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Our 21st Year

A TALE OF TWO COUNTRIES

BY KARI LARSEN

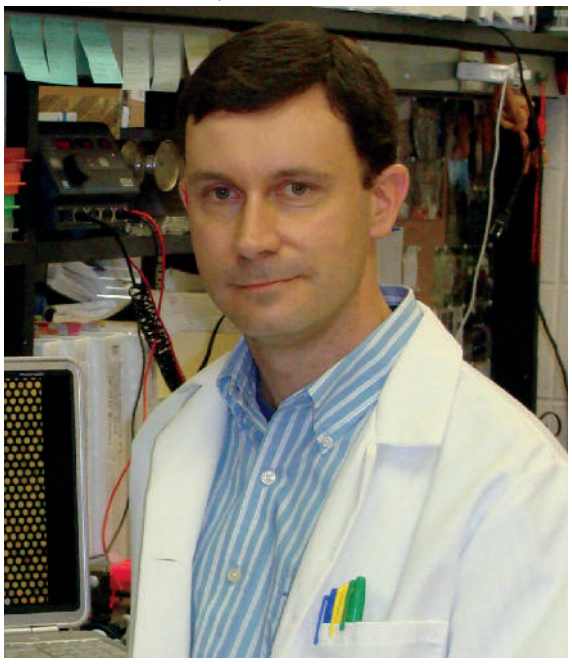
For more than a decade the United States and Australia have been two of the most conspicuous holdouts against signing the 1997 Kyoto Protocol on greenhouse gas reduction. The conservative administrations that led both countries during much of this period initially professed skepticism about global warming claims, and expressed distress regarding China's and India's lack of emissions caps. In addition, both countries depend upon coal for much of their energy needs and thus have significant economic concerns over the cost of capping carbon emissions. In 2009 new and more liberal U.S. and Australian governments launched ambitious efforts to secure passage of legislation to limit GHG emissions while encouraging the use of renewable energy sources.

The efforts of the U.S. Congress have increasingly become bogged down as conflicting legislative proposals have emerged, and the dominant issue of health care reform has overshadowed climate concerns. In Australia the government initiative has advanced somewhat further, but still has become mired in controversy. The Australian experience, although less publicized, presents a cautionary example of how difficult a road GHG regulation and alternative energy incentives face in the United States.

(continued on page 21)

BIOFUEL GENOME MAPPED

BY LUCAS ARGUESO, PH.D.



DURHAM, NC - A strain of yeast that thrives on turning sugar cane and other tough grasses into ethanol that might be used as biofuel has had its genome completely sequenced. This yeast strain studied and mapped is known as PE-2. Understanding this microbe may enable more efficient biofuel production and will produce even more robust industrial organisms that are versatile and capable of producing advanced biofuels from non-food crops like switchgrass.

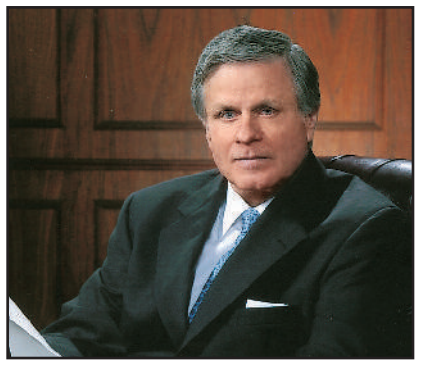
When oil prices crept to new highs in the 1970s, Brazil invested in alternative biofuels created from the country's abundant sugar cane crops. Commercially available baker's yeast was used to break down sugar cane into ethanol, but genetic tests showed that this yeast quickly disappeared in the harsh environment of industrial fermentation vats. However, yeast that grew naturally on the sugar cane was still viable in the vats and lasted through many more generations.

We took an organism that is hugely important

(continued on page 22)

DEPARTMENTS

PUBLISHER'S LETTER



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This issue wraps up 2009. Two new conventions, GridWeek and Solar Power International, were added to our regular coverage. We continue to invest to bring exclusive editorial from industry professionals as our nation moves forward toward energy independence. It's been a pleasure to add our voice over twenty plus years to this worthy undertaking and we look forward with much anticipation to 2010 and beyond.

Kari Larsen provides perspective on Australia's first attempt at cap and trade. Our two countries shared a lot in common in the 90's. We were the most conspicuous holdouts against signing Kyoto with conservative governments in both countries. 2009 elections brought about changes in both countries to liberal governments. Larsen looks at the path to Copenhagen in December on page one.

Dr. Lucas Argueso, PhD, of Duke University, studied and mapped a yeast strain, PE-2, that has a natural talent for carbohydrate biofuels. Switchgrass, elephant grass, and miscanthus grass are attractive areas for farming in the US as the technology is engineered to effectively break down cellulose on page one.

Lyn Corum reports on page 13 California's new energy legislation signed by Governor Arnold Schwarzenegger on October 11, the deadline date for signing or vetoing laws. He vetoed legislation that would have increased R.P.S. He signed into law legislation to increase the size of projects eligible for the state's feed-in tariff to a maximum of 3 mw, up from 1.5 mw.

Brad Kitchens, Class of 2006, comments on the 5% drop in power usage from January to July 2009 from a year ago and the dramatic shift in fuel prices. Industrial gas consumption has fallen by 13% in the first seven months of '09 vs. '08 caused by the recession and mild weather. Looking ahead on page 14, he sees markets tending to equilibrate over time, and the natural gas market is no exception. The real question is whether domestic natural gas supply and demand balance has changed for good. While we cannot say with certainty that it has not, betting on generation fuel prices has historically been a fool's game. But there are ways for generators to hedge those bets. Pursuing a balanced fuel strategy continues to make sense. Lead times for new power supply can be long, and fuel markets will continue to move up and down while these decisions are being made. Certainly the natural gas "game" has changed for now. But generators would be wise to be prepared for the possibility that the "game" may change dramatically, and rapidly again.

Congress appropriated $6 billion to pay for the credit subsidy costs associated with loan guarantees. In October, '09, the DOE unveiled its Financial Institution Partnership Programs (FIPP). Designed to address current deficiencies in credit and capital markets, FIPP co-finances projects with commercial lenders. Karen Wong sees potential barriers to financing the non-guaranteed portion of the projects and the costs of the application fees. On page 15, she says the program has transformative potential by introducing new technologies to market, reinvigorating project finance and building the nation's green economy.

Rod Lowman writes as President of America's Natural Gas Alliance (ANGA), representing 28 of North America's leading independent natural gas companies. Natural gas generation represents 400 gws of capacity, but this capacity is used less than 25 percent of the time, mostly for peaking. Improving its utilization can achieve immediate carbon reduction, he says on page 16. North America has more than 100 years of natural gas supply in 32 states and is 50 percent cleaner than coal.

Joe Dysart returns to report on the promise and pitfalls of cloud computing, a new approach to IT in which all company applications (APPS) and data are moved onto the web. The key arguments for moving to cloud computing is to free up overtaxed, in-house IT departments, enable employees to access company apps and data anywhere in the world and reduce costs under a pay-as-you-go payment arrangement. Dysart answers five objections to entering the cloud on page 17.

Secretary of Labor Hilda Solis spoke on October 27 at the Solar Power International Convention in Anaheim, CA. We are pleased to offer excerpts on page 18. She points out that the Recovery Act invests more than $80 billion for clean energy to develop new technologies, modernizing the grid and doubling our capacity to generate renewable electricity. She estimates the solar industry could create over one million new jobs by 2030. The Department of Labor announced in June a $500 million green job training grant and is teaming with ten other departments, agencies and six White House offices to develop ideas to leverage private capital.

Rowan Oloman warns against relying solely on CCS as the answer to our CO^2 problem on page 19. She quotes a McKinsey figure that CCS could lift the price of the next generation of European power plants by up to $1.3 billion per plant. Carbon recycling is an alternative that treats CO^2 as a commodity instead of a waste. Recycling options are being developed globally to convert CO^2 to formate salts, into algae biofuels, conversion to methanol, or solar photo catalytic conversion of CO^2 to fuels.

(continued page 12)

INDUSTRY NEWS

HITACHI AWARDED

BASKING RIDGE, NJ - Hitachi Power Systems America has been awarded a contract for the design and supply of a Selective Catalytic Reduction (SCR) System from East Kentucky Power Cooperative. The contract includes the design and supply of a SCR System for the Cooper Station's 225 MW net coal fired unit which utilizes eastern bituminous coal.

LEGACY METERS

BOSTON, MA – Ambient and Itron are developing the Ambient® EDC module, providing utilities a true, efficient path from the 60 million legacy ERT meters in the US to more advanced smart metering. "The possibility of leaving assets stranded has prevented many utilities from deploying smart grid technology," said John J. Joyce, ceo of Ambient Corporation.

PROJECT PIONEER

ALBERTA, CAN - Alstom, Capital Power, TransAlta, and the governments of Canada and Alberta created a partnership to construct a large-scale carbon dioxide capture and storage demonstration facility named Project Pioneer. Project Pioneer will be located at the Keephills 3 power plant, a 450 mw supercritical coal fired power plant to be built in Alberta.

BECHTEL PARTNERS

OAKLAND, CA - BrightSource Energy selected Bechtel as the engineering, procurement and construction (EPC) contractor for the 440 mw Ivanpah Solar Electricity Generating System in California. Bechtel Enterprises will become an equity investor in all of the Ivanpah solar power plants.

"We are proud to have been selected by BrightSource as its EPC partner on the Ivanpah facility and to have the opportunity to invest in the projects," said Ian Copeland, president of Bechtel Renewables and New Technology. Copeland is a member of World-Gen's Class of 2008.

The Ivanpah facility is scheduled to begin construction in early 2010 following final permitting by the California Energy Commission and the Bureau of Land Management.

In December 2008, BrightSource signed an agreement with Siemens for the largest ever solar-powered steam turbine generator for the first of the Ivanpah projects.

ROLLS-ROYCE INVESTS

MOUNT VERNON, OH - Rolls-Royce unveiled new assembly flow lines for its RB211 and Trent 60 gas turbine packages and state-of-the-art industrial gas turbine test facilities at its Mount Vernon operation. Total investment at the site exceeds $33 million, and is expected to provide 180 additional jobs, joining 1,100 Rolls-Royce employees already in Mount Vernon.

As part of the investment, two new test buildings housing a total of seven state-of-the-art industrial gas turbine test bays have been constructed. Additionally, two existing structures have been remodeled to house modern assembly flow lines for two Rolls-Royce engine-powered packages, the RB211 and Trent.

MANDATORY GHG

WASHINGTON,DC - On September 22, 2009, the U.S. Environmental Protection Agency (EPA) issued final rules requiring mandatory reporting of greenhouse gas (GHG) emissions from large GHG sources, according to the Environment Law ALERT issued by Leonard, Street and Deinard.

The EPA estimates that approximately 10,000 facilities will fall within the scope of this rule. The purpose is to collect data on GHG emissions to develop future regulation of carbon emissions, such as a carbon tax or a market based cap-and-trade program. GHG sources are required to begin collecting GHG emissions data beginning January 1, 2010, and submitting annual reports to EPA beginning March 31, 2011.

ROCKWELL'S GREENPRINT

MILWAUKEE, WI - Rockwell Automation has developed a new portfolio of manufacturing solutions to help companies save up to $6 billion a year. The portfolio includes a series of plant-wide energy optimization tools that create an integrated industrial energy management system based on Rockwell Automation industrial automation and information technology. It also will allow manufacturers to perform real-time load-balancing of their industrial processes, bring renewable energy sources online and execute demand response strategies connected to the Smart Grid.

SIEMENS INVESTS

CHARLOTTE, NC - Siemens Energy celebrated the groundbreaking for their new 60,000-square-foot expansion to the existing Siemens Steam Turbine-Generator Manufacturing plant in Charlotte.

Siemens plans to invest nearly $50 million and create 226 new engineering and manufacturing jobs at this location.

B & V TEAMS

ROCKVILLE, MD - Black & Veatch and Lockheed Martin have teamed to help utility clients improve reliability, efficiency and interoperability of the electric power grid and protect it against cyber attacks. The companies offer a comprehensive suite of integrated technology solutions and request grants offered by the DOE's Smart Grid Investment Grant Program.

PATTERN INKED

SAN FRANCISCO, CA - Riverstone Holdings and the management at Babcock & Brown's North American Energy Group purchased the 2,000 mw wind development portfolio from Babcock & Brown to form Pattern Energy Group, and its 4,000 mw development pipeline in windpower in 11 states and 4 countries, plus several transmission projects.

PLUG-IN HYBRID

LONG BEACH, CA - A plug-in hybrid electric terminal tractor used to move shipping containers will be tested at the Port of Long Beach, coordinated by EPRI.

The three-month demonstration project is part of a one-year demonstration, during which the tractor will also be tested and evaluated at ports in Savannah, GA, Mobile, AL, Houston, TX and New York City.

AEP DEPLOYS

ATLANTA, GA - AEP Ohio will purchase 110,000 GE smart meters as part of its gridSMARTSM demonstration project. Smart meters work in conjunction with grid automation technologies to provide real-time information. The meter deployment begins in 2010.

MPSA EXPANDS

LAKE MARY, FL - Mitsubishi Power Systems Americas will break ground on an advanced turbine manufacturing and service center near Savannah. GA. MPSA is establishing the facility for power generation and utility customers throughout North and South America.

PB SOLD

NEW YORK, NY - Parsons Brinckerhoff has agreed to be acquired by Balfour Beatty, for $626 million. Balfour Beatty is an international engineering, construction services company working principally in the UK, the US, Asia and the Middle East.

INDUSTRY NEWS

QUANTA ACQUIRES

HOUSTON, TX - Quanta Services has signed an agreement to acquire Price Gregory Services, valued at approximately $350 million. "The acquisition of Price Gregory will significantly expand the scale and scope of Quanta's existing natural gas operations," said John R. Colson, chairman and chief executive officer of Quanta and a member of World-Gen's Class of 2004.

CSU LAUNCHES EIQ

LONG BEACH, CA – The California State University submitted an application to the Department of Energy for funding to install, demonstrate and study smart grid technology.

The eIQ project will install advanced utility metering in 934 buildings at all 23 campuses, and cut utility spending by 15 to 20 percent.

CDP PARTNERS

NEW YORK, NY - The Carbon Disclosure Project plans to build an improved and upgraded version of its global climate change disclosure system. The system will make available primary information on corporate emissions performance collected by institutional investors, businesses and the world's national regulatory systems. CDP is partnering with Accenture, Microsoft and SAP.

SIEMENS INKS 565 WIND MWS

ORLANDO, FL - Siemens Energy has been awarded six new wind turbine orders in North America: two in Canada and four in the U.S., totaling $900 million.

"Importantly, these orders show how North America has been able to lay a groundwork to sustain this renewable industry over the long-term," added Randy Zwirn, president and CEO of Siemens Energy, Inc. "Five years ago, Siemens had one employee working in wind energy in the U.S. Today we have 900. And with continued investment and growth in this industry, as evidenced by these orders, the number of green jobs should only continue to grow." Zwirn is a member of World-Gen's Class of 2000.

On September 17, Siemens celebrated the groundbreaking of its planned wind turbine assembly facility in Hutchinson, KS. The 300,000-square-foot wind turbine nacelle facility is scheduled to become operational in fall 2010 and is expected to employ up to approximately 400 "green-collar" employees. The plant's annual planned output is approximately 650 nacelles - or 1,500 rated megawatts.

Siemens also recently expanded its 600,000-square-foot blade manufacturing facilities in Fort Madison, Iowa, which it opened in 2007 (see World-Gen, V. 19, #4).

ABB, TRILLIANT NETWORK

WASHINGTON, DC - ABB and Trilliant announced successful interoperability of Trilliant's SecureMesh™ communications network with ABB's Station Automation and Protection products. "The demonstrated interoperability of Trilliant's SecureMesh network with ABB's automation products is another significant proof point in the maturation of the Smart Grid," said Andy White, President of Trilliant. White is a member of World-Gen's Class of 2004.

AREVA'S IED'S

PALO ALTO, CA - AREVA's Transmission and Distribution division will supply thirteen intelligent electronic devices (IEDs) to Smart Grid research conducted by Electric Power Research Institute at its labs in Knoxville, Charlotte, and Lenox.

The devices will include IEDs for distance protection, transformer protection, line current differential management, feeder management, phasor measurement and GPS time synchronization.

VOGT TO SUPPLY

LOUISVILLE, KY - Vogt Power International has been selected to supply South Mississippi Electric Power Association with two Heat Recovery Steam Generators for the Moselle repower project.

"We are pleased that our equipment was selected and will assist SMEPA to improve their efficiency, flexibility and overall system performance," said Ron Pancari, Chief Operating Officer of Vogt Power International.

SIEMENS NETWORKS

ORLANDO, FL - Siemens Energy and Silver Spring Networks tested the Siemens SICAM substation automation unit over Silver Spring Network's Smart Energy Network. "Siemens' unique ability to create solutions that fit into an existing grid, and grow with new developments and changes in the grid, make the automation solutions we're delivering a strong strategic move," said Dave Pacyna, Senior VP, Siemens Energy's North American T and D Divisions, and a member of *World-Gen's* Class of 2003.

PLAN UNVEILED FOR SMART GRID

WASHINGTON,DC - Commerce Secretary Gary Locke unveiled at GridWeek, attended by World-Gen, an accelerated plan for developing standards to transform the US power distribution system into a secure, more efficient and environmentally friendly Smart Grid and create clean energy jobs. Produced by the Commerce Department's National Institute of Standards and Technology (NIST), the document identifies about 80 initial standards that will enable the vast number of interconnected devices and systems that will make up the nationwide Smart Grid to communicate and work with each other. These standards will support interoperability of all the various pieces of the system, ranging from large utility companies down to individual homes and electronic devices.

GE EXPANDS

TRONDHEIM, NOR - GE completed the acquisition of ScanWind, a developer of advanced drive train and control wind turbine technologies aimed at offshore deployment. "The acquisition of ScanWind is an important step in our strategy to place GE in a strong position in the growing offshore wind segment," said Victor Abate, Vice President of Renewable Energy for GE Energy. Abate is a member of *World-Gen's* Class of 2008.

BABCOCK ACQUIRES

DANVERS, MA - Babcock Power Services has acquired all assets of Welding Technologies located in Gainesville, GA. Welding Technologies provides field welded repair, replacement and refurbishment of plant equipment for the power generation industry.

NIST AWARDS

GAITHERSBURG, MD - The National Institute of Standards and Technology awarded EnerNex Corporation an $8.5 million contract to accelerate development of compatible standards required to build a secure, interoperable smart grid. The contract will run for up to two years.

ITRON DEPLOYS

LIBERTY LAKE, WA - Itron Inc. started full field deployment for its OpenWay advanced metering infrastructure solution to Southern California Edison. "OpenWay offers SCE a smart metering and communication system with advanced benefits and functionality," said Malcolm Unsworth, Itron president and ceo.

INDUSTRY NEWS

AMSC SIGNED

DEVENS, MA - AMSC has signed a $100 million contract with Sinovel Wind for wind turbine core electrical components to be deployed in Sinovel's 3 megawatt SL3000 wind turbines co-developed with AMSC Windtec™. Sinovel is China's largest wind turbine manufacturer and the world's fifth largest.

IBM UNVEILS

ARMONK, NY - IBM unveiled a new standards-based industry software platform that will enable utilities to accelerate the development of their smart utility solutions. The new Solution Architecture for Energy and Utilities Framework brings the capabilities of IBM software to power solutions across all areas of a utility.

SIEMENS ACQUIRES

ERLANGEN, GER - Siemens AG is to acquire the solar thermal power company Solel Solar Systems Ltd. "After the rapid and highly successful expansion of our wind power business, we now want to continue this success story in the solar sector," said Siemens President and CEO Peter Löscher.

ENERNOC TRACKS

BOSTON, MA - EnerNOC announced its latest version of CarbonTrak that provides a carbon accounting system designed to measure, manage, and report greenhouse gas emissions and prioritize GHG reduction efforts. CarbonTrak transforms GHG accounting into actionable information to cut energy usage and costs.

ITRON PARTNERS

LIBERTY LAKE, WA - Itron Inc. announced a partnership with OpenPeak Inc. for integration of Itron's advanced metering systems with OpenPeak's Home Energy Management Solution.

Philip Mezey, Itron North America senior vice president and chief operating officer said: "Itron's advanced meters, installed in homes, have the power to unleash a tremendous amount of valuable data about the fluctuating price of electricity, or the rate of natural gas consumption."

LOCKHEED MARTIN WINS

ROCKVILLE, MD - Lockheed Martin has been selected as one of several contractors to support the Environmental Protection Agency's Information Technology Solutions.

Lockheed Martin and its team will provide a broad range of information maintenance and services across the EPA.

VPI SELECTED

LOUISVILLE, KY - Vogt Power International received an order to supply the Heat Recovery Steam Generators for Progress Energy's Richmond County Energy Complex.

The combined-cycle plant, fueled primarily by natural gas, will generate approximately 600 megawatts of electricity.

SIEMENS, PJM INVEST

ORLANDO, FL - Siemens Energy and PJM Interconnection announced the release of the Spectrum Power(TM) Shared Architecture Integration Platform and its components.

This new architecture is the result of a joint investment by Siemens and PJM. The software binaries may be licensed through Siemens.

SIEMENS INNOVATES

ALPHARETTA, GA - The Siemens SPPA-D3000 suite continually analyzes, evaluates and reports machinery health, as well as overall plant health, making it more advanced and more accurate than other diagnostic products.

Siemens offers a comprehensive solution, from the machinery to the main I&C system, with advanced technology and benefits in the field of machinery protection.

LOCKHEED MARTIN INKED

ROCKVILLE, MD - Lockheed Martin was awarded a three-year $12.7 million contract by Pepco Holdings, Inc., to implement energy efficiency and conservation programs and services. The program runs until 2011.

ROLLS- ROYCE EXPANDS

COLUMBUS, OH - Rolls-Royce will expand its Ohio fuel cell research operations. Rolls-Royce Fuel Cell Systems will invest in testing equipment to consolidate its research and development at its North American headquarters.

ABB TURNKEYS

ZURICH, SW– ABB won an order worth $30 million from Hydro One Network to provide a turnkey static Var compensator (SVC) solution for a substation serving the Toronto area. ABB will design, supply, install and commission the system, scheduled for completion by 2011.

CANADA'S 1ST SOLAR

STONE MILLS, ON - SunEdison Canada and SkyPower announced the activation of Canada's first ground mount photovoltaic solar system.

The 9.1-megawatt project named First Light covers 90 acres of land, about the size of 50 Canadian football fields. The system will remove almost 8,000 metric tons of CO(2) from the air in its first year.

CCS VALIDATED

PALO ALTO, CA - The Electric Power Research Institute has joined with AEP and Alstom in a validation of advanced carbon dioxide capture and storage technologies at AEP's 1,300-megawatt Mountaineer plant in New Haven, WV.

The project will operate for up to five years.

AMSC SELECTED

DEVENS, MA - American Superconductor Corporation received an order for 17 sets of full wind turbine electrical systems from Hyundai Heavy Industries.

HHI will use the electrical systems in 1.65 megawatt doubly fed induction wind turbines it will be producing under a license from AMSC.

HORIZON WIND PARTNERS

HOUSTON, TX - Horizon Wind Energy has closed $101.9 million of institutional equity financing from JPM Capital Corporation in exchange for a partial interest in its 100.5 MW Rail Splitter wind farm project installed in June 2009 in Illinois.

The institutional equity investment will provide the investor with access to the accelerated asset depreciation (MACRS) benefits and to the cash grant.

INTERNATIONAL NEWS

BRAZIL

Wärtsilä has been contracted to operate and maintain the Geramar I and Geramar II power plants in Miranda do Norte. Generating a total of 320 MW for the national grid, this 5-year operations and maintenance agreement will result in the creation of approximately 60 new jobs.

BRAZIL

Alstom has signed a 30 million euros contract with Companhia de Geração Térmica de Energia Elétrica for the retrofit of units 3 and 4 of the Presidente Médici III power plant near Candiota City. Alstom's scope involves the upgraded components at the boilers of the two 160 MW units.

CHINA

Westinghouse Electric Company, its consortium team member The Shaw Group, China's State Nuclear Power Technology Corporation and Shandong Nuclear Power Company successfully completed the first pour of basemat structural concrete for the nuclear island at the Haiyang site.

CHINA

AREVA's Transmission and Distribution launched construction activities for its transmission and distribution Technology Center located in Shanghai's Caohejing Pujiang High-Tech Park.

With an initial investment of approximately $50 million, the AREVA T&D China Technology Center will be the first research and development center to be built by an international T&D company in China.

CHINA

GE Energy has signed a $115 million, nine year service agreement with Fujian Jinjiang Gas Power Co. The agreement covers four Frame 9FA gas turbines at the 1,500 mw Fujian Jinjiang plant.

CHINA

Alstom won an order to supply eight emergency diesel generators to the Taishan nuclear power plant in Guangdong. The Taishan project is part of China's plan to increase its total installed nuclear power generating capacity from about 1.2% to 5% by 2020.

CHINA

American Superconductor Corporation has received its second order for a D-VAR system from Beijing-based China National Machinery Industry Complete Engineering Corporation for Phase I of the Guanting Wind Farm.

COLOMBIA

Emerson Process Management completed a dual fuel-conversion initiative that enabled the Termocandelaria Power Plant to operate using either natural gas or oil. The project is the latest collaboration between Emerson and MPSA, which in 2008 formed an alliance for turbine retrofit projects.

FINLAND

Siemens Energy has been selected as the capture technology partner for the FINNCAP - Meri-Pori Carbon Capture and Storage (CCS) project by the owners of Meri-Pori power plant, Finnish utilities Fortum and Teollisuuden Voima Oyj (TVO). The coal-fired power plant is located at Pori in Western Finland and has an installed capacity of 565 MW. Fortum and TVO plan to apply for the European Flagship Programme with Siemens capture technology.

FRANCE

Alstom Power and Energias de Portugal Renovaveis (EDPR) have started the world's first wind farm to use the ecotècnia 100 wind turbine, designed and installed by Alstom Power. The site, at Vieux Moulin near Pithiviers in France, is the 12th wind farm to be fitted by Alstom Power.

GERMANY

Siemens Energy has successfully completed trial operation of the world's most powerful gas turbine, the SGT5-8000H, in the Irsching 4 power plant on schedule. After 1500 operating hours, 1200 at full load, and evaluation of the measured data the machine's original rated output of 340 megawatts was raised to 375 mw in simple cycle duty. In combined cycle operation output will increase by 40 mw to more than 570 mw.

GERMANY

E.ON and Siemens are putting a pilot CO2 capture plant into operation at the E.ON power

plant Staudinger in Grosskrotzenburg near Hanau. E.ON and Siemens intend to run the pilot plant until the end of 2010. The results achieved and the operating performance of the pilot plant will serve as the basis for large-scale demonstration plants, which are scheduled to start operation in the middle of the next decade.

INDIA

Vestas has received an order for 60 units of the V82-1.65 MW wind turbine from CLP located in Theni in the state of Tamil Nadu, South India. CLP is one of Vestas' long-term global customers, with installations in both China and Australia. In India, CLP currently owns and operates 100 MW of wind power with 245 MW under construction

IRAQ

Land O'Lakes International Development Division announced phase three of the Fallujah Widow's Dairy Development Program in Iraq. The goal of the multi-phased program, which started in October 2008, is to create a sustainable source of income for dairy farmers in Fallujah, Iraq, by providing a market for their excess milk and enough dairy products to meet consumers' demand. Phase Three of the program is to build a Modular Milk Collection plant that will provide training and employment opportunities for women, as well as introduce raw and value-added dairy products such as pasteurized milk in bulk, sachets and yogurt in different sized packaging.

IRELAND

LGC Skyrota Wind Energy has been selected as the preferred supplier of gearbox maintenance services by Eco Wind Power Ltd., a Dublin-based wind farm operator.

ISRAEL

Siemens invested $15 million in the Israeli solar company Arava Power for a 40% stake. Arava Power develops, builds and operates photovoltaic plants in Israel. Israel's aim is to meet around ten percent of its total energy needs with renewable energy plants by 2020.

JORDAN

Ausra, Inc. has been selected as the solar steam boiler supplier for the proposed 100-megawatt JOAN1 concentrated solar thermal power project currently under development in Ma'an. The project is expected to enter operation in 2013 and will be the largest CSP project in the world using direct solar steam generation.

KOREA

The Korean government unveiled its national renewable energy plan. The plan will cost 111.5 trillion won (about $85.8 billion) between now and 2030. Nearly a third will come from the government. Of that amount, 100 trillion won (about US$76.9 billion) has been allocated for the promotion of renewable energy and 11.5 trillion won (about US$8.8 billion) will be used to develop green technologies. Korea also is expected to be one of the world's largest exporters of renewable energy technologies, including wind turbines.

KUWAIT

The Kuwait Ministry of Electricity and Water has signed a turnkey contract with GE and Hyundai Heavy Industries totaling $2.65 billion for a new, 2,000-megawatt power plant in Sabiya.

MEXICO

Alstom won a $24 million contract to install air quality control systems on units 1, 2 and 3 of the Mazatlán power plant, operated by Comisión Federal de Electricidad in the state of Sinaloa.

PAKISTAN

Wärtsilä has been awarded a five year operations and maintenance (O&M) agreement by the Nishat Group of Companies. Nishat Power and Nishat Chunian Power are independent power producers supplying electricity to Pakistan's national grid.

POLAND

Foster Wheeler Global Power Group has been awarded a contract by ZE PAK S.A. for the design, supply and erection of a 55 MWe biomass-fired circulating fluidized-bed boiler island for the Konin Power Station.

RUSSIA

Siemens Energy has received an order from the Russian company OOO RN-Tuapsinskiy NPZ for the supply of six industrial gas turbine generators. The SGT-800 gas turbine-generators, each rated at 47 megawatts, will be operated in the Tuapse refinery located on the Black Sea. The first three gas turbines are scheduled for delivery by late 2010, with the remaining three units to follow by the end of 2012. The order is valued at approximately EUR90 million.

NEWSMAKERS

COVENTRY NAMED


Bruce D. Coventry

Bruce D. Coventry has been named president of Dresser Waukesha, succeeding Barry Glickman, who has been appointed president of Dresser's Flow Technologies business.

SHOCKLEY JOINS


Carolyn Shockley

Carolyn Shockley will join EPRI as vice president of its Fossil Generation sector. Shockley was general manager of GE Energy's Performance Services.

AWEA EXPANDS

The American Wind Energy Association expanded the Governors' Wind Energy Coalition with the nomination of Rhode Island Governor Donald L. Carcieri to serve as the Coalition's new vice chairman.

MARSULEX APPOINTS

Marsulex appointed Randy Hull as Senior Vice President, Development. He will be based in Toronto.

AMPHORA APPOINTS


John R. Beaty

Amphora has named John R. Beaty II President, Amphora Americas based in Houston. Amphora also has offices in Hyderabad, India, and Rome, Italy.

VENTYX APPOINTS VP


Norm Richardson

Ventyx announced the addition of Norm Richardson to the company's Advisory Services team as VP of Power Markets.

GARCIA JOINS

The Wurldtech team announced that Greg Garcia, former Assistant Secretary for Cyber Security and Communications with the US Department of Homeland Security, has joined its advisory board.

FUEL TECH APPOINTS

Fuel Tech, Inc. announced that Mr. Robert E. Puissant has been named Executive Vice President, Sales and Marketing.

AUSRA NAMES


Dr. Thomas Caulfield

Ausra named Dr. Thomas Caulfield President and Chief Operating Officer. Dr. Caulfield will accelerate the company's transition from a power plant developer to a global solar steam systems provider.

NEWCOMB JOINS


Deanna L. Newcomb

McDermott Will & Emery announced that Deanna L. Newcomb will be joining the Energy & Derivatives Markets Practice Group in the Houston office.

BATTISTA ELECTED

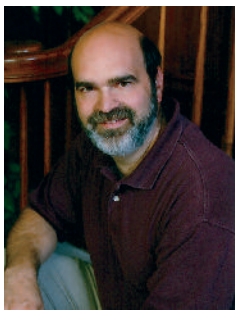
Valerio Battista, ceo of the Prysmian Group, has been elected President of the International Cablemakers Federation, the association of manufacturers of cables and systems for energy, data and telecom.

DIVINE NAMED CEO


J. Douglas Divine

Eagle Crest Energy Company announced that J. Douglas Divine has been named Chief Executive Officer. Divine recently served as Vice President, Project Development for BrightSource Energy.

ELY NAMES CEO


Joe Ragosta

Joe Ragosta has been named ceo of Ely Energy. Ragosta holds a PhD and MSc in Chemistry from Cornell.

INEA ELECTS


Phillip J. Finck

Idaho National Laboratory's Phillip J. Finck, Ph.D. has been elected to membership in the elite International Nuclear Energy Academy (INEA).

FLANAGAN-PUBLISHER'S LETTER

CONTINUED FROM PAGE 3

John Bourne writes on page 20 that in 2008, the global solar market increased 50 percent, and the US advanced to third place globally behind Spain and Germany. The market demand for solar has grown an average of 30 percent for the past five years, helped by incentives on the state level, and a 30 percent federal tax credit for commercial customers.

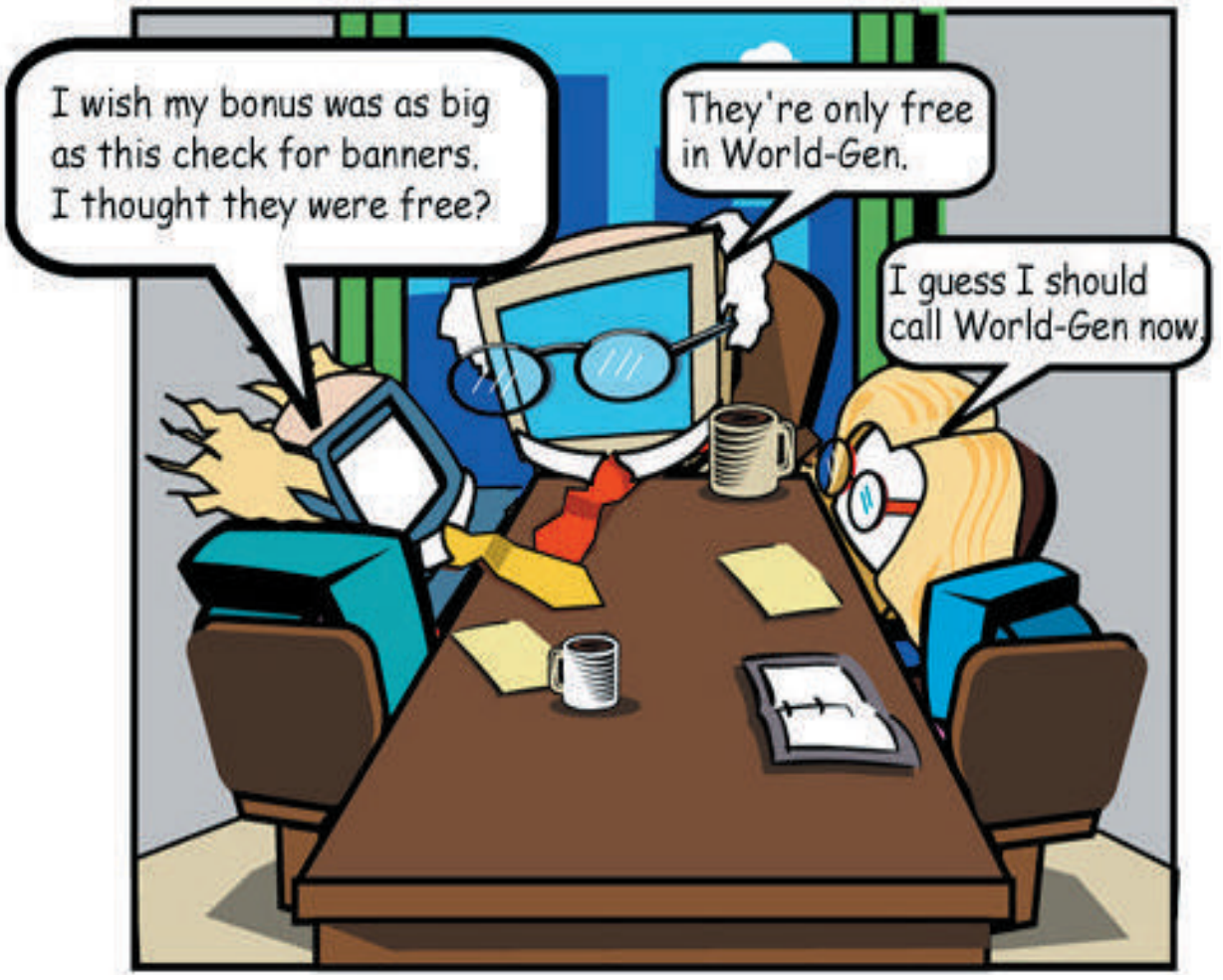
2010 Schedule

World-Gen is pleased to announce our 2010 Media Kit, also on world-gen.com.

- *Jan/Feb – Class of 2010*
- *March/April – EEI, PGE, AWEA*
- *May/June – CG '10, GTC –'10, WEC*
- *Sept/Oct – SPI, GridWeek, ANS*
- *Nov/Dec - PGI, Bueche Directory*

The 15th Bueche Directory of Developers is on world-gen.com.

Plan on stopping by our PGI exhibit C5-677 in Las Vegas, December 8-10, 2009.



TEN-YEAR SUCCESSFUL ODYSSEY

BY LYN CORUM, CLASS OF 2003

Ten years and two months after PG&E Generating filed an application with the California Energy Commission to construct the 510-MW gas-fired combined-cycle Otay Mesa Generation Facility, it began its commercial life under the ownership of Calpine Corp. The CEC certified the project in April 2001 and PG&E Generating sold it that July to Calpine.

But the project's history goes further back than 1999. In 1992, when all acknowledged that San Diego Gas & Electric would need new capacity by the end of the decade, the utility released a request for proposals to bid against the repowering of the South Bay Generating Station, which they still owned. Fourteen developers responded, some with two proposals. Among the bidders was Sithe Energy who proposed building a 500-MW or 250-MW plant at Otay Mesa.

Without going into details, suffice it to say SDG&E decided it could repower South Bay cheaper than any developer could build a new plant. Soon it changed its mind and decided it would rather buy market power from out-of-state. Under market restructuring in 1998, SDG&E sold South Bay to The San Diego Unified Port District. Sithe went out of business (only to return much later) and PG&E Generating picked up the idea of developing Otay Mesa and submitted its application to the CEC in 1999. (PG&E Generating also went out of business.)

Since Calpine bought the project in July 2001, it has had its own travails with the project, aside from going into bankruptcy and reemerging as a smaller company, with a focus on operations. Once the California Public Utilities Commission approved a 10-year contract between SDG&E and Calpine for the output in June 2004, several consumer organizations asked for a rehearing of the contract decision but it was upheld. Calpine had begun construction in September 2001, but suspended it after land was cleared. After signing the 10-year contract with SDG&E it restarted construction in June 2004.

Calpine again halted construction while the CPUC's contract decision was contested and reheard. Construction was also most likely affected by Calpine's financial problems in 2005 and subsequent filing for bankruptcy in 2006. Construction was restarted for the final time in May, 2007.

The plant itself, now almost 600 MW, is impressive. Its dry cooling system is the largest in California, according to Calpine, and it is fitted with advanced air emissions control equipment. To create emission reduction credits, Calpine paid for retrofitting local marine vessels and sanitation vehicles with new emissions controls.

The 10-year tolling agreement for the full output of the plant, gives SDG&E the ability to dispatch power and ancillary services from the plant. SDG&E will also supply natural gas. It has the right to purchase the plant in 10 years if it so chooses.

NEW ENERGY LEGISLATION

Governor Arnold Schwarzenegger signed several pieces of legislation into law on October 11, the deadline for signing or vetoing new laws. However, as he threatened earlier, he vetoed legislation that would have increased the renewable portfolio standard requiring all utilities to buy renewable resources from 20% of their retail energy sales by 2010, to 30% by 2020. He had already signed an executive order to do exactly that. Why reject the legislation? Because it included strict requirements for limiting renewable power sales to projects located within the state. Labor interests pressured lawmakers to protect in-state jobs. The governor, and other stakeholders, argued that California's renewable resources market is not limited to the state, and is, indeed westwide.

Other legislation he signed into law included increasing the size of projects eligible for the state's feed-in tariff to a maximum of 3 MW. The limit had been 1.5 MW. The CPUC is to set the price for the feed-in tariff to consider costs of environmental compliance and the value of distributed generation. The current feed-in tariff is low enough that only 13 projects have requested to sign up for the tariff.

Another new law will allow a limited expansion of retail choice. Nonresidential customers will be able to buy power from energy service providers rather than a utility. But there will be limits as to how many customers may leave each utility. The maximum allowable annual limit is to be determined by the CPUC. They may also decide in the future when to allow residential customers the ability to chose energy service providers.

But the major battle in the state legislature this year regarding energy was whether to exempt new gas-fired power projects from certain air emissions rules in Southern California. Two rules written by the South Coast Air Quality Management District allowing power projects to buy emissions reduction credits from its priority reserve account were thrown out in a 2008 court decision This account maintained emission reduction credits from retired emitters for use by fire stations, schools and other public interest entities who wished to build new facilities.

SCAQMD had included power projects in this category when it became apparent new power plants were needed to serve an increasing electricity demand, and the need to retire dirty power plants in the Los Angeles basin. ERCs for PM10 were virtually not available in the open market.

Senator Rod Wright wrote initial legislation which would have nullified the court order, returning SCAQMD's rule to what it was in 2007. However, environmentalists put up such a fight he wrote new legislation excluding power plants. Hundreds of thousands of small projects by public interest entities will get built, with the promise of creating 60,000 jobs, but less than a dozen power projects will probably have to follow the lead of Competitive Power Ventures which sponsored individual legislation to guarantee that its project will get built.

Assemblyman V. Manuel Perez introduced legislation, which the governor signed, that releases emission reduction credits to the 600-MW natural gas-fired combined cycle CPV Sentinel Energy Project. Why this plant? It has a contract to sell the power to Southern California Edison and will provide backup for all the future intermittent wind- and solar-generated power being signed up by SCE and other utilities.

A little noticed rule SCAQMD added to its two rules in 2007 and still in effect requires developers to hold power purchase agreements with a Southern California utility for their plants' output in order to qualify for ERCs from its priority account.

BARRIERS FOR NEW PLANTS

This last requirement was one of the several roadblocks that spelled the end for the 943-MW gas-fired combined-cycle Southeast Regional Energy Center the City of Vernon wanted to build. It had filed an application at the California Energy Commission in 2006 to certify the project. The project has been unable to overcome significant barriers and withdrew its application from the CEC September 29. Subsequently, the commission terminated its review of the application. on October 21. Changing power markets made the project an anachronism and had it been one-fifth its size, it might have stood a chance.

The major barriers included the project's inability to obtain emission reduction credits due to the same 2008 court ruling invalidating SCAQMD's rule allowing power projects to buy ERCs from its priority reserve account. Subsequently, SCAQMD denied Vernon a permit to construct the project.

Furthermore, the project would not have been able to comply with SCAQMD's rule requiring it to sell, under a long-term contract, its 700 MW of excess power to a Southern California utility. And it had no prospects for signing such a contract.

Lastly, the City of Vernon had not been able to acquire control of the site on which it wanted to build the plant. The land contained substantial hazardous materials and could not be sold until they were removed.

SPACE-BASED SOLAR?

Pacific Gas & Electric has asked the CPUC for approval of its 15-year, 200-MW contract with Solaren Corporation for power generated by a first-of-its kind space-based solar project. Solaren intends to build a geosynchronous orbit satellite to collect solar energy and transmit it to a ground receiver station in Fresno County for conversion into electricity. The operational date is June 2016. The CPUC released a proposed resolution in October approving the contract, but a majority of the commissioners must approve it before it is finalized.

According to PG&E, Solaren was founded in 2001 to develop, engineer, test, construct and operate space solar generating stations. The concept has been researched in the US over the past 40 years, PG&E said. Solaren's website provided no information on the company.

The commission staff acknowledges in the proposed resolution it has concerns about the viability of the project since Solaren will need to address several significant technological and regulatory barriers before the emerging technology can be commercialized. However, the staff decided to support PG&E's agreement with Solaren because it is consistent with the state's objective to increase reliance on renewable energy resources, and it will help support the advancement of new renewable technologies "at reasonable costs and risks to ratepayers."

Conditions being imposed on PG&E are that the utility will not rely on the proposed project for renewable portfolio standard compliance or procurement planning purposes prior to meeting certain development milestones. Actual costs are being kept confidential, but while payments PG&E makes to Solaren are fully recoverable in rates over the lifetime of the agreement, they are subject to commission review of PG&E's administration of the agreement.

NATURAL GAS — A GAME CHANGER?

BY BRAD KITCHENS, CLASS OF 2006

It is difficult to believe that we are one year beyond the feared collapse of our financial system, seemingly pulling out of a deep recession, and recovering rather nicely from what was a greater than 50% drop in stock prices from October 2007 to March 2009. In particular, the electric power sector weathered this downturn relatively well. Its stock decline was somewhat muted compared to the broader market, but so too has been its recent run up. Without question though, the recession has been felt – witness the power usage drop of over 5% during the January to July 2009 timeframe versus the same period in 2008.

Amidst this downturn, the industry has seen a dramatic shift in fuel prices – particularly crude oil and natural gas. In the summer of 2008, we saw oil prices nearing $150 a barrel and gas prices reached $13 per million BTU (MMBTU). Meanwhile, coal pricing has remained relatively steady. Eastern coal did spike during the summer of 2008, but prices have moderated since, reflecting increased pricing discipline as supply sources have consolidated. These days the focus of the utility industry seems to center on the price of natural gas. Looking at the graph, there has been a precipitous drop, and thus far, sustained drop in gas prices.

CAUSES OF THIS TREND

This recent freefall in natural gas prices has been the result of a confluence of factors. First, the recession has caused a significant change in gas and power demand. Industrial sector gas consumption for the first seven months of the year has fallen by 13% year over year from 2008. Additionally, mild weather has had an impact; for example, there were fewer than "normal" heating degree days over each of the past four years.

Recall the mid-2000s, as politicians and regulators were concerned with the availability and deliverability of gas. Domestic production was losing pace to domestic demand. Storage, LNG development, offshore gas development, and pipeline expansion were pushed by industry and policymakers. While offshore gas development has not been aggressively pursued, some other storage and deliverability constraints have been alleviated. Pipeline capacity has increased by 88 BCF/day to total about 210 BCF/day for both inter- and intra-state capacity. Natural gas peak underground storage capacity stands at about 3.9 TCF (about 5% greater than just two years ago). And supply development continues, most notably the proposed Alaska pipelines linking Alaska's North Slope with U.S. markets, slated for completion around 2020.

The biggest story, however, is the improvement in the cost curve of producing gas from unconventional sources – shale and tight gas structures. Advances in drilling and hydraulic fracturing have, according to some, reduced the resource cost to under $5 per MMBTU. In addition, in some cases, like the Marcellus, Huron, and Utica shale formations, these resources are closer to Eastern markets than traditional Texas, Gulf and Canadian supplies. Some estimates put U.S. gas reserves at nearly 2,000 TCF, roughly a 100 year supply at current consumption levels. This is a big increase in just the past two years and most of it is attributable to these shale structures. Although there are plenty of skeptics on the prolificacy of these shales, neither gas futures prices nor pundits forecast significant upward pressure on gas prices for the foreseeable future.

IMPACTS ON GENERATORS

Implications of this new "cheap" gas have been profound. Coal generation, already challenged by aging plant, rail issues, and water usage constraints, and haunted by pending carbon emissions legislation, has come under pressure. Competitive coal generators have been squeezed by lower market clearing prices and hence lower margins.

In some regions, coal-fired generation has moved behind some gas units in the dispatch order. Take-or-pay coal contracts have kept some coal units operating despite competitive gas prices. Given the ascendancy of gas-fired generation, many firms have begun to rethink their coal procurement and inventory strategies.

The impact of the gas-coal "inversion" differs depending upon the region in which generators operate. The effect of cheap gas has been most pronounced in the Southeast, where there is plenty of gas-fired combined cycle generation which competes for marginal dispatch against certain coal-fired units.

For other regions, industry observers have pointed to other limitations against ready displacement of coal units as a result of cheap natural gas, including ramping constraints, take-or pay clauses in many term coal contracts with dollars effectively spent for coal regardless of gas price fluctuations, and locational considerations (e.g., no combined cycle units in the same area).

The impact of these differences is creating challenges for resource planning. For example, those trying to develop new nuclear units are having to weigh and balance the lower capital costs of gas generation, likely carbon limitations and pricing, future gas price volatility, and the unpredictability of political and regulatory support. This balancing act is made more difficult now that gas prices are exceptionally low versus previous years' levels and many forecast prices at these current levels for the next several years. Further, the Senate's recent climate bill – Clean Energy Jobs and American Power Act – seems to stress natural gas as a preferred fuel source for generation.

TOO GOOD TO BE TRUE?

Both natural gas and power industry observers want to know whether this gas price dynamic is sustainable. Recall that gas prices hovered around or just below $2 per MMBTU for over 20 years, throughout the 1980s and 1990s. As recently as 1998, gas prices settled at just above $2 per MMBTU and the U.S. Energy Information Administration saw a "high case" for gas prices at around $3.25, but that level was not expected to be reached until 2020. Of course, these bearish price projections hit some serious bumps in the early and mid-2000s. It seems reasonable to expect pressure to mount on gas prices as a result of a likely economy-driven demand rebound or other unexpected supply issues.

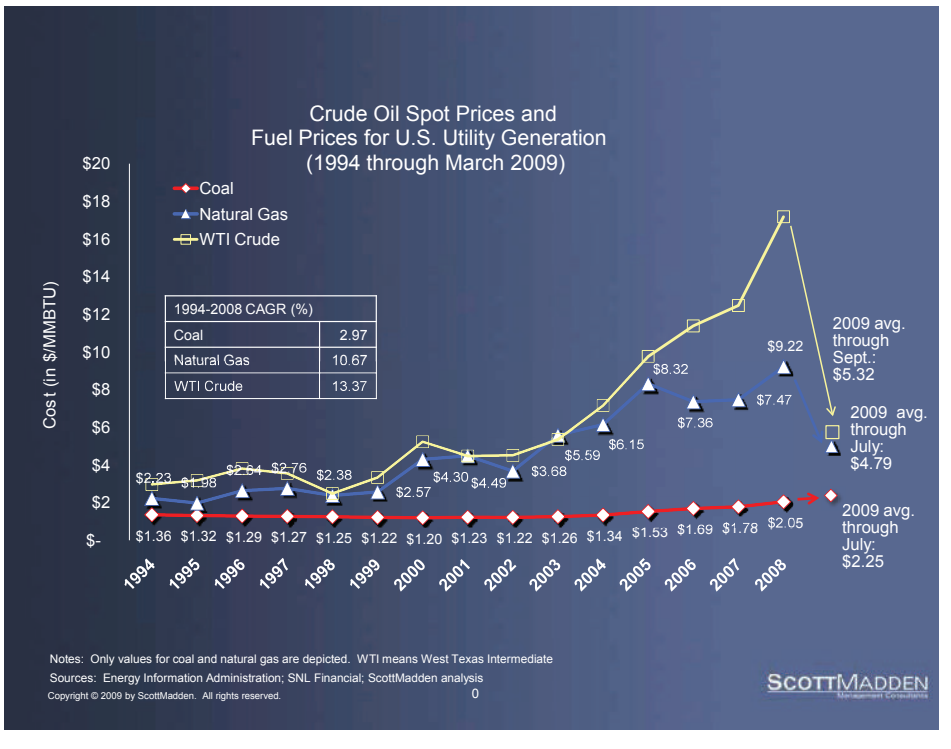
Demand recovery could occur more rapidly than we think. New coal generation remains politically and legally difficult to site and nuclear development is moving forward very slowly, so many expect that gas-fired combined cycle units will fill any base-load supply gaps in the near- to intermediate-term.

Second, we now see that global recovery has advanced in developing economies more quickly than in the United States. McKinsey Global Institute projects a return to 3.5% annual growth in energy consumption in China and India, occurring as early as 2010 but likely by 2013. Thus far in 2009, while worldwide GDP has contracted at approximately 1.5%, according to McKinsey, energy consumption is projected to grow at about 1%. Now consider worldwide energy consumption in the face of a heated worldwide economy. This could certainly have a ripple effect in an increasingly global natural gas market.

Third, whether or not there is agreement in Copenhagen, the momentum toward domestic climate change legislation will likely continue. This will formalize the shift from coal-fired generation toward alternative fuels, including gas.

Finally, weather plays an important part. In tandem with economic recovery, an extended bout of extreme temperatures could deplete some of the storage "cushion" that has helped keep natural gas prices down.

On the supply side, the big story has been the much improved economics of unconventional gas supplies. But infrastructure to drill, gather, and pipe gas from some of these plays must still be developed. Persistent low natural gas prices might serve to hold back some of this and other gas development. Consider also that hydraulic fracturing has raised opposition in environmental circles. State regulatory scrutiny has increased and federal legislators have taken an interest in its regulation. Even without federal regulation, increasing state oversight and local activism may slow development and increase costs of some promising plays. Director of Energy Research, Greg Litra, contributed to this article.



DOE LOAN GUARANTEE PROGRAM

BY KAREN B. WONG

Title XVII of the Energy Policy Act of 2005 established the Federal Loan Guarantee Program (the "Loan Guarantee Program") in August 2005. From the outset, though, the program has been plagued by administrative difficulties. The original rulemaking process was cumbersome and difficult. Interagency disputes regarding appropriations for the program, regulatory red-tape and institutional inertia slowed its implementation. Remarkably, the first conditional award under the program was not announced until March 2009, and the first loan guarantee not issued until July 2009.

The program, though may finally be reaching its stride. The American Recovery and Reinvestment Act of 2009 (the "Recovery Act") injected even greater urgency into the Loan Guarantee Program and the Obama Administration has made the success of the program a top priority. In recent months, the DOE has issued several new solicitations, announced a number of conditional guarantees, guaranteed its first loan, hired additional employees and consultants to expedite review of loan guarantee applications, proposed revisions to existing regulations to provide more friendly intercreditor terms, and launched the Financial Institution Partnership Program to streamline the issuance of loan guarantees. The prospects for the loan guarantee program now appear to be much brighter.

OVERVIEW

The DOE is authorized to issue loan guarantees under Section 1703 and, as added by the Recovery Act, Section 1705, of Title XVII. The original, pre-Recovery Act provision, Section 1703, permits the DOE to issue loan guarantees to eligible projects that avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases and employ new or significantly improved technologies.

The Recovery Act established an additional, temporary program for the rapid deployment of renewable energy projects by adding Section 1705 to Title XVII. Unlike Section 1703, the Section 1705 authorization is not limited to new or innovative technologies. So-called "commercial" or "conventional" renewables like wind, solar, and biomass are eligible technologies, as are transmission and "leading-edge" biofuels projects. The major advantage of the Section 1705 program is that Congress appropriated $6 billion to pay for the credit subsidy costs associated these loan guarantees. A Congressional "raid" of the Recovery Act appropriation to extend the Cash-for-Clunkers program reduced the Loan Guarantee Program's funding by $2 billion in July, although reports from Capitol Hill indicate that the House leadership will seek to restore the funds as part of the Defense Department appropriations bill.

The DOE interprets the Section 1703 innovative requirement to mean that the technology must not be used in three or more commercial projects in operation for at least five years in the same general application as the proposed project. This requirement has limited the scope of the Section 1703 program and underscores a central paradox of the Section 1703 program: the DOE would like to mitigate the Government's risk exposure with "safe" technologies but at the same time is constrained by the statutory requirement to guarantee only non-commercial technologies.

Because the Section 1705 authorization to offer loan guarantees for "renewable energy systems" overlaps with the DOE's authority under Section 1703 to support innovative renewable energy systems, the DOE permits sponsors of innovative projects to elect for DOE payment of credit subsidy costs. However, if an innovative project elects for DOE payment of credit subsidy costs, it must comply with Section 1705 by (1) commencing construction before September 11, 2011; (2) paying Davis-Bacon prevailing wages; (3) complying with Recovery Act reporting requirements; and, if the project is a "public work," (4) complying with the Recovery Act's Buy American requirements. The DOE's definition of commencement of construction requirements for purposes of Section 1705 creates a higher standard than the Treasury Department's definition of commencement of construction under the Recovery Act's Renewable Energy Grant Program in that Section 1705 requires physical construction to have occurred at the project site, including, at a minimum, exaction for foundations or the installation or erection of improvements.

FINANCIAL INSTITUTIONS PARTNERSHIP PROGRAM

On October 7, 2009, the DOE opened the window for commercial renewable energy generation projects and unveiled its much-anticipated Financial Institution Partnership Program ("FIPP"). This innovative new program is designed to address current deficiencies in credit and capital markets by leveraging private sector expertise with government support. FIPP makes loan guarantees available for up to 80% of a "Guaranteed Obligation," which may not exceed 80% of project costs, such that the DOE will not guarantee more than 64% of project costs. By contrast, under previous solicitations the DOE could guarantee loans of up to 80% of project costs (in the event that the Federal Financing Bank is the lender).

FIPP involves the co-financing of projects with commercial lenders. The Lender-Applicant and other participating lenders are required to share in a significant amount of the risk on a pari passu basis with DOE as guarantor. The program favors relatively simple financing structures, with the expectation being that most successful FIPP guarantees will be issued to projects with "traditional" senior secured debt. In addition, although projects may begin construction before the issuance of a guarantee, completed projects are not eligible for the program, and neither are projects that have received a commitment for post-construction (term) financing.

FIPP departs from the Loan Guarantee Program's previous structure by opening the program to applications from lenders (the "Lender-Applicant") and not from potential borrowers or project sponsors. Under FIPP, the credit analysis of the underlying project will initially and primarily be the responsibility of the Lender-Applicant, who is to evaluate and receive credit approval for the guaranteed obligation as if the guaranteed obligation were not partially guaranteed. Notably, the program carries the additional requirement that the project receives a credit rating of at least BB from Standard & Poor's or Fitch or Ba2 from Moody's.

RECENT ACTIVITY

The DOE is beginning to award and issue loan guarantees. The first conditional guarantee was announced in March and the first award finalized and awarded to Solyndra, Inc., a manufacturer of innovative cylindrical solar photovoltaic panels on September 4, 2009. In addition to the $535 million award to Solyndra, the DOE has also announced conditional loan guarantees to Beacon Power, an energy storage company, and Nordic Windpower USA. Announcements of additional loan guarantees awards are expected imminently. The rolling nature of recent solicitations portends a steady stream of loan guarantees as the program finally gets rolling.

Proposed revisions to the existing regulations would significantly improve the Loan Guarantee Program. In early August, the DOE began a formal rulemaking process to revise existing regulations to provide more favorable intercreditor terms to participating lenders. The existing regulations provide that if the DOE guarantees more than 90% of a loan, the guaranteed portion of the loan may not be "stripped" from the non-guaranteed portion. The DOE's proposed regulations would delete the requirement that the DOE have priority over other lenders with respect to the collateral for guaranteed loans.

OPEN SOLICITATIONS

As of October 20, there are currently two open Loan Guarantee Programs solicitations: the July 29, 2009, solicitation for innovative projects (the "July Solicitation"), and the October 7, 2009, solicitation for commercial technology renewable energy generating projects (the "October FIPP Solicitation"). The July Solicitation announced a rolling application process with seven rounds of review and the October FIPP Solicitation provides for a rolling application process with ten rounds of review. Because past solicitations have been significantly oversubscribed and the DOE's ability to issue guarantees is limited, applicants are encouraged to participate in early rounds.

JULY SOLICITATION FOR INNOVATIVE PROJECTS

The July Solicitation invites applications for loan guarantees in support of debt financing for projects in the United States that "employ energy efficiency, renewable energy, and advanced transmission and distribution technologies that constitute New or Significantly Improved Technologies." Under the July Solicitation, the DOE will undertake due diligence and project underwriting with assistance from independent consultants and outside counsel. Projects under the July Solicitation must satisfy innovative requirement discussed above, but may also qualify for DOE payment of credit subsidy costs, in the event they also qualify for loan guarantees under Section 1703.

OCTOBER FIPP SOLICITATION

The October FIPP Solicitation seeks applications solely for Commercial Technology Renewable Energy Generation Projects, including, without limitation, wind facilities, closed-loop biomass facilities, open-loop biomass facilities, geothermal facilities, landfill gas facilities, trash-to-energy facilities, hydropower facilities (including incremental hydropower) and solar facilities. The solicitation does not invite applications for manufacturing, transmission or leading edge biofuels projects.

POTENTIAL BARRIERS

The success of the program is not assured, nor is it designed perfectly. A

(continued page 22)

ELECTRIC POWER INDUSTRY WEIGHING GREATER ROLE FOR NATURAL GAS IN A CARBON-CONSTRAINED WORLD

BY ROD LOWMAN

The debate over climate change and American carbon policy has caused a national dust-up in the business sector in general and the electric power industry in particular. Relatively quick passage of a climate bill in the U.S. House in June has given way to a protracted debate in the Senate. And even broad-based organizations like the U.S. Chamber of Commerce have come under pressure as companies in and out of the power industry stake out their positions.

The American electric industry has rarely been more divided than it is today over carbon policy, with every organization working to define and refine its positions. But in this fog of uncertainty, business goes on, and hard decisions must be made. Some of the most difficult involve the choice of generation and the fuel to support it. As this work goes on, power generators are coming to understand the role that clean, abundant natural gas will increasingly play in fueling the nation's power supply.

Abundant supplies and lower prices for natural gas are making it more attractive than ever. Already, major power producers are incorporating natural gas into core short-term and long-term strategies, for a variety of compelling reasons.

America's Natural Gas Alliance (ANGA) was formed earlier this year to help inform the industry and the public about the contribution natural gas can make toward maintaining a secure, reliable, cost-effective electric power supply while helping achieve national goals for significant greenhouse gas reductions. ANGA represents 28 of North America's leading independent natural gas exploration and production companies, speaking for more than 40 percent of the total U.S. natural gas supply, producing about nine trillion cubic feet of natural gas per year.

CLEAN

It is nothing new that natural gas offers electric power generators major advantages in an environmentally sensitive and carbon-constrained world. Even environmental organizations have been recognizing the important role natural gas will play in delivering emissions reductions that have become a national priority.

For the power industry, the importance of carbon reduction gets amplified when a ton of carbon dioxide not emitted is assigned a dollar value, as in other parts of the world today. According to the U.S. Energy Information Administration (EIA), coal still fuels about 50 percent of the nation's electric supply and more than 80 percent of carbon dioxide output from electric power generation. Natural gas supplies about 22 percent of the electric supply, but only about 15 percent of CO2.

Both climate policy imperatives and carbon-economy fundamentals are steering power producers toward natural gas. Today, the fleet of domestic natural gas generation represents more than 400 gigawatts of capacity. But this existing capacity is used less than 25 percent of the time, and primarily for peak loads. This capacity is in place and already connected to existing transmission and pipeline infrastructure needed to support it. Improving its utilization can make an immediate contribution to achieving national carbon reduction goals. The EIA clearly expects natural gas consumption to rise, forecasting a 40 percent increase in the use of natural gas for electric power generation by 2030.

Natural gas also provides the support needed for the increased use of renewable energy. Today, the Edison Electric Institute (EEI) estimates renewable energy's contribution to total American power generation at 2.5 percent (excluding hydro power). But both EEI and EIA are forecasting dramatic increases in renewable power in the years ahead. In its 2009 Energy Outlook, the EIA says, "Natural gas and renewables provide most of the generating capacity added between 2007 and 2030." The trend is clearly under way. In 2008, natural gas and wind energy alone accounted for about 90 percent of the nation's new electric power generation.

ABUNDANT

Fortunately, natural gas resources are well capable of meeting this forecast growth. New technologies for exploration and development of natural gas, particularly from unconventional resources such as shale, have dramatically increased resources. In 2008, U.S. marketed gas production reached more than 21 trillion cubic feet, the highest level in more than 30 years. And last June, The Potential Gas Committee at the Colorado School of Mines reported that the United States has 1,836 trillion cubic feet of technically recoverable gas, an increase of 35 percent over its previous estimate. The June report was the highest resource total reported by the committee in 44 years.

North America today has more than 100 years of natural gas supply, and with new technologies that supply will continue to grow. This abundance of natural gas is significant for power producers in several ways. A stable long-term supply means a more stable marketplace, allowing for confident investment decisions in major projects. Gas resources have also become more geographically diverse. Natural gas is now produced in 32 states and in areas like the Marcellus Shale play in the Northeast that are near major markets. These new gas resources offer broad and flexible supply choices for the long haul, an important consideration for major energy projects.

Taken together, this evolving supply picture and the coming sea-change in climate policy present the electric power industry with the need for a significant paradigm shift.

BIG DECISIONS AT TVA

The Tennessee Valley Authority operates one of the largest and most diverse electric systems in the nation, and portions of their vast system are growing old and need replacing. Fossil fuel plants produce about 60 percent of TVA's power, while nuclear provides 30 percent and hydropower about 10 percent. Among the fossil plants, TVA operates 11 coal-fired power plants, six of which are more than 50 years old. Another three are more than 40 years old, and TVA's newest coal plant came on line in 1973. Over time, TVA has invested significantly in emissions controls on its coal plants, but those controls do not include carbon dioxide.

In this decade, TVA has added more than 2,000 megawatts of new natural-gas generating capacity, including the acquisition of one existing plant a year in each of the last three years. Recently, it announced that it will build an 880-megawatt gas-fueled plant in northeast Tennessee. The $640 million facility will employ state-of-the-art natural gas combined cycle technology.

A STRONG MIX AT FPL

FPL, one of the nation's largest utility companies, operates some 24,000 megawatts of generation capacity serving 4.5 million customers. The company's strategy is to employ a cost-effective combination of nuclear power and renewable energy, along with substantial natural gas capacity.

One project recently announced will build a 75-megawatt photovoltaic array to power a new planned community in South Florida. The company has another 110 megawatts of solar capacity, and overall plans to spend about $728 million on solar. These are high capital-cost projects. FPL estimates solar construction costs at some $6,000 per kilowatt hour of capacity. To balance those costs, the company will also build combined-cycle natural gas units at about $1,000 per kilowatt hour.

This year, FPL announced that it will convert major power plants at Cape Canaveral and Riviera beach from oil to natural gas. That conversion will lower plant emissions and allow FPL to make use of the nation's abundant supply of natural gas. In addition, the company's 10-year site plan filled with the Florida Public Service Commission calls for the addition of three new 1,200 megawatt combined cycle natural gas plants over the next three years and two more of that size in 2013 and 2014. In all, FPL's plan calls for the addition of more than 6,000 megawatts of natural gas capacity in the next five years.

ENERGY EFFICIENCY AT EXELON

Chicago-based Exelon and its CEO John Rowe are strongly committed to energy efficiency as a way to cost-effectively combine reliability and environmental stewardship. In a recent speech in Chicago, Rowe talked about the need to be alert to a changing environment and specifically mentioned changes in the natural gas market. Exelon has announced plans to build a 640-megawatt combined cycle natural gas plant at the Mountain Creek generating station near Dallas.

LOOKING AHEAD

In companies, organizations and states across the country, natural gas is getting a new look. For the first time in history, we are facing an abundance of natural gas supplies in North America. With abundant supply, experts predict that natural gas is more likely to remain affordable and avoid historic supply volatility. Perhaps most importantly, natural gas is 50 percent cleaner than coal in reducing greenhouse gas emissions in electric power generation.

THE PROMISE OF CLOUD COMPUTING

BY JOE DYSART

The business world is abuzz with the promise of cloud computing – a new approach to IT in which all applications and data are moved to the Web, but many industry insiders warn the strategy is fraught with peril.

"As a security guy, I tend to look at the idea of cloud computing from a risk perspective," says Kai Axford, a senior security strategist at Microsoft. "I have to tell you, I don't see a lot of companies agreeing to become liable if your data gets breached on their network."

Proponents counter that with all your company applications and data in the cloud, all employees can instantly access your network, no matter where they are in the world, using a wide array of Internet devices, including desktops, laptops, PDAs, smart phones.

Moreover, service fees for working in the cloud are often based on an extremely reasonable, metered plan. If your company only requires a smidgeon of computing time from a cloud computing vendor, that's all you'll pay for. If you need a little more, you pay a little more. Very fair.

Either way, no matter which way your leaning on cloud computing, industry insiders recommend you ask yourself – and your potential cloud solutions provider – these tough questions:

*Is the Cloud Really Less Expensive?: While reduced costs is one of the most often cited reasons for moving to the Cloud, a McKinsey and Company study released earlier this year found that for large corporations, cloud computing actually costs more. However, the study did add that organizations with $500 million in revenue or less could reap significant savings in the cloud.

*Can I Afford Service Outages or Apps That Don't Work?: Anyone who has had to endure endless downtime with their Webhost provider or other online services vendor (sorry, please hold) knows that service hiccups can be infuriating. When your apps are in the cloud, priorities on system fixes are decided by someone who is not on your payroll, and who may have plans for the evening.

*How Vulnerable Am I to Vista-Syndrome: During the past few years, most companies have wisely avoided upgrading to Vista, due to its reputation as an often incompatible, resource hog. But with cloud computing, a decision such as embracing or forgoing Vista will be left to your remote service provider – and not an in-house IT department that is acutely culpable for its decisions.

*Will I Become Trapped in the Cloud?: Another great risk in entrusting all your apps and data to a remote third party is that once you're locked into their service, it may be very difficult to migrate to another provider, or migrate back to an in-house solution. Happy smiles, warm handshakes – all those may vanish the day you tell your cloud provider, "We've decided to move on."

*How Secure is My Data?: The nature of cloud computing – generally distributing data and apps on multiple servers across the Web – lends itself to lapses in security. Your cloud solutions provider agreement may include all sorts of reassuring verbiage about painstaking safeguards. But what's really stopping your cloud provider from storing your critical company data on a server in Afganistan?

THE POTENTIAL OF SOLAR

BY HILDA L. SOLIS

Secretary of Labor Hilda L. Solis

We have a choice to make. The United States can remain one of the world's leading importers of foreign oil, or we can make the investments that would allow us to become the world's leading exporter of renewable energy. We can let the jobs of tomorrow be created abroad, or we can create those jobs right here in America and lay the foundation for lasting prosperity.

The President and I know what the right choice is. We believe that a more prosperous future for our Nation's economy means making investments in energy efficiency and clean energy today. And that is what we are doing.

$80 BILLION FOR CLEAN ENERGY

The Recovery Act invests more than $80 billion in clean energy. Let me say this again... the largest-single investment in our country's economy included the largest-single investment in clean energy technology and research in our country's history. This means putting tens of thousands of Americans to work developing new battery technologies for hybrid vehicles, modernizing the electric grid, making our homes and businesses more energy efficient, and doubling our capacity to generate renewable electricity. These are investments that create jobs!

We know the potential of solar. My colleagues at the Department of Energy estimate that in the southwest alone, 6900 gigawatts of solar electricity could be generated. They estimate that solar in the U.S. could be at the beginning of a 25% growth rate, resulting in solar contributing between 10% to 20% of total electricity by 2030. And they estimate that solar could create over 1 million new jobs by 2030.

I have seen first hand the impacts these investments are having in communities across our country. These are investments we are making in partnership with you. Yet I don't have to tell you that the U.S. lags behind in 3rd globally in this sector, behind Spain which installed 8 times more megawatts of PV... and behind Germany which installed 5 times more megawatts of PV.

$7.7 BILLION IN PROJECTS

That's why the Recovery Act dedicates $117 million for solar — including research and development, deployment and market transformation. That's why the Recovery Act includes $2.3 billion in tax credits for U.S. based clean energy manufacturing. This tax credit alone could create $7.7 billion in projects! That's why the Recovery Act provides a 30% grant in-lieu of tax credit for renewable energy projects. And that's why the Recovery Act includes $4 billion in fee subsidies to support loan guarantees for $40 billion or more in new and commercialized technologies.

These significant investments are just a few of the ways the Administration is using the Recovery Act - not only to create jobs now, but to lay a new foundation for economic and job growth. At the Department of Labor we are making investments in our clean energy future by investing in our nation's greatest resource today — its workers. We're doing it in a way that promotes both economic stability and the advancement of everyone in our diverse communities. By economic stability, I mean jobs and careers-jobs that can support a family by increasing incomes and narrowing the wage gap; jobs that are safe and secure, and give people a voice in the workplace through the right to organize and bargain collectively; jobs that are sustainable and that export products, not paychecks; and jobs that rebuild and restore a strong middle class. These are jobs in the clean energy economy! These are jobs in the solar industry!

$500 MILLION FOR GREEN JOBS

As Secretary of Labor I am working hard to ensure everyone has access to needed training for good clean energy jobs, and that the job training they receive is of the highest quality. In June, the Department announced grant competitions for $500 million in green jobs workforce training, grants that will involve new partnerships and support quality training needed for the clean energy economy. These are investments in our one stops and workforce investment systems, investments in training for both workers and employers, and investments leading to pathways out of poverty.

I'm happy to announce that we received over 900 applications which meet the requirements of the competition.This is nearly triple the demand we have seen for workforce training grants of similar size! These 900 applications show the initiative of communities across the country, the desire to have green jobs be a part of their economic recovery... and the willingness of employers to partner with labor unions, community based organizations, and educational institutions.

Over the coming months we'll award these grants and bring workers the training that leads to good paying and lasting jobs... and bringing employers the confidence that workers are receiving training which is relevant to their business.

But at the Department we're not working in a vacuum to achieve a skilled workforce for a clean energy economy. Secretary Donovan and I are working to bring clean energy training to residents of public housing to lead these residents to sustainable career ladders while greening their homes. Secretaries Chu and Duncan and I are leveraging our resources to bring training, employment and education to our systems.

And I challenge you today - work with us as we invest in our workforce system. Let's partner. Just as Secretary Chu and I partnered to award up to $27 million, including $10 million in Recovery Act funds, for the Solar Installer Instructor Training Network. These are funds to help train over 1,400 instructors and 168,000 solar workers... these are funds that demonstrate our commitment to accelerating the market adoption of solar technologies and creating sustainable jobs within the solar installation industry.

The commitment of this Administration extends beyond the Departments of Labor and Energy, Education and Housing. In a May meeting of the Middle Class Task Force, Vice President Joe Biden issued a challenge — deliver a report in 90 days outlining a plan that uses existing resources to overcome barriers to a national retrofit market.

Eleven Departments and Agencies and 6 White House Offices stepped up to the plate... developing ideas to leverage private capital, reduce energy costs for homeowners, provide quality training for workers and support for entrepreneurs. This means unified support for the development of financing and distribution business models for solar. Through our continued efforts we hope to ensure that the energy efficiency market will thrive long after the Recovery Act money is spent.

NEED THE SMARTGRID

We know that America cannot build a 21st Century clean energy economy without a smart, strong and secure electricity delivery system. The President announced 100 grants totaling $3.4 billion to private companies, utilities, cities and other partners to help build a nationwide smart energy grid.

The awards are not only expected to create tens of thousands of new job opportunities across the country, but they will also help us make a significant leap forward in building the infrastructure necessary to bring clean, low-cost energy sources to American homes and businesses.

These awards will encourage and allow rapid growth in renewable energies — like solar — helping meet our goal of doubling renewable energy capacity over the next few years. These awards will improve the reliability of our electricity system, helping to save the more than $150 billion lost each year in power outages and interruptions.

This significant investment is just one of the ways the Administration is using the Recovery Act to not only create jobs now, but also lay a new foundation for economic and job growth. To create entire new industries of clean energy jobs and break the stranglehold of foreign oil, we have to be honest about the difficult tasks and hard choices ahead.

LET'S PARTNER

While the path before us is clear, it will not be easy... we are facing monumental challenges. I have carried the message of a clean energy economy to miners in West Virginia, solar panel manufacturers in Tennessee, manufacturing students in Arkansas, auto workers in Michigan, veterans in San Antonio, and youth in San Francisco and East Los Angeles.

Our goal must be a clean energy future that works for all Americans, so that we can pass on to our children and grandchildren not just a stronger economy, but a cleaner planet. A clean energy future with good jobs for everyone... jobs that empower the worker to advance up a career ladder, sustain a family or achieve a secure retirement.

America will lead the clean energy economy of tomorrow, because it is the American spirit and our ingenuity that has made us the great nation we are today. America will lead the clean energy economy of tomorrow because of your leadership and determination today. I look forward to building our future together.

CARBON RECYCLING: AN ALTERNATIVE TO CCS

BY ROWAN OLOMAN

Carbon capture and storage is being hailed as the answer to the globe's most pressing question: what to do with the 27 billion metric tons of carbon dioxide emitted yearly from the burning of fossil fuels? Touted as the most promising interim solution to deal with the greenhouse gas responsible for global warming, CCS still remains unproven, costly and will not be commercially available for another 10-20 years. Meanwhile scientists are exploring alternatives to CCS by capitalizing on CO2 as a commodity instead of treating it as a waste.

27 billion tons of CO2 is already a hefty number but energy-related carbon dioxide emissions are projected to reach 43 billion metric tons per year by 2030, an increase of 60%. A new report by the International Energy Agency (IEA) estimates that growing energy demands from emerging giants like China and India, coupled with a lack of cost-effective alternatives to fossil fuels means that by 2050, 77% of the world's power will still be derived from fossil fuels.

"We will require immediate policy action and a technological transition on an unprecedented scale," IEA Executive Director Nobuo Tanaka said in Tokyo after releasing the report.

Carbon capture and storage (CCS), the process of capturing carbon dioxide and storing it in deep geological formations, in the ocean or as mineral carbonates, is being promoted by the IEA and others as the most promising technology to deal with fossil-fuel derived emissions. Not negating the role of alternative energies, the IEA is merely realistic about the enduring use of fossil fuels and the urgent need to deal with the resulting carbon dioxide.

On May 15th, 2009 U.S. Secretary of Energy Steven Chu announced at the National Coal Council that $2.4 billion from the American Recovery and Reinvestment Act will be used to expand and accelerate the commercial deployment of carbon capture and storage (CCS) technology, including financing to train a generation of engineers and geologists to work in the field.

Chu said "To prevent the worst effects of climate change, we must accelerate our efforts to capture and store carbon in a safe and cost-effective way". Governments in Europe, Australia, Canada and China are also strongly investing in the technology.

Nevertheless, several massive hurdles still stand in the way of full-scale CCS deployment.

UK consulting firm McKinsey figures that adding CCS to the next generation of European power plants could lift their price by up to $1.3 US billion each. Their thorough analysis shows that the typical cost of a demonstration project is likely to be in the range of $80-$120 US per tonne of CO2 sequestered.

Legally, there are concerns over whether CO2 transport and long-term storage present human or ecosystem related

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PERSPECTIVE

GREAT TIME TO GO SOLAR

BY JOHN BOURNE

Think California is the mecca for solar in the US? Think again. While California continues to be a leader in solar installations, other states and cities - many from unexpected regions - are rising up as solar powerhouses.

Global Solar Center has conducted a 50-state survey of solar incentives and adoption, which has revealed surprising results. States that were solar laggards have now become solar leaders. In 2008, the global solar market increased 50% and the US advanced to third position globally. Additionally, the market demand for solar power has grown an average of 30% per year for the last five years.

According to Global Solar Center, incentives are at their all time best in many areas that had previously been solar power backwaters. Take Pennsylvania for example, which until recently had been among the smallest solar markets with under 1 MW of installed capacity. In May 2009 the state began its Pennsylvania Sunshine Solar Rebate Program, which provides $2.25/Watt grants (roughly 35% of total installed cost) to residential customers. Or the recently extended Georgia Power Solar Buyback Program, that offers to buy electricity generated by solar power at $0.183/kWh, well over market rate. Incentives like these are popping up around the country and are throwing fuel on the solar fire.

Add in the 30% Federal Tax Credit, which is offered as a cash grant for commercial customers, and it is clear why states like New Jersey and Georgia are adopting solar at faster rates per capita than California.

"With incentives on the federal, state and local level along with the support and expertise offered by our members, like Global Solar Center, this is a great time to go solar," said Monique Hanis, spokesperson for the Solar Energy Industries Association in Washington, D.C.

The challenge now for solar is not incentives - it is in the installation market. Consumers trying to go solar are often uncomfortable with the technology. They also are not well educated on the government incentives, which means they cannot determine what the financial equation is. Finally, with very little name brand recognition, and thousands of installers of variable quality, people don't know who to trust and where to receive accurate information.

With a lack of information and lack of trust in the market, the sales cycle is considerably longer in solar than similar industries. Global Solar Center has found that on average the time it takes for a customer to install solar panels, from initial contact with installers to successful interconnection into the grid, is just over the one year mark. This helps explain why the installation cost comprises anywhere from 30-50 percent of the total cost of a solar installation.

Over the last year a few companies have recognized this inefficiency as an opportunity for improvement. Companies have created online tools that are increasing adoption of solar power and lowering the costs to consumers. One example of this is the SunSpotter™, which uses satellite imagery and solar calculation algorithms to generate accurate quotes. After analyzing energy usage information and ensuring project feasibility, the customer is provided with an accurate, customizable quote that outlines all expected costs and savings associated with a solar installation saving the time and money of an on-site survey. Tools such as the SunSpotter™ (developed by Global Solar Center), are shortening the sales cycle for solar installations by up to 3 months. They are also contributing to declining solar costs by allowing installers to focus on higher quality projects.

"The renewable energy industry in its present state is extremely fragmented and changing rapidly. Customers want to lower their bills but are confused as to where to go and who to trust. Global Solar Center solves this problem by offering unbiased, reliable information, free quotes and a network of qualified installers to get the job done," says Global Solar Center Chairman Jack D. Hidary.

LARSEN-COUNTRIES

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AUSTRALIA: HALF A LOAF

The initial Australian climate change proposal aimed to reduce the country's greenhouse gas emissions to between 5 and 25 percent below 2000 levels over the next 10 years, conditioned on international agreement at a planned December 2009 climate summit in Copenhagen to achieve equally aggressive reduction goals. Although this proposal was supported by Australia's governing center-left Labor party, the conservative Liberal/National party coalition opposed the bill as economically unwise and environmentally ineffective. The liberal Green party agreed with the later position and declined to support the Labor proposal, which ultimately failed in the Australian Senate.

NEW RENEWABLE TARGET

Australia's climate change legislation included a new national mandatory renewable energy target. In an August 2009 compromise, the Labor government proposed, and the Senate agreed, to proceed immediately with the renewable energy portion of the climate change bill while considering amendments to the portion of the proposal that would involve trading of emissions credits under a cap-and-trade system. The compromise also involved pledges of assistance to energy intensive industries like aluminum producers and coal mines, with the Labor government planning to reintroduce a revised version of the cap-and-trade portion of the bill before year's end.

During the subsequent two months, the Labor government called on the opposition Liberal Party to submit its suggested changes to the proposed carbon trading scheme to be considered for inclusion in amended legislation, once Parliament returned from its recess in October. Australian press reports indicated that the Liberal Party leadership was reserving its right to filibuster the Government's emissions trading scheme legislation in November and to delay a vote until after Christmas.

Any such tactic would need the support of independents in the Australian Senate, and several have stated that they support the idea of delay until at least early 2010, after the Copenhagen summit.

By late October the Labor government reintroduced carbon trading legislation into the House of Representatives as it continued talks with the opposition on proposed changes, including increased compensation in the form of additional emissions permits for coal-fired power stations. Under the new proposal, a cap-and-trade system would begin in 2011.

The legislation will not be considered by the Senate until mid-November with the last opportunity for a vote on the bill in 2009 being November 26.

AUSTRALIA'S TOP 100

It is interesting to note that a report sponsored by a leading Australian investment bank and released in early October showed that most of Australia's top 100 listed companies lack investment plans to cope with the country's proposed emissions reduction laws. Of the companies surveyed, 76 percent said they had yet to decide on such measures, and more than one-third of the 100 largest companies had not set clear targets to reduce their carbon emissions. Such indecision may not be possible in the U.S., no matter what the fate of climate change legislation.

The U.S. Environmental Protection Agency has already proposed regulations to require reporting of greenhouse gas emissions from certain sectors of the economy. Approximately 10,000 facilities, accounting for approximately 85 percent of GHG emitted in the United States, would be covered under the proposal.

Their first annual report would be due to the EPA in 2011 for calendar year 2010 emissions, except for certain vehicle and engine manufacturers, which would begin reporting for model year 2011.

UNITED STATES: CONFLICTING PLANS

Despite the EPA's bold reporting plan, on a national level, US GHG reduction/renewable energy expansion efforts are increasingly bogged down in conflicting legislative priorities. On June 26, 2009, the US House of Representatives passed the American Clean Energy and Security Act (ACES), also known as the Waxman-Markey Bill, sending it to the US Senate for action. ACES would create a comprehensive, economy-wide cap-and-trade program to reduce GHG emissions, authorize significant new programs to encourage renewable energy production and use, and create a new federal renewable electricity credit (REC) trading system. It places an overall cap on GHG emissions, and covered entities must obtain an allowance or offset for each metric ton of carbon dioxide equivalent emitted. Allowances, offsets and their derivatives would be traded on the new GHG markets.

ACES DRAFTED

Under ACES as currently drafted, GHG emissions are capped starting in 2012 at 97 percent of 2005 levels for 2012. The cap is gradually reduced to 83 percent of 2005 levels for 2020, 58 percent of 2005 levels at 2030, and finally 17 percent of 2005 levels at 2050.

Each year, covered entities must submit an allowance or an offset for each metric ton of carbon dioxide equivalent emitted, with penalties for failing to do so. ACES also requires retail electricity suppliers to meet increasingly higher percentages of their load with electricity from renewable energy sources. Beginning in 2012, 6 percent of electricity is to come from renewable sources and efficiency, gradually rising to 20 percent by 2020.

On September 30, 2009, Senators John Kerry (D-MA) and Barbara Boxer (D-CA) announced the introduction of the Clean Energy, Jobs and American Power Act, which in many respects mirrors the provisions of ACES. Notably, in its current form, the Senate bill expressly preserves the EPA's authority to regulate GHG emissions under the Clean Air Act, as it has proposed in a recent rulemaking.

The Senate bill also lacks a federal renewable energy standard, although a parallel piece of legislation sponsored by Senator Jeff Bingaman (D-NM).

One other important issue not addressed by the Kerry-Boxer bill is the form that regulatory oversight of newly created carbon allowance and offset markets would take.

In contrast to provisions of the House bill relating to the roles of FERC and the CFTC in regulating carbon and carbon futures markets, the Kerry-Boxer bill includes in a section covering carbon market oversight only the "sense of the Senate" that there shall be a "single, integrated carbon market oversight program" designed, among other things, to "ensure a well-functioning, well-regulated market, including a futures market, designed to manage risk and facilitate investment in emissions reductions. . . ."

It is unclear whether the Senate version ultimately will borrow broadly from the House version with respect to shared oversight between FERC and the CFTC or will grant jurisdiction over carbon cash and derivatives products trading to one agency.

MORE REGULATORY CONTRADICTIONS

Two other legislative initiatives add still more regulatory contradictions:

In early July, Senators Diane Feinstein (D., Cal.) and Olympia Snowe (R., Maine) introduced legislation to establish federal oversight for GHG allowances markets. Their bill (S. 1399) would require most trading in GHG permits and their derivatives to take place on regulated exchanges or through a "carbon clearing organization" to be established by the CFTC.

A small number of derivatives contracts that can't be standardized for exchange-based trading could be bought and sold in private over-the-counter deals, as long as they are reported to the CFTC. This is in contrast to the provisions of ACES, which divides the oversight authority between the FERC for cash-based allowances trading, and (seemingly) the CFTC for carbon futures and derivatives trading.

The Feinstein-Snowe bill also classes standardized bilateral swaps as regulated derivatives, creates professional standards for carbon traders and brokers, and establishes a centralized electronic database to track trades – all provisions that are not contained in ACES.

The Obama Administration has stated that derivatives trading regulatory reform is an Administration priority. On August 11, 2009, the U.S. Department of the Treasury delivered legislative language to Capitol Hill that would significantly restructure the regulatory framework that governs the market for over-the-counter derivatives.

The proposed legislation would require central clearing and trading of all standardized OTC derivatives, institute higher capital requirements and higher margin requirements for non-standardized derivatives, extend regulatory oversight, and further restrict the definition of eligible investors able to engage in certain exempt OTC derivative transactions.

Both the House Financial Services and Agriculture Committees have revised the Treasury proposal and have presented multiple Congressional Over-the-Counter-Derivatives Market Act of 2009 proposals, with the latest being passed unanimously on October 21, 2009 by the House Agriculture Committee, which renamed the draft the Derivative Markets Transparency and Accountability Act of 2009. These proposed provisions do not specifically address the cap-and-trade markets, but will have substantial impact on them.

UNMET RESPONSIBILITIES?

Some observers believe that if ACES follows a path in the U.S. Senate similar to Australia's climate change proposal, the near-term result could be a new national renewable energy standard with no federal carbon cap-and-trade system.

There is considerable sentiment in Congress, generated by the 2008 financial meltdown, that the trading of emission allowances and their derivatives will produce fraud, excessive speculation and market manipulation. In this context, it is uncertain whether the legislation aimed at reforming the derivatives markets will at add fuel to a federal renewable energy standard or broader climate change program, or only complicate matters further.

If both the U.S. and Australia wind up with legislation that encourages renewable energy yet fail to restrict GHG emissions, it is unlikely that either country will be viewed as meeting its responsibilities to address global warming by the 190-plus Kyoto Protocol signatory countries when they meet in Copenhagen

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The views expressed herein are solely those of the authors and do not necessarily reflect the views of McDermott Will & Emery or its clients.

ARGUESO-BIOFUEL

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from an industrial standpoint but completely unknown in terms of its genetic and molecular properties. We learned much more about how a complex genome is organized and may contribute to a robust and well-adapted organism.

I worked with researchers from Brazil and the University of North Carolina on the study. Now we have sequenced the genome, so we have a road map that will allow us to build upon its natural abilities. This opens the door to crossing yeast strains to make even more efficient yeasts for enhanced biofuel production.

Knowing more about what makes yeast hearty will help as biofuel production evolves. In addition to the sugar cane fuels of Brazil, scientists and farmers are also looking into new carbohydrate sources that could easily be farmed in the United States and other areas, since sugar cane farming is limited to warm climates. Switchgrass and giant grass, also known as elephant grass, are possibilities, along with miscanthus grass.

The PE-2 genome will aid research into finding the best and strongest yeasts for converting the cellulose in grasses into biofuel.

I believe this strain has a natural talent for carbohydrate biofuels that have not yet been introduced in the United States. When the technology is engineered to effectively break down cellulose, I believe this strain of yeast will be an ideal delivery vehicle for that technology.

The study also yielded some interesting genetic information about Saccharomyces cerevisiae, the most studied and utilized yeast species.

The study was funded by two grants from the National Institutes of Health, a BRASKEM/FAPESP grant, and support from ETH Bioenergia, a Brazilian company that produces ethanol and sugar from sugar cane.

Dr. Argueso, who is from the Duke Department of Molecular Genetics and Microbiology, worked with researchers from Brazil and the University of North Carolina on the study: Margaret Dominska and John H. McCusker, of the Duke Department of Molecular Genetics and Microbiology; Fred S. Dietrich, also of the Department of Molecular Genetics and Microbiology and the Duke Institute for Genome Sciences and Policy; Piotr A. Mieczkowski, of the Department of Genetics at the University of North Carolina, Chapel Hill and Brazilian scientists from Campinas State University; and the University of São Paulo of the University of São Paulo.

DOE LOAN-WONG

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number of obstacles may limit its effectiveness. First, in today's constrained capital and credit environment, finding equity investors and/or financing to bridge the non-guaranteed portion of project costs can be challenging. The DOE has taken the view that Renewable Energy Grants, while combinable with a loan guarantee, do not count towards a project sponsor's equity contribution. Furthermore, even with the substitution of the Recovery Act's Renewable Energy Grant for the production tax credit or the investment tax credit, the economics of many renewable energy projects require the participation of tax equity investors to monetize the significant depreciation benefits associated with these capital intensive projects. Although the literal text of the October FIPP Solicitation would suggest that the FIPP program might preclude investment structures that involve tax equity participants, our informal discussions with advisors to the DOE indicate that the DOE was simply emphasizing structural simplicity rather than intending to preclude the participation of needed tax equity investors. In addition, the DOE's suggestion that applications for projects which rely on a higher equity contribution by the borrower/sponsor will be viewed more favorably would appear to favor projects with stronger sponsors less in need of a guarantee.

Second, applying for a DOE loan guarantee can itself be expensive. In addition to the time, effort, and professional fees associated with an application, applicants are required to pay an application fee in addition to facility fees and maintenance fees that apply should a project be awarded a loan guarantee. The requirement of a preliminary credit assessment by a rating agency for projects over $25 million, and for all projects under FIPP, further raises the cost of participating in the program.

CONCLUSION

The loan guarantee program has the potential to bring projects and technologies to fruition that would otherwise not be funded in the commercial marketplace. This was the original purpose of the Loan Guarantee Program—to provide financing for innovative projects for which the commercial debt markets were not open. The program may yet introduce the "game-changing" technologies its advocates promise that it will. Many of the projects and technologies seeking loan guarantees involve interesting applications of technologies with significant potential to reshape the energy landscape.

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RECYCLING-OLOMAN

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risks and who is ultimately responsible if a leak occurs. While progress is underway in some countries, no country has yet developed the comprehensive, detailed legal and regulatory framework that is necessary to effectively govern the use of CCS.

In fact, no full-scale CCS project that captures and sequesters carbon dioxide from a coal-fired power plant as of yet exists. The IEA is hopeful that 10 full-scale demonstration plants will be up and running globally by 2015 meaning it may be 10 to 20 years before CCS technology is readily available.

So why expensively transport and store the CO2 underground when it could be profitably recycled post-capture?

Researchers and start-up companies are now investigating a wide range of CO2 conversion methods.

"The market is open for innovation," states Larry Kristof, CEO of Mantra Energy, a company gaining international recognition in the field of carbon recycling. "It is likely that governments will soon legally mandate carbon capture from industrial plants and there needs to be a cost-effective way to implement it," says Kristof.

Mantra's technology, named the electro-reduction of carbon dioxide (ERC), aims to take CO2 directly from industrial waste gases and convert it to formate salts and/or formic acid, both valuable chemicals used in a variety of industrial applications. Formic acid also has the potential to play a leading role in fuel cell development, both as a direct fuel and as a fuel storage material for on-demand release of hydrogen.

The ERC technology could provide a net revenue of up to US$700 per tonne of CO2 recycled, with an ROI previously forecast at 20% per year, depending on local costs.

Compared with CCS, the ERC provides a positive return on investment, not an unrecoverable cost. Plus a demonstration ERC unit could be installed at a client's premises within a year and a commercial plant within 2 years, much faster than for CCS.

In a speech to the United States Senate Margie Tatro, Director of Fuel and Water Systems at Sandia National Laboratories, a US Department of Energy run research center formed to develop science-based technologies that support national security, advocates that carbon recycling is the way of the future.

"We must act now to stimulate this area of research and development. Other countries are exploring reuse and recycling of CO2 and it would be unfortunate if the U.S. became dependent on imported technology in this critical area," say Tatro.

Carbon recycling options being developed globally vary considerably. The range includes the biochemical conversion of CO2 into algal biofuel, the thermochemical conversion into methanol and the biocatalytic or solar photocatalytic conversion of CO2 to fuels. Each has its own set of advantages and disadvantages and some are more believable than others.

At this stage, what sets Mantra and a handful of others apart is that it has a publicly disclosed patent application, backed up by several technical articles in reputable journals and has already established market interest for their products.

As fear of climate change grips the globe, businesses and governments are desperate to find an answer to our CO2 problem. Relying solely on CCS is an incredibly risky and in many places unworkably expensive solution. More imaginative thinking shows us that the 27 billion metric tons of CO2 per year may actually represent a business opportunity.

A budding industry, carbon recycling for profit offers an exciting and viable alternative to carbon capture and storage programs. Without a doubt, as a portfolio of solutions will have to be developed to address climate change, carbon recycling is destined to be at the forefront.

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