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ADDRESSING THE ENVIRONMENTAL NEEDS OF THE NORTHEAST: A LOOK AT THE FUTURE ALTERNATIVE FUELS

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The purpose of this article is to place alternative fuels into their historical context, at least for the northeastern area of the country, and to provide an idea of what NESCAUM¹ predicts for the likely future penetration of various fuels in the Northeast.

The Northeast is faced with severe air quality problems which include summertime smog, wintertime carbon monoxide exposures in cities, fine particulates along many of the transportation corridors, and various air toxics exposures. The regional ozone, or smog, problem is probably the most onerous for the states to address. The regional area involved encompasses the entire Northeast corridor which is one long stretch of urban-suburban sprawl from the Washington, D.C. metropolitan area all the way north through Portland, Maine.

The Northeast's most severe air quality ozone season in many years occurred in 1988.² The atmospheric transport of ozone precursor emissions and ozone occurred on a frequent basis and episodes persisted for several days at a time. The transport was so dramatic that levels well above the ozone standard were measured as far north as Acadia National Park, which is close to the Canadian border on the coast of Maine. These levels above the ozone standard occurred in the early hours of the morning (1:00 a.m.) and were not just slightly above the standard, but rather 80% to 90% above the standard.³

Given such dramatic ozone levels, it is clear that we have quite a problem before us. Motor vehicle emissions are a major component of the problem. Motor vehicles emit hydrocarbons which comprise approximately 50% to 65% of the states' hydrocarbon inventory in the northeast.⁴ They also emit nitrogen oxides (NO_x) and are responsible for between 45% and 55% of the NO_x inventories in those states.⁵ It is these two pollutants that combine in sunlight to form smog. NESCAUM believes that to effectively reduce motor vehicle emissions, a combination of four vehicle emission control strategies

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1. The Northeast States for Coordinated Air Use Management (NESCAUM), is an organization of eight state air quality agencies founded in 1967 by the governors of New York, New Jersey, and the six New England states. The NESCAUM board is composed of the lead air quality management official from each of the states. Their major concern is protecting public health.

2. U.S. EPA Air Quality Trends Report 1987-1990.

3. U.S. EPA, AIRS Database 1989.

4. Northeast State Emission Inventories 1988-1990.

5. *Id.*

must be pursued.

First, we need cars that produce little to no pollutants. Second, we need to make cleaner fuels available for those vehicles. Third, there must be effective vehicle inspection programs that identify high emitting vehicles and ensure that these vehicles are repaired and maintained.⁶ Fourth, we need to implement innovative programs which will effectively limit, or control, the increase in vehicle usage. This article addresses the first two strategies.

I. USE OF POLLUTION REDUCING VEHICLES

The Clean Air Act explicitly mandates that the Environmental Protection Agency (EPA) manage and implement a motor vehicle control program.⁷ This mandate covers every state except California which has the option to administer its own program.⁸ The Clean Air Act Amendments (CAAA) provide other states with the option to opt into the California program. In the Northeast there are several states that are actively pursuing that option.

A. *The California Program*

The California program is complex and comprehensive. Essentially, the program mandates continually lower vehicle emissions for hydrocarbons on an annual basis during the late 1990s and early 21st century. The auto industry has the flexibility to certify vehicles at different levels. But in terms of their statewide sales fleet, the vehicle sales for each motor vehicle manufacturer must comply with a fleetwide average which becomes increasingly more stringent each year. Eventually, the nitrogen oxide and carbon monoxide standards will be twice as stringent as the federal standard. To the Northeast, California's phase in of stringent vehicle standards is attractive because such standards would address the massive effect that vehicle emissions have on the ozone and air toxics levels in the northeast.

NESCAUM is in the process of analyzing the difference between the future federal program as mandated under the Clean Air Act and California's future program. The preliminary results of this analysis indicate that the California program would reduce hydrocarbons by 35% to 40% over the federal program in the year 2010. For nitrogen oxides, the additional reductions

6. The increase in vehicle use is an aspect of the problem which is very difficult to effectively address. Based on the experience of the growth in vehicle use during the 1980s, growth in vehicle use has the potential to overwhelm the success that is achieved with the other motor vehicle control programs. For example, in the Boston Metropolitan area, the population grew during the 1980s by 4%. During the same period vehicle miles travelled grew by more than 40%. Much of the growth has to do with demographics.

7. Pub. L. No. 101-549, §§ 201-235, 104 Stat. 2399, 2471-2531 (1990) (codified in scattered sections of 42 U.S.C.).

8. California had a motor vehicle emissions program before EPA established a program in the 1970s. The California program was grandfathered into the original 1970 Clean Air Act.

would be approximately 25% to 30%.⁹ Emission reductions of these magnitudes, even though they are long term, are very attractive for air quality control programs to pursue.

B. The Future of Low and Zero Emission Vehicles

The California low emission vehicle (LEV) program requires 2% of the statewide vehicle sales from all the major auto companies in model year 1998 to be electric vehicles or zero emission vehicles.¹⁰ The sales mandate increases dramatically, to 10%, in the year 2003. Several of the northeastern states will be proposing regulations to adopt the California program including the zero emissions vehicle mandate.

The trend towards mandating zero emission vehicles through the adoption of the California LEV program is growing throughout the Northeast. The governors from Maine, New York, New Jersey, and Massachusetts are committed to proposing adoption of the LEV program. The governor in Maryland is supporting legislation to adopt the program. NESCAUM believes that one year from now eight to ten states will be pursuing the program.

There is a potential market for zero emission vehicles. In just the eight Northeastern states, there should be a market for 200,000 to 250,000 by the year 2003. It is encouraging to note that all of the major auto companies have electric demonstration and development programs already underway. NESCAUM believes that the states have a responsibility to assist the electric vehicle market by creating economic incentives for consumers and fleets to purchase electric vehicles, and to address the need to provide the infrastructure support which will be required for electric vehicles.

Electric vehicles are not really zero emission vehicles because electric vehicles are dependent on the electric power system for electricity which in turn results in air pollutant emissions. But for the Northeast, the utility of reduced emissions of hydrocarbons, carbon dioxide, carbon monoxide, and NO_x, has substantial emission benefits. As a result, the prospects for electric vehicles in the Northeast are very encouraging.

II. USE OF CLEANEST AVAILABLE FUELS

The Clean Air Act provides states with an option to adopt fuel quality regulations that they believe are needed to meet the National Ambient Air Quality Standards.¹¹ In 1987 and 1988 the NESCAUM states proposed a

9. Draft of Pechan Report Evaluation of the California LEV Program for the Northeast States.

10. PROPOSED REGULATIONS FOR LOW-EMISSION VEHICLES AND CLEAN FUELS, CALIFORNIA AIR RESOURCES BOARD STAFF REPORT (Aug. 1990).

11. 42 U.S.C.A. § 7545(c)(4) (West 1983 & Supp. 1991).

reduction in the Reid Vapor Pressure (RVP) of gasoline.¹² Historically, during the summer months when the Northeast experiences its most severe ozone problems, the RVP of gasoline was typically 11.5 pounds per square inch (PSI) or higher.¹³ Cars were designed to use a gasoline with a volatility of 9 PSI.¹⁴

NESCAUM assisted the states in the evaluation of gasoline volatility. Eventually, all eight states committed to proposing a 9 PSI limit. Although under very strong pressure from the petroleum industry to back off, the states proceeded to finalize RVP limits and implemented the program in 1989. The result was that the states, at a very low cost, eliminated approximately 250,000 tons of hydrocarbon emissions during the summer months. These were very light hydrocarbon emissions which play a major role in the transported regional smog problem.

This control program caught on. In the midst of it, the EPA proposed a similar program for the nation. In addition, cleaner gasoline was being pursued independently by petroleum companies, mainly in the California market.

The 1990 Clean Air Act Amendments followed suit. The CAAA mandates an RVP reduction for reformulated gasoline throughout the country.¹⁵ Essentially, the Act requires gasoline to be 15% cleaner in terms of hydrocarbons and toxics for 1995. The Act also includes a second phase requiring further reductions for the year 2000.¹⁶ This gasoline is required to be distributed in the nine worst areas, but any area that is not meeting the ozone health standard has the option to adopt it. In the Northeast, Maine and Rhode Island have opted into the reformulated gasoline program and it is expected that the entire Northeast area, and even the middle Atlantic states, will opt in as well. This is a very appealing program because it will achieve significant hydrocarbon and air toxics reductions and will not cause costly administrative burdens.

The progress that has been made in reformulated gasoline has created less of an incentive to pursue methanol, ethanol, and compressed natural gas (CNG) as base fuels for fleets. Consequently, it is unlikely that methanol, ethanol, or CNG will make much of a penetration into the general fleet market unless other significant incentives, such as financial incentives or Corporate Average Fuel Efficiency (CAFE) regulations are used.

Through the fleet program, CNG, and possibly methanol, may make substantial inroads throughout the nation. Regionally, however, the economics, the infrastructure needs, and the air quality technical issues associated with methanol have made it impractical for the Northeast to

12. The RVP is the volatility of gasoline, meaning the rate at which it evaporates.

13. U.S. EPA Gasoline Volatility Proposal, August 1987 Federal Register.

14. U.S. EPA New Vehicle Certification Procedure Regulations.

15. Pub. L. No. 101-549, § 216, 104 Stat. 2489 (codified at 42 U.S.C. § 7545(h)).

16. Pub. L. No. 101-549, § 219, 104 Stat. 2493 (codified at 42 U.S.C. § 7545(k)).

seriously pursue methanol to any significant degree.

Compared to methanol, CNG appears more attractive because the economics are much better, the infrastructure to deliver CNG to the region is in place, and the technical challenges in building vehicles optimized for CNG are being overcome. There is also potential for methanol and CNG to play a major role as an alternative fuel in urban bus fleets. Currently, most of the urban bus fleet is using diesel fuel. Switching to methanol or CNG will have enormous benefits in reducing diesel particulate emissions.

CONCLUSION

In the Northeast it is anticipated that methanol and CNG will be used to some degree in fleet operations and in urban bus systems. The progress in producing a clean reformulated gasoline has ensured that gasoline will continue to play a major role for a long time in the Northeast. I predict that the entire Northeast will opt into the federal reformulated gasoline program. California's reformulated gasoline may be significantly cleaner than Phase II federal reformulated gasoline. Within the next few years the northeastern states will evaluate both reformulated fuels to determine which is more beneficial, feasible, and cost effective for future use in the Northeast.

