

Future of U.S. Energy Sector Is Focus of Attendees at Fifth Annual Beaver Creek Energy Conference

More than 50 energy sector analysts, financial executives, owners, transmission experts, utility managers and power generators were given a provocative glimpse of the future of America's energy industry during the Fifth Annual Beaver Creek Energy Conference, sponsored by E3 Consulting and Calyon on February 1 & 2.

And, thanks to record snowfall on the slopes surrounding the Beaver Creek Lodge – where the conference has been held for five years running – conference participants spent some energy of their own while they were taking part in indoor and outdoor activities in the beautiful alpine setting in the Colorado Rockies.

The serious business of seeing what is ahead in the U.S. energy, power and fuel sectors was accomplished by several presentations and panels, which included:

- An overview of the predictions from last year's Beaver Creek Energy Conference, presented by Paul Plath, Senior Vice President at E3 Consulting.
- Energy Policy Act (EPACT) 2005, a View From the Hill, by David Fitzgerald, a partner in the law firm of Sullivan and Worcester.
- The Truth About the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR), by Jim Short, Chief Operating Officer, and Earl Franklin, Executive Director of E3 Consulting.
- Wired for the Future?, an examination of the future of transmission in the U.S., by Trudy Harper, President of Tenaska Power Services.
- A panel discussion examining the financing of legislation favored technologies, moderated by Glenn Muscosky, a director at Calyon. Panelists included Daria Pishko, Vice President of DZ Bank; Peter Rigby, Director, Standard & Poors; Rob McLeese, President, Access Capital; and Paul Plath, Senior Vice President, E3 Consulting.
- A presentation entitled Fuel Reserves and Market Drivers, given by Andy Franks, Managing Director, E3 Consulting; and Bill McAleb, Executive Director, E3 Consulting.



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Left to right: Richard Garcia, E3 Consulting; Paul Steinway, KM Power; Ric Abel, Prudential Capital; Trudy Harper, Tenaska Power Services.

- A panel discussion of various predictions of what the U.S. energy sector will look like in five years. The panel was moderated by Richard Garcia, Managing Director of E3 Consulting, and included James Guidera, Managing Director, Calyon; Jim Pagano, Senior Vice President, Caithness; Paul Steinway, President, KM Power; Trudy Harper, President of Tenaska; Frank Napolitano, Managing Director and Global Head of Sales & Origination in Energy Trading, Lehman Brothers; and Rick Abel, Senior Vice President, Prudential Capital.

Looking into the crystal ball, the 17 presenters and panelists – along with lively interaction, input and opinion from the audience – suggested a number of future U.S. energy sector developments:

- Natural gas prices will end the year on an average of between \$8.25-\$8.50/MMCF.
- At least one permit for a new U.S. nuclear plant will likely be issued, but no new IGCC plants will be financed in 2006 due to perceived cost and performance risks.
- Perhaps five new LNG facilities will be built over the next few years, but LNG will have no significant impact on gas supplies or pricing.
- FERC's new regulations promoting transmission projects are the first federal initiatives in two decades supporting new transmission. Transmission still favors regulated utilities, but PUHCA repeal perhaps

makes it more plausible for IPPs and investors to become a utility.

- The IPP generation market is shrinking in some areas as utilities buy IPP assets and change the rate base of former IPPs. The debt equivalency issue will become more important. IOUs are arguing that long-term contracts look like debt on balance sheets, which hurts consumers (higher credit costs). IOUs are using this argument to get waivers from the competitive RFP process.
- Overcapacity is being resolved as developers and regulators have been busy with renewable sources of energy. Co-ops did not build in the last cycle, so there are contract opportunities there as well as co-ops building new generation. In addition, there are growing opportunities for IPPs to offer ancillary services, which will lead to some competitive situations.
- CAIR and CAMR regulations may force decommissioning of some older plants, opening the way for a potential building boom in the Eastern U.S. (see related story). However carbon issues remain a concern. The regulations and policies regarding carbon were written without a real concern about the realities of power generation and carbon issues have largely been ignored for new coal-fired generation being built today.
- New build peaking facilities with tolls are being bid as low as \$4.50/kW per month, compared to an avoided cost of coal at \$16-\$20/kW per month. This situation still leaves a lot of room for gas plants. Peaking facilities will continue to have good opportunities, particularly as renewable energy sources are mandated. Gas is ideal for peaking purposes, and it will take up the slack from renewables; we will need more peaking capacity as renewable mandates come into play.
- Skepticism abounds regarding renewables. The only way to get to projected renewable targets is by mandates, not decisions based on real economic value. Most of the emphasis is on wind, but the transmission infrastructure is not there for many more large scale wind projects – and the costs will be huge to meet the expected mandates.

For further information, please contact Paul Plath at 303-762-7061.

E3 Consulting Plays Central Role in IGCC Debate

In February 2005, E3 Consulting drafted a letter to the United States Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards that requested clarification of EPA's position regarding Best Available Control Technology (BACT) analysis for proposed coal-fired power plants. BACT analyses are required as part of the permitting process for any new major source. Specifically, we asked if EPA would require a BACT analysis for a coal-fired power generating station to include Integrated Gasification Combined-Cycle (IGCC), Circulating Fluid Bed (CFB), and other potentially lower-emitting processes as available control alternatives.

E3's inquiry to EPA was prompted by on-going, independent and objective due diligence work for several lenders that were considering construction financing for three proposed new coal-fired power generating stations located in the mid-west and south-western U.S. In each of these three cases, the proposed coal-fired plants were initially permitted in their respective states based on conventional pulverized coal technology coupled with current technology low-NOx combustion controls, acid-gas scrubbing, particulate removal and mercury control technologies. When the air permits for each of the projects were approved, they were vigorously opposed by environmental groups on the basis that the states did not require analysis of IGCC and other advanced technologies as BACT. Although the permits were eventually upheld without significant changes to the proposed plant technologies, the challenges were costly in terms of added costs for additional mitigation measures and extensive delays in starting construction.

The debate over whether IGCC and other advanced clean-coal technologies should be established as BACT for new coal based generation has been simmering for years. Industry and environmental interest groups have actively lobbied congress, state PUCs and EPA for the past several years to take definitive positions on the issue. Three states (Illinois, Montana and New Mexico) have taken the position that IGCC should be evaluated as part of a BACT determination, and two states (Wisconsin and West Virginia) have adopted the opposite position. The remaining states are either

undecided, are awaiting further federal guidance or simply have yet to address the issue at all.

As part of our continuing efforts to provide objective, independent advice to our lender clients regarding risks related to financing new power generation projects, E3 requested clarification of EPA's position on the issue. E3's inquiry was from the position of a disinterested third-party and we did not advocate or suggest that EPA should adopt a particular stance on the issue.

“Clearly the IGCC as BACT debate has entered a new and more contentious phase with an uncertain outcome.”

On December 13, 2005, EPA responded to our February 2005 letter and provided the following statement of EPA's position on this issue to date. In its letter to E3, EPA stated:

“As noted in prior EPA decisions and guidance, EPA does not consider the BACT requirement as a means to redefine the basic design of the source or change the fundamental scope of the project when considering available control alternatives.” “..the question in this instance is whether IGCC results in a redefinition of the basic design of the source if the permittee is proposing to build a supercritical pulverized coal (SCPC) unit. In this situation, EPA's view is that applying the IGCC technology would fundamentally change the scope of the project and redefine the basic design of the proposed source...Therefore, where an applicant proposes to construct a SCPC unit, we believe the IGCC process would redefine the basic design of the source being proposed.”

EPA went further to apply the same logic to Lowest Achievable Emissions Reduction (LAER) analysis, which is required for new or modified projects in non-attainment areas.

Clearly, E3 wasn't the first to request such a determination from EPA, as various lobbying groups have tried for years to get EPA to clarify its position. Our inquiry was consistent with our business of providing an independent review of business and technical matters related to project risk. E3 did not make its inquiry on behalf of an advocacy group on this issue.

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EPA's response has set off a flurry of both praise and condemnation from industry and environmental groups. While some coal producers and utility groups have applauded the decision for reducing regulatory uncertainty, a number of environmental and IGCC proponents have attacked the decision as weakening federal permitting requirements and have challenged the legality of EPA's action on the basis that it skirted established rulemaking procedures. On February 10, 2006, four environmental groups (American Lung Association, Ohio Environmental Council, Sierra Club and Valley Watch) filed a petition with the U.S. Court of Appeals in the District of Columbia seeking rejection of EPA's decision. As of the publication date of this newsletter, the U.S.

Court of Appeals had not taken any action on the petition.

Clearly the IGCC as BACT debate has entered a new and more contentious phase with an uncertain outcome. E3 Consulting will continue to follow the issue closely and provide its clients with objective analysis of this and other regulatory issues facing the electric power industry.

Copies of E3's letter to EPA and their response can be found at the following link on E3's website: <http://www.e3co.com/CAIR>. For further information contact Paul Plath at 303.762.7061 or Jim Short at 303.762.7062.

E3 Consulting Forecasts Power Generation Building Boom When Older Coal Plants Can't Meet New EPA Pollution Caps

Review made public at E3 Beaver Creek Energy Conference



In a presentation at the Fifth Annual Beaver Creek Energy Conference, E3 Consulting warned that numerous units in the aging fleet of coal-fired power plants in 25 Eastern states may not be able to meet tougher new EPA pollution standards going into effect beginning in 2009.

E3 said many facilities may prove to be unsuitable for costly retrofitting projects and will have to be shut down, a situation that will require their replacement with more efficient facilities with lower emissions, commencing what could be a multi-billion-dollar reconstruction effort taking years. The presentation was made by James F. Short, Chief Operating Officer, and Earl H. Franklin, Executive Consultant of E3 Consulting. Their conclusions were reached after thorough review of the U.S. Environmental Protection Agency's Clean Air Interstate Rule (CAIR), which passed into law in March, the Clean Air Mercury Rule (CAMR) and pending state and local legislation cutting greenhouse gas emissions. In their normal course of project work, E3 attempted to determine the effect of these rules on an actual portfolio of coal-fired units, and that led them to their conclusion that making small changes to the assumptions going into the rules can make big changes in the results.

Coal-fired power plants have an effective life of 50 years,

and many in the U.S. are that age. E3 concluded that the new environmental regulations may present an insurmountable challenge to the old facilities. Retrofitting or upgrading old plants to meet stricter pollution standards without being able to buy enough emissions allowances will be very expensive at some sites and impossible at others, E3 warned. Aggressive reductions in oxides of nitrogen will begin in 2009 and in 2010 for sulfur dioxide, but few in the industry have been able to calculate the full impact of pending cuts in emissions allowances as well. Revised State Implementation Plans must be submitted by CAIR states by September 11, 2006. Many of these states have not yet determined how they are going to revise their SIPs to comply with CAIR. That means the regulated community cannot determine what the ground rules are going to be for them yet.

COLLAPSE SEEN IN EMISSIONS ALLOWANCES MARKET

Short said utilities and merchant power generators who believe the liquid trading market for emissions allowances will permit their older plants to operate without meeting the new pollution standards may be in for a surprise. "Two thirds of the current allowance bank is going to go away. Allowances will be in short supply and will be very expensive," said Short.

Today, plants that operate efficiently and produce less pollution can sell their allowances to plants with

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insufficient allowances so those plants can operate at their physical potential. With the implementation of CAIR, the whole trading market for allowances will change, getting tighter, and perhaps losing liquidity. “The reduction in available allowances will be so high that we may see the liquid market for allowances literally collapse,” said Short. “We believe if that happens, there will be a wave of retirements, retrofitting and new construction of state-of-the-art coal plants. Capital and construction expenditures could reach well over \$50 billion over the next five or 10 years.

“By 2015, our calculations show you’ll effectively have one allowance left for every 2.86 you had in 1998,” said Short. “Everyone in the affected states is in the same boat. Where are the allowances going to come from? The answer is retrofits and retirements.” Short said it is doubtful retrofits and retirements alone will provide enough emissions reduction to support active allowance trading. Making matters worse, the EPA pollution reduction targets require the states to comply without taking into account increases in population or economic growth in the states, further necessitating additional power generating facilities.

COMPLIANCE COSTS AT OLD PLANTS CAN BE PROHIBITIVE

E3’s staff of engineers, finance and environmental experts concluded that applying selective catalytic

reduction (SCR) to control nitrogen oxide, flue gas desulfurization to control sulfur dioxide, and increased particulate control at older existing plants in eastern states will cost billions. E3 determined that, provided retrofits are relatively easy and can be physically accomplished at all facilities, capital costs could be as high as \$80 billion, with total levelized costs of \$15 billion per year (2006 dollars) over the next 30 years. “In fact, some facilities will not be able to be retrofitted and retrofit at others will not make economic sense. Without a liquid allowance trading market, the future looks pretty bleak for such facilities,” said Short.

HIGHER ELECTRIC PRICES, SHORTAGE OF BUILDING MATERIALS

All these costs will mean higher electric prices in the eastern interconnect. “Somebody’s going to have to come up with the \$15 billion per year, and it is going to be the rate base,” said Short. Further, EPA’s analyses do not take into account the construction logistics associated with so many plants being retrofitted and reconstructed. E3 concluded that it may not even be possible to accomplish all the work that will need to be done to comply with the regulations between now and 2015. We may find that the equipment and materials for these projects can not be produced at the rate, and trained craft may not be available in the amount required to meet the regulatory deadlines.

For further information please contact Jim Short at 303-762-7062 or Earl Franklin at 406-582-4144.

Energy Industry Veterans King, McAleb, Tudor Join E3

Energy industry veterans Peter B. King, William B. McAleb and Carol E. Tudor have joined E3 Consulting, adding immensely to the firm’s bench strength. With the additions, E3 now has more than 25 professionals dedicated to helping clients achieve predictable outcomes in energy-sector initiatives.

Peter King has been named Managing Director of Business Development, and will be responsible for formalizing and broadening the firm’s global marketing initiatives, in addition to other senior level management responsibilities. Peter brings more than 25 years of diverse experience in



Peter King

environmental sciences and engineering to E3 Consulting, with expertise spanning the public and private sectors, both domestic and international. His background includes 15 years in senior business development positions with major engineering consulting companies. Most of his private sector experience has focused on the global oil and gas and power industries. Peter’s business development experience includes strategic initiatives such as creation and management of strategic alliances with global petroleum companies, sales management (leading teams of major account managers), and direct sales to multinational companies in the U.S. and abroad. Peter holds a BS in

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Chemistry from the University of Vermont, a Masters in Environmental Sciences and Engineering from the University of North Carolina, and a Masters in International Business from the Garvin School of International Management (Thunderbird) in Phoenix, Arizona. He can be reached by email at peter.king@e3co.com or by phone at 720-833-6344.



Bill McAleb

Bill McAleb will be the firm's newest Executive Director, focusing on the liquefied natural gas market, especially gas facility design and construction. Bill is also a specialist in the analysis of economic and competitive issues surrounding inter-fuel competition. Bill is a highly regarded industry analyst and commentator who frequently delivers analysis on a broad array of energy issues to industry gatherings and media outlets. Bill's practice emphasis is the delivery of actionable management and strategic advisory services related to enterprise resource planning (ERP), strategic plan development and implementation, M&A transaction advisory, project finance support, market development architecture,



Carol Tudor

regulatory policy impact and contract development and negotiation. An engineering graduate of the University of Texas at El Paso, McAleb holds advanced degrees in Petroleum Engineering from Tulane University, in addition to an MBA in Finance from the Freeman School of Business at Tulane University. He can be reached by email at bill.mcaleb@e3co.com or by phone at 303-762-7073.

Carol Tudor has joined the firm's Environmental Consulting Practice. A Colorado Registered Professional Environmental Engineer, Carol received her undergraduate degree at the University of Guelph in Ontario, Canada. Carol's seven years of consulting experience include performing environmental site assessments, subsurface investigations, petroleum site remediation, and National Environmental Policy Act (NEPA) compliance reviews. She has performed on-site investigations at commercial, industrial and mining facilities. Carol's client base has included the petroleum retail sector, property owners and management companies, and telecommunication facilities construction firms. She can be reached by email at carol.tudor@e3co.com or by phone at 720-833-6345.

Utility Staff Shortages to Provide Great Careers for Youth

By Donald J. Hurd, President & CEO, E3 Consulting,® LLC

The coming shortage of managers, technicians, craftspeople and professionals needed to operate American electric utilities in the next decade will create major employment opportunities for young people interested in careers in the power sector of the future. That is the conclusion of the Colorado Utility Careers Task Force, a group of volunteer professionals and educators we convened last year to examine human resources challenges and solutions in the electric power industry in coming years. Now, after conducting some significant research over the past six months, the task force's message to high school students and college freshmen unsure of their majors is this:

The utility/power sector of the future will be challenging, high-tech, stable, environmentally sophisticated – and financially lucrative at all levels. Because of the focus on environment and energy

efficiency, renewable energy systems and other emerging technologies now becoming commercially viable will need to be integrated into the systems across our country – no small task. The continuing growth in demand for energy, deployment of new technology and the aging work force all add up to fabulous career opportunities in the energy sector. Young people should begin now to examine an educational path that will lead them into some very attractive and rewarding careers in what will be a new era of power generation in this country.

According to the U.S. Bureau of Labor Statistics, even with energy sector consolidation, there will be a shortage of about 10,000 power industry jobs by 2012 – just six years away. The wave of expansion in the industry that will be supported by the Energy Policy Act of 2005 is expected to drive the need for managers and staff even more. Our own research

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shows that tougher new emissions standards set by the U.S. Environmental Protection Agency last year could result in the retirement of certain older, less efficient coal-fired plants in the 28 Eastern and Southeastern states now governed by these new environmental laws. If those old plants are shut down, a substantial building boom will bring online state-of-the-art coal fired plants and renewable energy systems – continuing the significant progress the utility industry has made in emissions reduction over the past 35 years.

“There will be a shortage of about 10,000 power industry jobs by 2012.”



Colorado’s leading institutions of higher learning are preparing power generation and transmission curriculum now for those interested in working directly on systems to keep our lights on, and they are developing sources of funding for leading professorships in power generation. However, the power sector of the future will need the minds of a host of other professionals and skilled craft, from accountants to environmental specialists, from security specialists to system maintenance experts, from lawyers to human resources executives, and everything in between. The industry offers an impressive array of career paths that cannot be outsourced.

The 15-member Colorado Utility Careers Task Force, which I Chair, includes representatives from Energy Central Jobs, educators from the Colorado School of Mines, Colorado State University, the University of Colorado and the Community College of Denver. We’ve also been consulting with Bismarck State College in North Dakota, the leading provider in the nation of a two-year course in power generation. Also on the task force are representatives from Xcel Energy, the Platte River Power Authority, Aquila, Western Area Power Administration, Fort Collins Utilities, Colorado

Springs Utilities and Tri-State Generation and Transmission. All of the task force members have been extremely active and interested in finding solutions to the looming shortage of power sector managers, crafts and staff.

Last fall, we conducted a formal poll of more than 240 utility industry hiring authorities, and learned from them that:

- More than 46 percent of the workforce will retire within the next 10 years.
- The average of the utility workforce is between 41-60.
- The ideal age the hiring managers would like to have is 31-40.
- The aging workforce is “one of several challenges facing the company.”
- Shortages today are greatest in the ranks of 1) technicians and specialists, 2) engineers, 3) mid-level management, and 4) senior level management.
- In 10 years, those shortages will rank about the same in priority.
- Most positions open today require 1) a master’s degree, 2) a two-year associate degree, 3) other technical certification, and 4) a four-year bachelor’s degree.

We are now in the midst of another formal poll that will determine current pay scales up and down the employment spectrum, specific job needs by skills category, average time-to-fill, most productive recruitment sources, number of positions filled with in-state applicants versus out-of-state, and specific activities now focused on filling potential high-vacancy slots.

With all of this data, the educators on the task force will be able to better design relevant two-year and four-year curriculum to attract faculty, students and funding, while the utilities can begin to get the message out to young people that a career in power generation just might be the workplace wave of the future.

For further information you can contact Don Hurd at 303-762-7063.