Generating with Environmental Mandates

THE INDUSTRY STEPS UP

BY JAMES F. WOOD

James F. Wood
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THE ELECTRIC GENERATION INDUSTRY IS IN the midst of one of the largest capital spending campaigns since the fossil and nuclear build-out of the 1970s. By 2015, this sector of the economy will have committed and spent nearly $30 billion – not to increase the amount of generation in the United States, but to reduce emissions and improve the environmental performance of the coal-fired fleet that represents nearly 50 percent of the domestic supply of electricity.

In the spring of 2005, the Environmental Protection Agency implemented the Clean Air Interstate Rule and the Clean Air Mercury Rule. The clean air rule requires additional and dramatic reductions in SO_x and NO_x emissions by 2015. The mercury measures will require a 70 percent reduction in mercury emissions by 2018. The clean air rule followed the implementation of the Acid Rain Program established by the 1990 Clean Air Act amendments. Between 1990 and 2005, electric generation from fossil plants in the United States increased almost 40 percent, an average of 2.7 percent per year, consistent with the general growth of the economy. During the same period, NO_x emissions decreased about 45 percent and SO_x emissions decreased about 30 percent.

The acid rain and clean air programs were successfully implemented using a market-based "cap and trade" mechanism that encouraged generators to select how they would meet the compliance requirements. For the SO_x component, there is a hard and permanent cap, which declines to 8.95 million tons in 2010, a level of 50 percent of the sector's 1980 emissions. The "cap-and-trade" mechanism unraveled the ambiguity associated with other proposed compliance structures, allowed generators to make economic decisions in respect to which facilities to retrofit and encouraged a market structure to develop between suppliers and customers that reduced capital costs and improved implementation schedules.

The benefits of these regulatory policies were estimated by Chestnut & Mills and reported by the EPA in 2006. By 2010, the estimated benefits from reduced premature deaths, lower incidence of heart and lung ailments and preservation of some National Parks exceed $240 billion. By 2020, these benefits are estimated to increase to $350 billion. These benefits do not include mercury reductions from the mercury emissions restrictions.

In contrast to the acid rain program, many states are moving forward with command-and-control mercury regulations that limit or restrict trading in ways that will place ambiguity into the implementation process, adding cost and schedule uncertainty and creating vendor-customer conflict. Generators in states that have adopted the EPA-recommended trading program will have more flexibility implementing these limits. However, the cap-and-trade concept permitted by EPA is being challenged in federal court by a 16-state coalition. The suit is filed in the United States Court of Appeals for the District of Columbia Circuit. In August 2006, the court consolidated petitions and designated New Jersey v. EPA as the lead case.

Compliance is further complicated due to the speciation of mercury in the flue gas. Bituminous coal-fired plants equipped with selective catalytic reduction for NO_x control, flue gas desulfurization for SO_x control, and electrostatic precipitation for particulate control have been able to demonstrate 70 to 90 percent mercury capture. This co-benefit occurs because most of the mercury entering the flue-gas desulfurization is in ionic form, having been oxidized by the selective catalytic reduction and chlorine in the flue gas. Elemental mercury does not seem to be captured in the flue gas desulfurization or, if it is, it may be re-volatilized and escape back into the flue gas.

Sorbent technologies, including activated carbon, are in commercial testing at many plants. It is known that significant amounts of SO_3 in the flue gas inhibit the capture of mercury by activated carbon. Estimates of the costs required for a 500-megawatt facility to achieve 90 percent mercury reduction using activated carbon are in the range of $6 million per year.

These costs and technical uncertainties, as well as the mixed mercury regulatory framework, are likely to cause owners of some older coal generation to reconsider whether this generation should remain in service or be mothballed. Although this may seem like good news for those for whom coal will never be clean enough, coal remains the most abundant fuel in the United States and has benefits related to national security and generation diversity that may be entirely lost in this debate.

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Federal plans to store nuclear waste at Yucca Mountain continues to spur opposition in the state, according to a recent poll.

The *Reno Gazette-Journal* surveyed 600 people and found that 76 percent are against the project, and 57 percent said the issue will influence their vote for the next president.