Update on NO_X Regulations: Markets and control technologies

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Several of the most stringent NO_X emission control programs currently in place have been implemented through emissions trading, notably the Northeast's NO_X Budget and California's RECLAIM. And more are likely on the way, including a proposed program in Texas, the potential emergence of a 22-state program under the NO_X SIP Call, and possibly a national program based on new legislation. Perhaps most importantly, there is considerable interest in developing 3-pollutant (SO_2, NO_X, and toxics – e.g. mercury) or four-pollutant (add CO_2) emission control regulations in order to reduce the total cost and uncertainty associated with improving the environmental performance of large stationary sources (especially electric power plants). Such regulations will almost certainly involve emissions trading in part or in whole, with potentially important implications for SCR and SNCR technologies. Equally as important, if not more, is the introduction of competition to electricity generation, problematic though this process has turned out to be.

The most general observation is that fuel combustion, especially for electric power production, continues to evolve towards a process chemistry engineering model. That is, engineers and plant operators continue to look more analytically at the design and performance of the entire fuel handling, combustion and exhaust gas treatment system, utilizing more and better instrumentation and controls to optimize unit performance, often on a near-real-time basis. This approach stands in contrast to the older view of emissions controls as afterthoughts to production processes. Competitive forces are particularly important here, since they can change the meaning of 'optimum performance' to emphasize total financial returns over traditional goals of reliability and cost control. With pollution control devices essentially shrinking the bottom line rather than expanding the rate base, firms are finding new ways to minimize capital costs while improving operating efficiencies. These efforts have resulted in new NO_X control technologies, and new combinations of control technologies and plant control systems now in construction and operation at full scale.

A less desirable outcome has been the extreme volatility of NO_X allowance prices; in the Northeast's OTC NO_X Budget, prices two years ago spiked up over $7,000 per ton, while in California, RECLAIM Trading Credits (RTCs) have been priced at over $50,000 per ton. Worse yet, in the RECLAIM market last year, several electric power plants had emissions that vastly exceeded the number of allowances they were able to obtain, resulting in some of the largest environmental fines ever recorded, up to $17 Million in one case. (It's worth noting, though, that the firm that paid this fine was also able to sell some of the power it was generating for a net gain of $45 Million.) On the other hand, some small manufacturing firms found it more profitable to shut down production or install control technologies, and then sell their excess RTCs. These volatility problems result from a combination of emission and power market design features, and an underappreciation by some business leaders of the risk they are exposed to under emission trading programs. The main emission market issues are the lack of auctions for allowances and restrictions on banking allowances over time. The main troubles firms suffered was a failure to consider and prepare for increased demand for emission allowances, which resulted in insufficient investment in emissions control technologies. The key implications of these allowance pricing issues are that allowance prices do not represent marginal costs of controlling NO_X emissions except in the very shortest of terms, and that incentives to install and improve emissions control technologies are now much higher than they were until recently.

A final observation is that combinations of combustion controls (e.g. LNB) and SCR units appear to be the principal strategy for the future, where emissions caps or 85% emission reductions requirements are expected. But concerns over the potential effects of mercury or CO_2 emission regulations remain, and firms will need to evaluate and manage their exposure to regulatory risks. Mercury control requirements might increase the value of SCR units, since they can allow for more cost-effective capture of mercury in the exhaust stream of coal-fired power plants. However, very strict requirements might force the substitution of gas for some coal-fired generation, easing the effective stringency of a NO_X cap on the remaining units, decreasing the need for NO_X control technologies. Similarly, CO_2 control requirements (a somewhat remote possibility, it would seem) might well have a similar effect, although current progress on carbon capture and sequestration technologies suggests realistic pathways towards a long-term future for coal-fired power generation.

The watchword for the future of SCR, SNCR, and other NO_X control technologies will be flexibility. Technologies that can provide optimum performance under a wide set of regulatory and market conditions (fuel, power, and emissions markets) will be most highly valued. Integrated strategies that include technological, financial, and managerial tools will have the flexibility to respond to new challenges and seize new opportunities.