POLICY IMPLICATIONS OF RELYING ON ENERGY CONSERVATION AS AN ACID RAIN CONTROL STRATEGY

Paul A. Centolella and F. Ross Pultz, Ohio Office of the Consumers' Counsel, and Eric L. Miller, AES Environmental Services

I. THE IMPACTS OF ENERGY CONSERVATION ON SO_2 REDUCTION PROGRAMS.

There is increasing agreement that acid rain is a national problem which requires federal action. At least twenty bills addressing acid rain have been introduced in the 100th Congress. Most would require reductions in utility SO_2 emissions of 8 to 12 million tons and in NO_x emissions of 0 to 4 million tons with deadlines for significant emission reductions ranging from 1993 to 2005. Significant SO_2 and NO_x emission reductions could impose substantial costs on states in the lower Midwest which both rely heavily on coal fired electrical generation and contain regions which are economically dependent on high sulfur coal production.

The Ohio Office of the Consumers' Counsel (OCC) is completing a study of energy conservation as an SO_2 reduction strategy. OCC's consultants for this study are Howard Geller and Peter Miller of ACEEE and Eric Miller of AES Environmental Services.

A. Methodology

First, an Ohio specific study of conservation potential was completed, which paralleled earlier work for the ECAR region (Geller et al., 1987). This analysis indicated that measures with a cost of conserved energy of 6 cents per-saved Kwh or less had the potential to reduce annual energy use by 26,966 Gwh or 22% of 1986 consumption.

Second, an integrated planning model was used to develop base case and conservation load forecasts and to predict the impacts of conservation programs under a range of SO_2 reduction requirements and compliance strategies. The model forecasted base case average annual load growth of 1.5 %, closely paralleling utility forecasts. In the moderate and aggressive conservation cases energy use was forecasted to grow at 1.0% and 0.7% per year respectively. The forecasted reductions in load growth are comparable to savings reported by large utility conservation programs (CECA and ACEEE, 1987). The conservation programs selected were cost effective independently of whether SO_2 reductions were required, although most of the benefits occurred after year 2000. The average costs of conserved energy in the moderate and aggressive conservation cases were 2.07¢/Kwh and 2.65¢/Kwh respectively.

The study considered rate cap, tonnage ceiling, and stretched out emission reduction requirements. Against these requirements, we evaluated, with and without conservation, control strategies which relied heavily on fuel switching (low cost at 1985 generation levels); scrubbers (at units under 30 years old); and a combination of scrubbers and least emissions dispatching (base loading scrubbed units).

B. The Results

Pursuing an aggressive conservation strategy would keep Ohio SO_2 emissions at or below current levels (2.2 million tons annually) through 2007, avoiding a forecasted increase to 2.5 million tons by 2005. Since coal and baseload nuclear facilities comprise 92% of the generating capacity of Ohio utilities, conservation programs heavily impacted the use of coal-fired capacity.

By avoiding the most expensive emission control measures, aggressive conservation programs reduced the annual cost of SO_2 control by 21% to 49%. These results are not inconsistent with earlier studies which indicated that conservation by year 2000 could reduce SO_2 control costs in the ECAR region by 11% to 17% (Geller et al., 1987) and that zero load growth would reduce SO_2 control costs for AEP by 38% (Center for Clean Air Policy, 1987). Our results are also consistent with qualitative assessments of conservation impacts (Jessup, 1988). By preserving flexibility, conservation magnified the impact of least emissions dispatching. The combination of aggressive conservation and least emissions dispatching, compared to the base case designated scrubber scenario without least emissions dispatching, cut the annual cost of SO_2 control by 60%. Our results also indicated that the contribution of energy conservation to reducing the cost of SO_2 control was substantially greater when emission reduction requirements were structured as a ceiling on total tonnage, rather than as a cap on emission rates per unit of heat input, and when the timing of required reductions was stretched out.

When a ceiling on SO_2 emissions was assumed, conservation had little or no net impact on high sulfur coal use. In the aggressive conservation, designated scrubber, least emissions dispatch case, high sulfur coal use remained at or above current levels throughout the period studied. In other cases, reductions in high sulfur coal use of up to 48% were projected, but in emission ceiling cases, these reductions were projected to occur regardless of whether conservation was pursued.

II. POLICY IMPLICATIONS

The potential of energy conservation to reduce the cost of acid rain control has begun to stimulate policy discussions among representatives of state air quality authorities, utility regulators, energy offices, and U.S. EPA (NESCAUM, 1988). Our results suggest:

1. Aggressive energy conservation could have a significant impact on reducing emissions growth and the cost of SO_2 control.

2. Acid Rain Control Legislation must be fashioned to accommodate energy conservation as an emission control strategy.

   a. To give full credit to conservation related reductions in atmospheric SO_2 and NO_x loadings, statutory requirements must be structured as a ceiling on the tonnage of emissions allowed. Tonnage ceilings limited to non-NSPS units or based upon available capacity can avoid objections that a ceiling on total emissions could limit economic growth.

   b. Legislation should not limit allowable compliance strategies. Even if conservation is listed as an acceptable strategy, verifying that emission reductions are attributable specifically to conservation could require years of litigation.

   c. Legislation should give specific direction to EPA to accept projected conservation program results incorporated in state load forecasts, provided adequate contingency planning is contained in the State Implementation Plan (SIP). Contingency planning will be required to implement any legislation. State regulators are in a better position than U.S. EPA to evaluate the potential of conservation programs.

   d. Legislation should specifically include provisions to allow trading and resolve disputes regarding the allocation between states of conservation related emission reductions in multi-state utility systems and power pools. Two types of solutions have been suggested: an arbitration system administered by U.S. EPA or the federal assignment of separate emission ceilings to multi-state utilities and power pools.

   e. A system of emission reduction banking which offered flexibility for unexpected changes in energy consumption while achieving cumulative loading targets would facilitate emission controls based upon a tonnage ceiling.

   f. Compliance and planning deadlines must be sufficient to allow states to develop demand-side capabilities and achieve significant load growth moderation.

   g. In the development of U.S. EPA implementation guidance, coordination between EPA and the states will be required. Both a state advisory committee to EPA and federal assistance to states in the development of demand-side capabilities could prove valuable.

3. Conservation underscores the need for increased coordination among state air quality authorities, utility regulators, and energy offices in SIP development and implementation, including:

   a. Integration of official load forecast and SIP development to incorporate conservation impacts;

   b. Forecasting of dispatching and generation patterns to support SIP development and implementation; and

   c. On-going data exchange regarding load growth to fine tune demand-side programs and determine when emissions control contingency plans should be implemented.

Energy conservation can substantially reduce the cost of acid rain control and appropriate control legislation could provide a major catalyst for near term development of conservation programs. Relying on energy conservation as a control strategy will require us to think in new ways about the statutory requirements and implementation for SO_2 control.

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