

# COAL AIMS TO RECLAIM “FUEL OF CHOICE” STATUS



In summing up his keynote remarks at COAL-GEN 2002 in St. Louis August 1, Ameren Corporation president and chief operating officer Gary Rainwater said, “In Ameren’s view, the best energy security is a big pile of black coal at a coal-fired power plant.” Joining Rainwater during the event’s keynote session were Jacob Williams, vice president of generation development for Peabody Energy, and Carl Bauer, associate director of coal and environmental systems for the Department of Energy’s National Energy Technology Laboratory (NETL).

All three said new coal generating capacity is critical to U.S. national security because it is a fuel supply that is domestic, abundant, inexpensive, and, thanks to new technologies, increasingly clean. More than 1,200 people attended the event and more than 100 coal-industry suppliers exhibited at St. Louis’ America’s Center.

Eighty percent of Ameren’s total generation comes from coal-fired power plants, said Rainwater, and the percentage will increase when Ameren buys CILCO, which produces 90 percent of its power with coal. “It’s true that like most other recent developers, when we built generation, we turned to natural gas-fired combustion turbine peaking generation,” said Rainwater. “However, recently, generation developers have been looking at coal as a fuel source for the first time in years. That’s partly because the development of new technology that helps us monitor and control emissions makes coal more viable. But even more important – extremely volatile natural gas prices, concerns about the natural gas infrastructure, and natural gas reserve deliverability have made coal look more attractive than at any time in the last 20 years.”

It was Williams of Peabody Energy who drew one of the strongest reactions from the pro-coal keynote audience when he said, “Gas suddenly becoming baseload in the West for the first time last year is one of the reasons why, for the first time in 20 years, we have seen real electricity prices rise.” What that really means, said Williams, is that the traditional baseload sources – hydro, nuclear and coal – are

fully utilized in the West and they had to rely on gas-based generation for almost all hours of the day in late 2000 and early 2001 to serve load.

“Over time, the U.S. will rely on gas for more hours of the year to serve load and help establish power market prices,” said Williams, “and the U.S. will likely see real electric price increases since there will not be any excess low-cost baseload coal to fill the needs unless new baseload coal capacity is built.”

## TRANSMISSION LACKING

Williams also expressed concern about the inadequacies in the U.S. power transmission system to move low-cost coal generation to places needing it. Citing DOE’s 2002 national transmission grid study, he noted that the eastern U.S. has a greater number of, and more severe, transmission bottlenecks than does the West. He said that lack of excess transmission means that many power markets are solely riding the gas curve and are unable to avail themselves, or take maximum advantage of, lower-priced baseload coal capacity. “The value of transmission increases as we run out of excess coal capacity in the Northeast, Southeast, South and West over the next five years,” he said. “Transmission is key to moving new and extra coal-based generation to markets that do not have this resource. Furthermore, transmission is the key to limiting potential market power abuse in the electric market.”

Coal plants *can* be permitted, said NETL’s Bauer, noting that siting is critical. Yet despite the fact that lead times are longer, technical issues are more complex than those of natural gas, and public acceptance is more difficult, coal is likely to meet them more cost effectively than competing technologies,” he said.

## IF YOU BUILD IT

Among presenters at COAL-GEN’s megasession, Daniel Wheeler of the Illinois Office of Coal Development detailed how his state not only welcomes new coal-fired generation, but is aggressively promoting it with funding incentives. The Illi-

nois Coal Revival Program provides \$3 billion in revenue bond financing for power plants, scrubbers, and alternative energy sources, and \$500 million in grants for new or expanded electric generating capacity.

Projects currently under consideration to receive state funding include two 750 MW pulverized coal projects being developed by Dynegy; a 550 MW circulating fluidized bed coal-fired plant under development by EnviroPower; a 1,500 MW mine-mouth coal-fired facility by Franklin Energy; two 330 MW fluidized bed units being developed by Indeck Energy; Midwest Generation’s proposed conversion of two 550 MW gas-fired generators to coal at its Collins station; and Peabody Energy’s proposed 1,500 MW Prairie State pulverized coal plant.

In neighboring Kentucky, a new coal-fired power plant that is moving full-steam ahead is the E.A. Gilbert Unit 3 expansion at East Kentucky Power Cooperative’s Spurlock Power Station in Maysville, Ky. GE Power Systems announced at COAL-GEN that it will be supplying a 300 MW tandem compound, double-flow steam turbine to the project for delivery in third quarter 2003. Plant construction is scheduled for completion by fourth quarter 2004.

## FLEET OPTIMIZATION

Regardless of how much coal capacity is added, the bulk of the existing fleet of coal plants will continue operating. For these plants, performance optimization is essential. A competitive environment that has resulted in fewer employees, however, complicates realizing the full benefits of optimization, and less time for detailed performance analysis.

Operating a generation portfolio in today’s market requires a robust, collaborative, distributed IT framework. Because global optimization is always more challenging than local optimization, IT solutions must be able to link and coordinate information flow across applications to address inter-dependency of performance and reliability issues, according to Curt Lefebvre of NeuCo Inc. and Scott Stallard

## COAL-GEN WRAPUP

of Black & Veatch, who delivered a presentation at COAL-GEN.

Technology and know-how have not yet evolved to the point where plant and portfolio optimization are readily accomplished, but steps are being taken in that direction. NeuCo and Black & Veatch, for example, are teaming up to integrate NeuCo's optimization expertise with Black & Veatch's field experience with on-line performance monitoring to develop a real-time performance optimization tool. PerformanceOpt, currently in beta testing, creates an environment for unit optimization where the plant owner can optimize the tradeoff between unit output, efficiency, emissions, and reliability. This tool will provide operators and engineers with advanced diagnostic drill-down techniques (e.g., quickly identify interrelationships among parameters), enhanced what-if capabilities (e.g., effect of steam pressure setpoint changes on NO<sub>x</sub> emissions), and improved equipment condition assessments (e.g., whether a surface condenser is limited

by tube sheet blockage, air in-leakage, or leaking drain valves).

Optimization tools such as PerformanceOpt owe their genesis primarily to the neural network-based combustion optimization systems that have been in use in various guises for almost a decade. NeuCo now has more than 40 commercial installations of its CombustionOpt system, achieving a 14.8 percent average NO<sub>x</sub> reduction and 0.5 percent heat rate reduction. An installation at Reliant Energy's Cheswick Station in Pennsylvania, discussed at COAL-GEN by NeuCo's Peter Spinney, illustrates the challenge and promise of plant optimization. Cheswick is a 570 MW PC tangentially fired boiler with a Westinghouse WDPF-II control system and an ABB TFS-2000 low-NO<sub>x</sub> firing system. Skeptical operators, the lack of a functioning data historian, tie-in scheduling difficulties, and staffing limitations all concerned plant management, but the plant's environmental requirements convinced plant management that combustion optimization was important.

Reliant had several objectives for the combustion optimization project: (1) Primary – maintain ozone-season NO<sub>x</sub> emissions at or below current requirements; (2) Secondary – minimize fuel costs and manage opacity constraints; (3) Other – reduce ammonia usage when SCR comes on-line in 2003, and optimize the SCR and FGD together in 2004.

After installing CombustionOpt, Reliant Energy evaluated the results in both enabled and disabled modes during a one-month study period in late 2001. Across all loads, the system achieved a 15-20 percent NO<sub>x</sub> reduction, a 1.9-2.4 percent heat rate reduction, and a 15 percent opacity reduction. Further, while CombustionOpt is not intended to negate the need for SCR, it will help minimize ammonia usage, increase catalyst longevity and avoid ammonia slip. An economic analysis indicates more than \$2 million in annual savings from fuel costs and avoided NO<sub>x</sub> credit purchases. □