|---|
|  | Original Senate Version  | Second Draft Version  |
| Renewable Portfolio Standard                       | 10% by 2020;<br>Creates nationwide credit trading program  | NONE  |
| Clean Energy RD&D Funding                          | Renewables & hydrogen: \$2.5 B<br>Energy Efficiency: \$3.3 B<br>Over 4 year timeframe  | Renewables: \$3.0 B;<br>Hydrogen: \$2.15 B<br>Energy Efficiency: \$3.9 B<br>Over 5 year timeframe   |
| Production Tax Credit                              | 1.8¢/kWh for wind and biomass:<br>• Extended to 12/31/06<br>• Expanded to solar & geo-thermal  | 1.8¢/kWh for wind and biomass:<br>• Extended to 10/01/13<br>• Expanded to solar & geo-thermal, trash-to-energy, and landfill gas                  |
| Purchase Tax Credits                               | Fuel Cells: 30% up to \$1,000/kW<br>Microturbines: 10% up to \$200/kW<br>CHP: 10%<br>Residential Wind: 30%<br>Residential Solar: 15% | Fuel Cells: 20% up to \$1,000/kW<br>CHP: 10% for systems <15 MW that meet efficiency standards<br>Residential Wind: 15%<br>Residential Solar: 15% |
| Federal Clean Energy Procurement                   | Federal energy purchases must include 3% renewables in 2004, ramping up to 7.5% by 2010  | Same + \$300 million program to install solar PV on 20,000 public buildings   |
| Greenhouse Gas Initiative                          | Establishes voluntary GHG database and Office of National Climate Change Policy  | NONE  |



## Legislative & Regulatory Roundup (continued from p. 9)

### **FERC Ruling on Renewable Energy Credits Prompts Confusion**

The U.S. Federal Energy Regulatory Commission (FERC) issued a ruling in October intended to clarify the issue of who owns the renewable energy credits (RECs) associated with small renewable generators. Under the Public Utility Regulatory Policies Act (PURPA), utilities are required to purchase power from such "qualifying facilities". However, many of these contracts predate the creation of RECs and are silent on the issue of ownership. The FERC ruled that in such cases the generator retains ownership of the RECs. However, several states, such as California, already have regulations that assign the RECs to utilities. If the FERC ruling stands, state regulators will be faced with revamping existing rules to be consistent with the federal mandate.

#### **In Brief:**


**Net Metering for Fuel Cells California...** Gov Davis signed a bill mandating net metering until 1/1/06 or until 45 MW have been installed in service areas with greater than 10,000 MW peak demand and 22.5 MW in areas with less than 10,000 MW.

**IREC Unveils Net Metering / DG Interconnection Model...** The Interstate Renewable Energy Council's newly released model rules are intended as a guide to policymakers. (available at [www.irecusa.org](http://www.irecusa.org))

**California Extends Self-Gen Incentive Program Through 2007...** The program provides incentives for on-site renewable energy and combined heat and power projects.

**Schwarzenegger Policy Supports Clean Energy...** Including accelerating the California RPS to require 20% of the state's energy to be sourced from renewables by 2010; more tax incentives for on-site generation.

**Ohio Awards Distributed Generation Grants...** A total of \$924,019 was awarded to 26 separate projects, including solar, wind, biomass, and advanced reciprocating engine projects.

**Canada Joins International Partnership for the Hydrogen Economy...** The group was proposed by the U.S. earlier this year and calls for collaboration on hydrogen research, development, and demonstration. (<http://www.eere.energy.gov/hydrogenandfuelcells/partnerships.html>) 

## Market & Company Briefs

(continued from p. 4)

### **Hydrogen / Fuel Cells**

**Canada to Fund Hydrogen from Renewables...** An estimated C\$85 million will be re-allocated from existing programs.

**Fuel Cell Installed at Coal Mine...** FuelCell Energy installed the world's first fuel cell powered by coalmine methane at a mine in Hopedale, OH. The 200-kilowatt demonstration unit will operate for six months.

**Nuvera Fuel Cell Demonstrated in Fiat Autos...** A 40-kW Nuvera stack was integrated into two vehicles and demonstrated in Milan, Italy.

**Stuart Energy Partners with Major European Companies on Hydrogen...** Stuart, Statkraft SF, and Corporacion Energia Hidroelectrica will jointly develop


advanced hydrogen production and distribution solutions.

### **Hydro**

**Reliant Hydro Plant Deemed "Low Impact"...** The company's 44-MW Beaver River plant in upstate New York is one of only seven plants that have received certification from the Low Impact Hydropower Institute.

**PPL to Shut Down Maine Hydro Plants...** PPL has reached agreement to sell three hydro plants with aggregate capacity of 18 megawatts to a coalition of federal agencies and private groups. The coalition plans to close the dams to restore migratory fish runs.

### **Clean Coal**

**Clean Coal Proposed for Montana...** The City of Great Falls and five electric coops are looking for an alternative to paying volatile prices for wholesale power. The group is said to be considering participation in a 500-MW coal-wind hybrid plant under development by Great Northern Power Development. 



## Project / Funding Opportunities



### CEO FundSource™ List

#### Major Active Solicitations

| State / Agency                         | Program  | Description  | Key Dates   | Contacts  |
|--|--|--|---|---|
| <b>U.S. FEDERAL GOVERNMENT SOURCES</b> |  |  |   |   |
| DoE                                    | Small Business Innovation Research-2004<br>Sol#: DE-FG01-03ER03-29               | - Scope: Grants for R&D in broad topical areas<br>- Eligible Technologies: Advanced energy; hydrogen, et al<br>- Eligible Applicants: Small businesses <500 employees<br>- Funding: Up to \$100K Phase I; \$750K Phase II                            | Solicitation: 10/07/03<br>Applications due: 1/06/04 | Tel: 301-903-1414<br>sbir-sttr@science.doe.gov<br>www.science.doe.gov |
| DoE                                    | Advanced Coal Research<br>Sol#:DE-PS26-04NT41898-00                              | - Scope: R&D grants<br>- Eligible Tech:Incl fuel cell and emissions technologies<br>- Eligible Applicants: public & private universities<br>- Funding: \$50-400K/project; \$3.0 MM total   | Proposals: 12/04/03<br><b>REVISED</b>               | Crystal Sharp<br>Tel: 304-285-4442<br>csharp@netl.doe.gov             |
| DoE:<br>NNSA                           | Non-Hydro Renewable Procurement<br>Sol#:DE-RF52-04NA0000                         | - Scope: Req for Info for renewable energy procurement for NNSA facilities in Amarillo,TX & Kansas City, KS<br>- Eligible Tech: wind, solar, geothermal, biomass<br>- Eligible Applicants: unrestricted<br>- Funding: Purchase of up to 17 GWh /year | Proposals: 11/10/03                                 | David Nienow<br>Tel: 505-845-6072<br>dnienow@doeal.gov                |
| DoE:<br>ORNL                           | Fuel Cell & Adv Vehicle Pwr Electronics R&D<br>Sol#: 6400002514S                 | - Scope: R&D support for DC-to-DC converter for FCVs<br>- Eligible Tech: 14V converters capable of 5kW<br>- Eligible Applicants: unrestricted  | Proposals: 11/14/03                                 | Christine Sullivan<br>Tel: 865-574-7507<br>sullivancm@ornl.gov        |
| NREL                                   | Low Speed Wind Turbine Project- Phase II   | - Scope: Design/ dev of low speed wind turbines<br>- Eligible Applicants: Industry/ universities/ non-profits<br>- Funding: 3-9 grant awards; Up to \$2 million per award  | Proposals due: 11/17/03                             | Neil Wikstrom<br>Tel: 303-384-6960<br>neil.wikstrom@nrel.gov          |
| DoE                                    | Micro Residential CHP<br>Sol#:DE-PS36-03GO93014                                  | - Scope: Grants for RD&D of residential CHP systems<br>- Eligible Tech: <15kW power generator w/ heat recovery<br>- Eligible Applicants: Any industry or academic org.<br>- Funding: Ph I=\$200-500K/ea; \$1MM tot;30% cost share                    | Proposals: 11/24/03                                 | Matt Barron<br>Tel: 303-275-4922<br>gochp@go.doe.gov                  |
| DoE                                    | Industries of the Future: Chemicals/ Forest Products                             | - Scope: R&D to enhance industrial efficiency<br>- Eligible Tech: Renewable/ advanced energy considered<br>- Eligible Applicants: Industry/ universities/ non-profits<br>- Funding: Cost shared grants; Total: \$35 million                          | Proposals due: 11/30/03                             | Beth Dwyer<br>Fax: 303-275-4788<br>beth.dwyer@go.doe.gov              |
| DoE                                    | Hydrogen Education Development<br>Sol#DE-PS36-03GO93016                          | - Scope: Grants for outreach/ education of teachers, students, and public on the hydrogen economy<br>- Eligible Applicants: Industry/ universities/ non-profits<br>- Funding: \$1.0 - 3.5 MM over five years total                                   | Proposals: 12/04/03                                 | James Damm<br>james.damm@go.doe.gov                                   |
| <b>CANADA</b>                          |  |  |   |   |
| Hydro-Quebec                           | Call for Tenders: Wind Generation  | - Scope: Procurement of 1,000 MW wind generation under long-term contract<br>- Eligible Applicants: Suppliers from new sources only  | LoI: 3/1/04<br>Proposal 6/15/04                     | Samson Belair<br>Tel: 514-393-5402<br>email: eolienhqdre@deloitte.ca  |
| SaskPower                              | Renewable Energy RFP   | - Scope: Procurement of 15 MW renewable energy<br>- Eligible Tech: Wind,solar, small hydro, biomass  | RFP due Fall '03                                    | www.saskpower.com   |
| <b>U.S. STATES</b>                     |  |  |   |   |
| California                             | CA Energy Commission PIER Program: Environmentally Preferred Advanced Generation | - Scope: CHP research, development, and demonstration<br>- Eligible Tech: Any advanced gen tech w/ heat recovery<br>- Eligible Applicants: Any public or private organization<br>- Funding: Up to \$2 MM per project; 3-8 awards                     | Proposals Due: 12/12/03                             | Kathy Chan<br>Tel: 916-654-4379<br>KChan@energy.state.ca.us           |
| Hawaii                                 | Hawaii Electric Co/ Renewable Hawaii, Inc. Maui Renewable Power                  | - Scope: Renewable power RFP<br>- Eligible Tech: Min 1 MW renewable on Maui Electric<br>- Eligible Applicants: Any; - Funding: PPA or invstmnt   | Proposals accepted: 12/04/03                        | Arthur Seki<br>Tel: 808-543-7987<br>Arthur.Seki@heco.com              |

## Project / Funding Opportunities (continued from p. 11)

### CEO FundSource™ List

#### Major Active Solicitations

| State / Agency              | Program   | Description   | Key Dates                                   | Contacts  |
|-----------------------------|---|---|---|---|
| <b>U.S. STATES (cont'd)</b> |   |   |   |   |
| Mass                        | MTC Green Power Predevelopment Financing Grant                              | - Scope: Grants & loans for renewable energy projects<br>- Eligible Tech: Renewables >500kW in New England<br>- Eligible Applicants: Public entities only<br>- Funding: \$2 MM total; \$50,000/project; 20% cost share                | Proposals accepted: 10/10/03 'til committed | Jim Christo<br>Tel: 508-870-0312<br>pdfi@masstech.org                     |
|                             | MA Tech Collaborative Green Bldg Design & Construction Assistance (Round 4) | - Scope: Purchase and installation of renewable projects<br>- Eligible Technologies: All qualified renewables<br>- Eligible Applicants: Any industry or non-profit org.<br>- Funding: Up to \$500,000 per project; Total: \$2 million | Proposal deadline: 11/26/03                 | Quincy Vale<br>Tel: 508-870-0312  |
| New Jersey                  | Board of Public Utilities: Renewable Energy Advanced Power Project          | - Scope: Grants/financing for RE projects<br>- Eligible Tech: Min 1.0 MW "pure" renewables; Must be in NJ & capable of delivering into PJM power pool<br>- Funding: \$50 MM total; 20% cost share req'd                               | Proposals accepted: 10/1/03 'til committed  | Cassandra Kling<br>Tel: 609-292-7471<br>Cassandra.kling@bpu.state.nj.us   |
| New York                    | NYSERDA EnergySmart Wind Incentives<br>PON#792                              | - Scope: Incentives to installers of wind turbines<br>- Eligible Applicants: Trained installers<br>- Funding: Up to \$100K per project; \$2.5 million total   | Applications due: 12/30/03                  | Tel: 518-862-1090<br>info@nyserda.org<br>www.nyserda.org                  |
|                             | NYSERDA EnergySmart CHP & Renewables<br>PON# 783                            | - Scope:Funding for feasibility studies<br>- Eligible Tech: Combined heat/power & renewables<br>- Eligible Applicants: unrestricted<br>- Funding: Up to \$50K per project; \$500K total   | Applications accepted: 9/17/03 - 11/19/03   | Tel: 866-NYSERDA<br>Mark Gundrum<br>info@nyserda.org<br>www.nyserda.org   |
|                             | NYSERDA EnergySmart Renewable Energy Technology OptionsProgram<br>PON# 737  | - Scope:Incentives for dev, demo, and commercialization<br>- Eligible Tech: solar, wind, biomass, hydro<br>- Eligible Applicants: unrestricted<br>- Funding: \$40K per project Stage I; \$250K per project for Stage II               | Stage I Applications due: 3/01/04           | Tel: 866-NYSERDA<br>Jennifer Harvey<br>jlh@nyserda.org<br>www.nyserda.org |
| N.Carolina                  | North Carolina Greenpower   | - Scope: Renewable energy power purchases (5-15 MW)<br>- Eligible Tech: New & existing renewables in NC<br>- Eligible Applicants: unrestricted<br>- Funding: Least-cost purchase contract; up to 5 yrs                                | Applications due: 11/14/03                  | www.ncgreenpower.org<br>RFP@advancedenergy.org                            |
| Oregon                      | Energy Trust of Oregon  | - Scope: Community solar power demo<br>- Eligible Tech: Solar PV; 5 kW or larger<br>- Eligible Applicants: Public & non-profit orgs<br>- Funding: Min \$100,000; One or more projects   | Applications due: 12/15/03                  | Charlotte Rollier<br>charlotte@energytrust.org<br>Tel: 503-493-8888       |
| Washington                  | Puget Sound Wind RFP  | - Scope: Procurement of 125 MW of wind resources<br>- Eligible Tech: Min 25 MW w/ access to PSE system<br>- Eligible Applicants: Any non-affiliate of PSE<br>- Terms: PSE energy purchase or ownership; Least cost                    | Final RFP: 12/3/03<br>Proposals due:1/9/04  | Charlie Black<br>Tel: 425-462-3081<br>charlie.black@pse.com               |
| Wisconsin                   | We Energy Biomass RFP   | - Scope: Up to 25 MW biomass energy procurement under long-term (20-year) power purchase agreement.<br>- Eligible Tech: New biomass located in MISO area<br>- Eligible Applicants: No restrictions                                    | Applications due: 11/26/03                  | Philip Theisen<br>Tel: 414-221-2473<br>phil.theisen@we-energies.com       |
|                             | Wisconsin Public Power/Madison Gas & Electric                               | - Scope: Up to 80 MW wind energy procurement<br>- Eligible Tech: Grid connected wind<br>- Eligible Applicants: No restrictions  | Applications due: 12/01/03                  | Gregory Bollom<br>Tel: 608-252-4748<br>gbollom@mge.com                    |
| Other                       | Biomass Group, LLC (Ohio)   | Scope: Solicitation for PURCHASE of power from 145 MW wood-fired plant in southern Ohio under 10-20 year contract   | Offers due: 12/01/03                        | Ed Hart<br>Tel: 813-426-5061  |



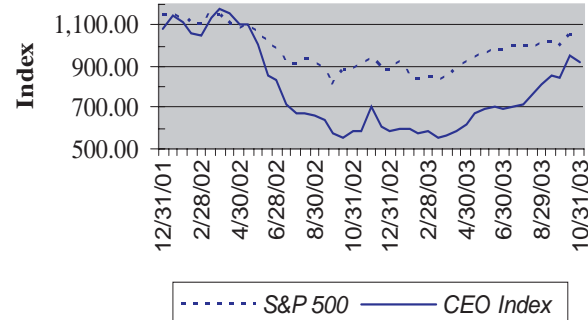
## Investor's Insight



### CEO Stock Index Up 9.6% for Month

Overall the trend continues as the *CEO Stock Index* was up another 9.6% for the month and is now up 58.5% year-to-date. The broader market, portrayed by the S&P 500, gained 5.5% for the month and is up 19.4% for the year. Seven companies rose by 30% or more; in large part due to continued support for the prospect of distributed generation technologies. Mechanical Technology, involved with the development and commercialization of direct methanol micro-fuel cells, was the biggest gainer, up over 42% for the month. Dynetek Industries' stock dropped by more than 18%. This company, which focuses on fuel storage systems mainly for natural gas and hydrogen applications, did not come out with any negative news over the month.

### CEO Stock Index vs. S&P 500



| Company Name                 | Ticker Symbol | Stock Price 10/31/03 | Market Cap (in Millions) | 1-month Change | YTD Change   | 1-year Change |
|------------------------------|---------------|----------------------|--------------------------|----------------|--------------|---------------|
| Ballard Power Systems        | BLDP          | \$12.95              | \$1,528.9                | -1.5%          | 17.0%        | 17.0%         |
| Capstone Turbine Corporation | CPST          | \$1.99               | \$162.6                  | 5.3%           | 121.1%       | 109.5%        |
| Catalytica Energy Systems    | CESI          | \$4.39               | \$77.7                   | 35.1%          | 59.1%        | 33.8%         |
| DynaMotive Energy Systems    | DYMTF         | \$0.33               | \$16.1                   | -8.3%          | 65.0%        | 32.0%         |
| Dynetek Industries           | DNK.TO        | C\$1.47              | C\$29.6                  | -18.3%         | 13.1%        | 33.6%         |
| Electric Fuel Corp.          | ARTX          | \$1.82               | \$63.9                   | 33.8%          | 184.4%       | 119.3%        |
| Energy Conversion Devices    | ENER          | \$10.81              | \$236.7                  | 2.5%           | 10.3%        | 9.1%          |
| Engelhard Corporation        | EC            | \$28.58              | \$3,598.2                | 3.3%           | 27.9%        | 29.0%         |
| Evergreen Solar              | ESLR          | \$2.65               | \$30.2                   | 28.0%          | 105.4%       | 278.6%        |
| Fuel Cell Technologies       | FCT.V         | C\$0.61              | C\$24.5                  | 13.0%          | 22.0%        | 5.2%          |
| Fuel Tech N.V.               | FTEK          | \$4.45               | \$87.7                   | -16.8%         | 6.2%         | 29.0%         |
| FuelCell Energy              | FCEL          | \$15.28              | \$600.5                  | 30.6%          | 133.3%       | 164.8%        |
| Global Thermoelectric        | GLE.TO        | C\$5.56              | C\$162.2                 | 30.8%          | 133.6%       | 136.6%        |
| Hydrogenics Corporation      | HYGS          | \$6.59               | \$320.9                  | 33.1%          | 86.7%        | 68.1%         |
| Mechanical Technology        | MKTY          | \$6.60               | \$182.2                  | 42.2%          | 295.2%       | 388.9%        |
| Medis Technologies           | MDTL          | \$9.43               | \$220.7                  | -8.9%          | 88.6%        | 56.6%         |
| Methanex Corporation         | MEOH          | \$9.87               | \$1,248.6                | 5.3%           | 17.8%        | 15.3%         |
| Millennium Cell Inc.         | MCEL          | \$3.33               | \$98.9                   | 14.8%          | 39.3%        | 68.2%         |
| Plug Power Inc.              | PLUG          | \$6.32               | \$385.1                  | 23.2%          | 40.8%        | 0.6%          |
| Proton Energy Systems        | PRTN          | \$2.84               | \$95.1                   | 9.2%           | 42.0%        | 30.3%         |
| Quantum Fuel Systems         | QTWW          | \$9.12               | \$207.0                  | 35.1%          | 288.1%       | 324.2%        |
| Spire Corporation            | SPIR          | \$5.70               | \$38.6                   | -0.9%          | 144.6%       | 150.0%        |
| Stuart Energy Systems        | HHO.TO        | C\$3.85              | C\$108.5                 | -2.5%          | 54.0%        | 60.4%         |
| Syntroleum Corporation       | SYNM          | \$4.02               | \$135.9                  | 0.0%           | 132.4%       | 209.2%        |
| UQM Technologies             | UQM           | \$3.37               | \$63.4                   | -6.1%          | 33.2%        | 20.4%         |
| <b>CEO Stock Index</b>       |               | <b>923.55</b>        |                          | <b>9.6%</b>    | <b>58.5%</b> | <b>57.1%</b>  |
| <b>S&amp;P 500 Index</b>     |               | <b>1050.71</b>       |                          | <b>5.5%</b>    | <b>19.4%</b> | <b>18.6%</b>  |

Investor's Insight (continued from p. 13)

## Company Profile: Catalytica Energy Systems

**Catalytica Energy Systems, Inc. (NASDAQ: CESI)**, based in Mountain View, CA, develops and manufactures catalytic technology that focuses on attaining near-zero emissions for power plants. The company is led by Michael Murry, the President and Chief Executive Officer. Mr. Murry joined Catalytica in January 2003 with over 20 years of business operations and sales management experience in the chemical and power industries. He most recently held senior management positions at Ballard Power Systems.

The company's first commercial product is called Xonon Cool Combustion™. Xonon® (pronounced 'Zo-non'; and is actually 'No NOx' spelled backwards) is a catalytic technology, which prevents the formation of chemical pollutants in the combustion process. When incorporated within a gas turbine, Xonon

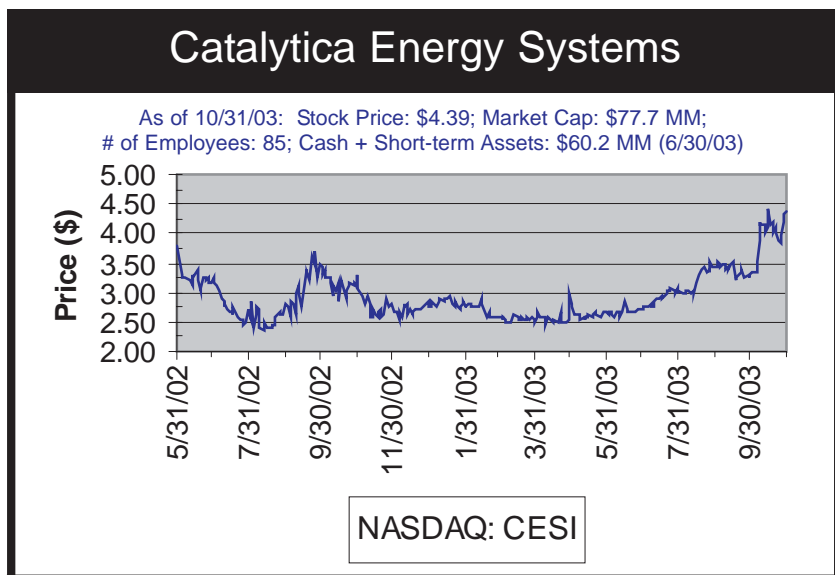
allows for combustion at lower temperatures by using a catalyst instead of a flame to combust the fuel. The Xonon catalyst acts as a molecular thermostat, controlling the temperature of the reaction and avoiding the high temperatures of traditional flame-based combustion systems which create NOx. As such, Xonon essentially eliminates the formation of NOx, a major contributor to smog. This technology also burns the fuel completely and therefore reduces emissions of carbon monoxide and unburned hydrocarbons.

Catalytica has been working with several of the large gas turbine OEM's (such as GE Power Systems, Kawasaki, and Solar Turbines) in order to install the Xonon technology in the manufacturing process. The company is also developing new catalytic technologies for fuel processing systems for fuel cells used in automotive applications, as well as applying the Xonon technology to microturbines, hybrid

gas turbines, and diesel engines used in both stationary and transportation applications.

### CEO's Analysis

As of June 30, 2003, Catalytica had approximately \$58.6 million in cash and cash equivalents on hand (relative to the company's burn rate over the last year, which was \$15.5 million). At this point in time, Catalytica will use their capital for ramping up their product development and commercialization activities, and additional research and development. The company should easily have enough cash and cash equivalents to satisfy their capital requirements over the next twelve months.



Based on evidence from field trials of Catalytica's technology, CEO believes that the company's products should be enthusiastically accepted into the marketplace. As corroboration, Xonon achieves NOx emissions of less than three parts per million, and as Catalytica states, "without any incremental health or safety

risks, and provides a more cost-effective and less burdensome approach to reducing emissions from gas-fired power generation".

Looking at the continuing trend for cleaner, more environmentally-friendly power generation and the recognized presupposition that many of the new power sources will be fueled by natural gas, Catalytica's technology has the potential to do extremely well. The blackout in August has obviously increased awareness to the benefits of distributed generation, which can also help the company's cause.

Key to the company's overall success, however, is the manner in which they handle the transition from a research and development company to more of a manufacturing firm. Also of principal importance is the company's ongoing success in their relationships with the natural gas turbine OEMs.

## Investor's Insight (continued from p. 14)

### Up and Comers

#### Advent Solar Obtains New Funding

Advent Solar of Sandia Park, NM has obtained \$400,000 of Series A funding. The company has also started looking for approximately \$7 million of Series B financing. Advent Solar is developing photovoltaic cells, modules, and integrated products based on solar power. The company's products will be applied to parking meters and certain features in automobiles, as well as for other uses. The company currently has only four employees but plans to grow to about 50 by the end of 2004.

#### HaveBlue Patent Application Granted

HaveBlue LLC based in Ventura, California has been issued patent number 6,610,193 by the United States Patent Office. This patent was officially issued to Craig Schmitman, HaveBlue's founder and current President & CEO. Mr. Schmitman has assigned the patent to HaveBlue.

The patent covers the onboard production and use of hydrogen as a fuel in marine vessels. HaveBlue's technology enables the use of fuel cells in yachts and ships. In the first system for sailing yachts, the HaveBlue power and propulsion system produces hydrogen from purified (desalinated and de-ionized) seawater. "This news from the U.S. Patent Office is most welcome and it will accelerate our efforts to bring this revolutionary technology to sailors, boat and

yacht builders worldwide," said Schmitman. "The benefits of our self contained energy system have been warmly received by weekend sailors and world cruisers alike," he added.

#### First Hydrogen Fuel Cell Water Taxi on San Francisco Bay Powered By Anuvu

Anuvu Incorporated, based in Sacramento, California, provided their Anuvu Power-X™ fuel cell/battery electric hybrid engine for the first zero-emission, hydrogen-fueled public water taxi on San Francisco Bay.

The company's fuel cell engine is the result of nearly ten years of research and development. Emitting only heat and water vapor, Anuvu's fuel cells will allow government ferries, commercial marine fleets, and recreational boats to have environmentally friendly engines. The robustness of Power-X fuel cells provides unique durability ideal for rough water conditions. A proprietary filtration system prevents salt-air and water from interfering with or damaging the fuel cells functionality. The standardized design makes the fuel cells easy to integrate into contemporary marine vehicles.

The boat is funded by California's Center for the Commercial Deployment of Transportation Technologies and illustrates the real-life feasibility of environmentally conscious marine transportation initiatives. [Ω](#)

## Emissions Market Update

### Ticker Tape Snapshot

|                          |  |
|--------------------------|--|
| SIP NOx                  | Prices for SIP Call NOx held steady through October following nine months of consistent decline. Both vintage 2003 and vintage 2004 NOx credits were reportedly trading near \$2,500/ton through most of the month. Vintage 2005 credits continue to hold just above \$3,000.  |
| Houston-Galveston NOx    | The HGA market continues to be thinly traded as companies contemplate long-term compliance strategies. Several transactions were posted during October totaling approximately \$1.5 million in value. The last trade of a multi-year stream was reported at an average price of approximately \$50,000 per ton per year.   |
| SO2                      | The SIP Call SO2 market was relatively active this month, with traders reporting buyers pushing prices to highs for the year - with trades made north of \$190 per ton at the end of the month. CEO anticipates allowance prices will hold firm in the \$200 range in coming months in the face of the revised New Source Review regulations that will likely yield more buyers in the market.   |
| Renewable Energy Credits | Texas: Although trading was reportedly thin, Texas REC prices held relatively firm in October. Vintage 2002 and 2003 RECs traded between \$13.50 and \$14.00 /MWh. Traders indicate future vintages (2004 and later) are being bid under \$10 /MWh, apparently due to concern that new wind projects in West Texas will substantially increase the supply of RECs in out years. In the Northeast, there was a flurry of activity in Connecticut as buyers paid over \$40 /MWh for Class 1 certificates (vintages 2004-2006). |



## Industry Calendar



| Dates of Event  | Event   | Location  | Contact   |
|-----------------|---|---|---|
| Nov 3-5, 2003   | Eighth National Green Power Marketing Conference  | Hyatt Regency<br>Chicago,<br>Chicago, IL                | Ivilina Thornton: 303-275-3781,<br><a href="http://www.eere.energy.gov/greenpower/conference">www.eere.energy.gov/greenpower/conference</a>   |
| Nov 3-7, 2003   | 2003 Fuel Cell Seminar: Fuel Cells for Secure, Sustainable Energy                           | Fontainebleau Hilton Hotel,<br>Miami Beach, FL          | Fuel Cell Seminar: 202-973-8671,<br><a href="mailto:fuelcell@courtesyassoc.com">fuelcell@courtesyassoc.com</a> ,<br><a href="http://www.fuelcellseminar.com">www.fuelcellseminar.com</a>                |
| Nov 11-13, 2003 | AWEA Wind Financing Workshop  | Westin Mission Hills Resort,<br>Palm Springs, CA        | Stephen Miner: 202-383-2504,<br><a href="mailto:sminer@awea.org">sminer@awea.org</a> ,<br><a href="http://www.awea.org">www.awea.org</a>  |
| Nov 15-19, 2003 | 20th International Electric Vehicle Symposium (EVS-20): Powering Sustainable Transportation | Long Beach Convention Center,<br>Long Beach, CA         | Pam Turner: 408-741-5870,<br><a href="mailto:evs20symposium@aol.com">evs20symposium@aol.com</a> ,<br><a href="http://www.ev20.org">www.ev20.org</a>   |
| Nov 17-18, 2003 | 5th Annual Financing U.S. Power Projects  | The Westin New York at Times Square,<br>New York, NY    | CBI: 800-817-8601,<br><a href="mailto:register@cbinet.com">register@cbinet.com</a> , <a href="http://www.cbinet.com/events/PB329/index.html">www.cbinet.com/events/PB329/index.html</a>                 |
| Nov 17-19, 2003 | 16th NREL Industry Growth Forum: Financing the Path to Clean Energy and a Hydrogen Future   | Hyatt Regency Austin on Town Lake, Austin, TX           | David Glickson: 303-275-4097,<br><a href="mailto:david_glickson@nrel.gov">david_glickson@nrel.gov</a> ,<br><a href="http://www.cleanenergyforum.com">www.cleanenergyforum.com</a>                       |
| Dec 3-4, 2003   | The 2003 Southeast Green Power Summit   | The Emory Inn,<br>Atlanta, GA                           | Rita Kilpatrick: 404-659-5675,<br><a href="http://www.southeastgreenpower.net">www.southeastgreenpower.net</a>  |
| Dec 3-5, 2003   | Financing Wind Power Projects   | Metropolitan Hotel,<br>New York, NY                     | Infocast: 818-888-4444,<br><a href="http://www.infocastinc.com/wind">www.infocastinc.com/wind</a>   |
| Dec 3-5, 2003   | The 2003 Hydrogen Production and Storage Forum  | Hilton Garden Inn at Franklin Square,<br>Washington, DC | Patricia Kinzer: 207-781-9604,<br><a href="mailto:pkinzer@intertechusa.com">pkinzer@intertechusa.com</a> ,<br><a href="http://www.intertechusa.com">www.intertechusa.com</a>                            |
| Jan 5-8, 2004   | 23rd ASME Wind Energy Symposium   | Reno Hilton Hotel,<br>Reno, NV                          | Dr. Scott Schreck: 303-384-7102,<br><a href="mailto:scott_schreck@nrel.gov">scott_schreck@nrel.gov</a> , <a href="http://www.nrel.gov/wind_meetings/aiaa_2004">www.nrel.gov/wind_meetings/aiaa_2004</a> |
| Feb 4-6, 2004   | 3rd Wind Energy & Power Markets Conference  | Adam's Mark Hotel,<br>Denver, CO                        | EUCI: 303-770-8800,<br><a href="http://www.euci.com/conferences">www.euci.com/conferences</a>   |
| Feb 25-26, 2004 | Retail Power Market Summit  | Lake Buena Vista, FL                                    | CBI: 800-817-8601,<br><a href="mailto:cbireq@cbinet.com">cbireq@cbinet.com</a> ,<br><a href="http://www.cbinet.com/events">www.cbinet.com/events</a>  |
| Mar 1-3, 2004   | POWER-GEN Renewable Energy  | Flamingo Hotel,<br>Las Vegas, NV                        | Lisa Gasaway: 918-832-9245,<br><a href="mailto:pgreconference@pennwell.com">pgreconference@pennwell.com</a> ,<br><a href="http://www.power-gengreen.com">www.power-gengreen.com</a>                     |
| Mar 28-31, 2004 | Global Windpower 2004   | McCormick Place,<br>Chicago, IL                         | Stephen Miner: 202-383-2504,<br><a href="mailto:sminer@awea.org">sminer@awea.org</a> ,<br><a href="http://www.awea.org/global04.html">www.awea.org/global04.html</a>                                    |
| Jul 11-14, 2004 | Solar 2004 - A Solar Harvest: Growing Opportunities   | Portland, OR  | ASES: 303-443-3130,<br><a href="mailto:ases@ases.org">ases@ases.org</a> ,<br><a href="http://www.ases.org">www.ases.org</a>   |