

United States  
Environmental Protection  
Agency

Office of Air Quality  
Planning and Standards  
Research Triangle Park, NC 27711

EPA-452/S-92-001  
June 1992

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# **HIGHLIGHTS OF THE EPA INNOVATIVE REGULATORY STRATEGIES WORKSHOP**

## **MARKET-BASED INCENTIVES AND OTHER INNOVATIONS FOR AIR POLLUTION CONTROL**

**JANUARY 15-17, 1992**



**HIGHLIGHTS OF THE  
EPA INNOVATIVE REGULATORY  
STRATEGIES WORKSHOP**

**MARKET-BASED INCENTIVES AND  
OTHER INNOVATIONS FOR  
AIR POLLUTION CONTROL**

**Summary of Workshop Discussion Sessions**

**January 15-17, 1992  
Washington, DC  
Georgetown University Conference Center**

**Sponsored by:**

**U.S. Environmental Protection Agency**

**Air Quality Management Division  
Office of Air and Radiation**

**and**

**Regulatory Innovations Staff  
Office of Policy, Planning and Evaluation**

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Region 5, Library (PL-12J)  
77 West Jackson Boulevard, 12th Floor  
Chicago, IL 60604-3590**

**This report has been reviewed by the Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency (EPA), and has been approved for publication. Any mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use. Furthermore, the EPA is not endorsing any particular program featured in the workshop; the programs included were chosen to illustrate key issues associated with various innovative strategies.**

**Questions and comments on the document should be directed to the workshop chairperson:**

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**Technical support was provided by the Radian Corporation.**

**A companion document entitled "Summary of Innovative Regulatory Strategy Programs Found in the Literature and Popular Press," EPA-452/S-92-002, identifies a wide range of innovative programs being developed or implemented.**

**EPA-452/S-92-001**

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## INTRODUCTION

The Clean Air Act Amendments of 1990 allow, and in some cases require, States to adopt market-based strategies or other innovative types of air pollution control. The U.S. Environmental Protection Agency's (EPA's) innovative regulatory strategies program seeks to encourage and facilitate, as appropriate, the development, demonstration, and implementation of a wide range of innovative regulatory air pollution programs, including market-based, informational, and pollution prevention approaches.

This 3-day national workshop, attended by over two hundred people from Federal, State, and local agencies, industry, environmental and public interest groups, and the academic community highlighted issues associated with a variety of innovative, market-based strategies which are currently being developed or used by State and local authorities around the country. Documentation of innovative regulatory programs identified but not presented at the workshop will be available as a separate EPA report. It should be noted that EPA is not endorsing any particular program presented at the workshop or addressed in this summary report, but is providing information that might be helpful to State and local agencies in designing their own programs.

## OBJECTIVES

The purpose of the EPA Innovative Regulatory Strategies Workshop was to bring together and facilitate discussions among individuals with practical experience or interest in developing market-based strategies for air pollution control. The workshop was designed to:

- Promote the consideration and use of market-based regulatory strategies;
- Explore design and implementation issues related to strategies such as marketable emission permits, pollution fees, and transportation controls;
- Facilitate peer exchange of information and ideas on actual programs (either existing or being developed); and

- Identify implementation obstacles and other issues for further research.

To achieve these objectives, the workshop was divided into three sessions: taxes and fees, marketable permits, and other innovative regulatory strategies for air pollution control. As indicated in the final agenda that follows, each session began with a series of case studies that illustrated key elements of the various strategies and related actual experiences with innovative regulatory programs. Summaries of the case studies are found in the notebook distributed at the workshop.

The case studies presented in each session were followed by facilitated small group discussions where issues illustrated by a specific case study were addressed in greater detail. At least three concurrent small group discussions were held following the case studies in each session. This document contains summaries of the issues addressed during each of those small group discussions. These summaries report the actual content of the discussions and do not reflect the EPA's interpretation of the discussions.

A fourth workshop session was held which consisted of a general discussion, by all participants, of issues needing further research. The results from that session are also included in this document and will be considered by the EPA in the development of a future research agenda.

**INNOVATIVE REGULATORY STRATEGIES WORKSHOP  
AGENDA  
WEDNESDAY, JANUARY 15, 1992**

11:00 a.m. - 1:00 p.m. Registration

1:00 p.m. **Welcome and Overview**

**Welcome** Barry Korb, Workshop Moderator  
Director, Regulatory Innovations Staff  
Office of Policy, Planning and Evaluation, U.S. EPA

**Opening Remarks** John Seitz, Director  
Office of Air Quality Planning and Standards  
Office of Air and Radiation, U.S. EPA  
and  
Maryann Froehlich, Acting Director  
Office of Policy Analysis  
Office of Policy, Planning and Evaluation, U.S. EPA

**Overview of  
U. S. Programs** John O'Connor, Senior Program Manager  
Radian Corporation  
and  
Linda Critchfield  
Acid Rain Division  
Office of Air and Radiation, U.S. EPA

**Keynote Address** William Rosenberg, Assistant Administrator  
Office of Air and Radiation, U.S. EPA

**Session I** **Innovative Uses of Taxes and Fees for Stationary and Mobile  
Sources**

2:30 - 5:45 p.m.

**Introduction** Barry Elman  
Regulatory Innovations Staff  
Office of Policy, Planning and Evaluation, U.S. EPA



## **INNOVATIVE REGULATORY STRATEGIES WORKSHOP AGENDA (Continued)**

**Case Studies**

Louisiana Environmental Scoring System/  
Property Tax Exemptions  
John Glenn  
Louisiana Department of Environmental Quality  
Baton Rouge, Louisiana

Drive Plus: Sales Tax/Rebate Based Upon Vehicle Emissions  
and Fuel Efficiency  
Deborah Gordon  
Union of Concerned Scientists  
Berkeley, California

Alternative Fuels Programs  
Kevin McCarthy  
Office of Legislative Research  
Hartford, Connecticut

### **Concurrent Small Group Discussions**

**THURSDAY, JANUARY 16, 1992**

**Session II**                      **Marketable Permits for Stationary, Mobile, and Area Sources**  
**8:15 a.m. - 12:15 p.m.**

**Introduction**                      Karen Martin  
Office of Air Quality Planning and Standards  
Office of Air and Radiation, U.S. EPA

**Case Studies**                      South Coast Marketable Permits Program:  
VOC and NO<sub>x</sub> Sources  
Pat Leyden  
South Coast Air Quality Management District  
Los Angeles, California

Locomotive Emissions Trading  
Marijke Bekken  
California Air Resources Board  
Sacramento, California

Wood Stove/Fireplace Marketable Permit Program  
Nicholas Kirsch  
Telluride Transit Company  
Telluride, Colorado

## **INNOVATIVE REGULATORY STRATEGIES WORKSHOP AGENDA (Continued)**

### **Concurrent Small Group Discussions**

#### **Luncheon 12:30 p.m.**

**Luncheon Speaker** Richard Morgenstern, Acting Assistant Administrator  
Office of Policy, Planning and Evaluation, U.S. EPA

#### **Session III 2:00 - 5:30 p.m.**

### **Other Innovative Strategies for Air Pollution Control**

**Introduction** Conniesue Oldham  
Office of Air Quality Planning and Standards  
Office of Air and Radiation, U.S. EPA

**Case Studies** Free Bus Ride/Voluntary No Drive Day  
Ray Bishop  
Tulsa City/County Health Department  
Tulsa, Oklahoma

Media Programs to Encourage Carpooling  
Lynn Sonntag  
Disney Productions  
Los Angeles, California

Employer-Based Trip Reduction Programs  
Sarah Siwek  
LA County Transportation Commission  
Los Angeles, California

SCRAP (Old Car Buy Back Program)  
Terrence Larson  
Unocal  
Los Angeles, California

### **Concurrent Small Group Discussions**

## **INNOVATIVE REGULATORY STRATEGIES WORKSHOP AGENDA (Continued)**

**FRIDAY, JANUARY 17, 1992**

**Session IV                      Dialogue on Issues Leading to Future Research**  
9:00 a.m. - 12:00 p.m.

This session will provide an opportunity for all workshop attendees to:

- Share highlights and synthesize issues raised during the small group discussions
- Hear about additional programs identified by individuals in the concurrent small group discussions
- Participate in the definition of a future research agenda

**Closing Remarks**

**Adjourn**  
12:00 p.m.

### **WORKSHOP COMMITTEE**

Conniesue Oldham, Ph.D.  
Workshop Chairperson  
Office of Air Quality Planning and Standards  
Office of Air and Radiation  
U.S. EPA

Karen Martin, Ph.D.  
Regulatory Strategies Section Chief  
Office of Air Quality Planning and Standards  
Office of Air and Radiation  
U.S. EPA

Barry Elman  
Air Innovations Program Manager  
Regulatory Innovations Staff  
Office of Policy, Planning and Evaluation  
U.S. EPA

## LIST OF ACRONYMS

AVR	Average Vehicle Ridership
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAFE	Corporate Average Fuel Economy
CNG	Compressed Natural Gas
CO <sub>2</sub>	Carbon Dioxide
EPA	U.S. Environmental Protection Agency
HOV	High Occupancy Vehicle
I&M	Inspection and Maintenance
LAER	Lowest Achievable Emission Rate
LEV	Low Emission Vehicle
MACT	Maximum Achievable Control Technology
NESCAUM	Northeast States for Coordinated Air Use Management
NO <sub>x</sub>	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
PAYD	Pay As You Drive Auto Insurance
PSD	Prevention of Significant Deterioration
RACT	Reasonably Achievable Control Technology
RFP	Reasonable Further Progress
ROG	Reactive Organic Gases
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SO <sub>x</sub>	Sulfur Oxides
STAPPA/ ALAPCO	State and Territorial Air Pollution Program Administrators/ Association of Local Air Pollution Control Officials
TCM	Transportation Control Measure
TRI	Toxic Release Inventory
VOC	Volatile Organic Compound
VMT	Vehicle Miles Traveled

**SESSION I**

**INNOVATIVE USES OF TAXES AND FEES FOR  
STATIONARY AND MOBILE SOURCES**

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## LOUISIANA ENVIRONMENTAL SCORING SYSTEM\*

### INTRODUCTION

Thirty-one individuals participated in this small group discussion. The group included persons from Federal and State government, industry, academia, and public interest groups. Louisiana State government officials and some others in attendance considered the program successful due to its ability to motivate industry compliance. Their views are reflected under the following sections on Louisiana Program Successes and Key Factors Motivating Industry Compliance. Some industry participants, however, strongly opposed particular aspects of the program, believing that it unfairly burdened corporate facilities. Their views are listed under the section entitled Industry Concerns about the Louisiana Program.

There was considerable interest in the adaptability of this program to other jurisdictions. There was general agreement that improvements in the program structure could be made; however, most participants thought that the Louisiana Program provided a model, or at least a starting point, for development of similar programs. Suggestions made by individuals in the group on ways to improve the program, as well as political and equity issues to be considered before adopting a program, are also listed below.

### HIGHLIGHTS

#### ◆ Louisiana Program Successes

- Used a multimedia approach.
- Rewarded improvement in compliance.
- Generated 5 million dollars in local revenues.
- Reported emission decreases of 36 million pounds of toxic release inventory (TRI) air pollutants and 10 million pounds of criteria pollutants, based on the 1-year life of this program.
- Emphasized pollution prevention rather than end-of-pipe control.

#### ◆ Key Factors Motivating Industry Compliance

- Tax exemption privileges could be diminished for a long time.
- Score cards were made publicly available.
- Companies engaged in competition to obtain good scores.

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\*This program was cancelled by the recently elected governing party.

◆ **Industry Concerns About the Louisiana Program**

- Regulation was retroactive to 1990.
- Emissions/employee ratio as a criterion for allocating bonus points was questioned.
- Larger facilities thought they were unfairly burdened.
- Use of tax structure to achieve environmental goals was viewed as unfair, especially since industry pays most of the State's property tax.

◆ **Possible Ways to Improve the Program or Similar Programs**

- Use a risk-based approach to award bonus points: weight environmental risks of various TRI chemicals.
- Consider whether a facility is in a nonattainment area.
- Reduce uncertainties for industry.
- Phase in the program.
- Consider implementing a formula to weigh historical environmental progress of sources in the scoring system.
- Implement the program legislatively, not administratively.
- Run sample test scores before the regulation is issued to determine the effectiveness of the score card.

◆ **Policy Considerations**

- What type of approach best encourages environmental progress?
  - Carrot (incentive) or stick (disincentive).
  - Fixed target or open-ended? Command-and-control approaches have required compliance with specific targets. Open-ended approaches encourage continuous improvement, but are a new concept and create a degree of uncertainty for industry.
- Industry needs regulatory certainty.
- Potential conflict between agencies geared toward environmental protection and those geared toward economic development.



- Factors including high toxic emissions, high unemployment, a weak economy, and support from the Governor, led to a favorable political climate for adopting the program.
- Programs implemented administratively, rather than legislatively, may be more vulnerable.

◆ **Equity Issues**

- Establish regulations that reward good environmental citizens.
- Reward previous environmental efforts.
- Make fines commensurate with environmental impact.
- Evaluate whether tax structure is fair.



## FEEBATES

### INTRODUCTION

Approximately 70 individuals, representing a cross section of Federal, State, industry, and environmental organizations attended the group discussion on feebates. The following discussion summary reflects the dialogue among individuals in the group. Ideas are those of individuals, and were not necessarily agreed upon by the group as a whole. The group did not come to a consensus on the effectiveness of the program in reducing emissions. All comments about Drive Plus refer to the proposed program in California. Comments about feebates refer to programs similar to Drive Plus, but not to a specific program.

### HIGHLIGHTS

#### ◆ Drive Plus and Emissions Reductions

- The goal of Drive Plus is to reduce the sales-weighted average of vehicle emissions. The program is designed to lower the average, not to impose a limit.
- The group generally agreed that it is difficult to determine the effect of Drive Plus on emissions reductions of criteria pollutants. Individual perspectives follow:
  - Drive Plus is based on the premise that a car's emissions over its useful life are a function of its certified emissions [according to the Federal test procedure (FTP)]. However, cars do not maintain their initial emission levels due to tampering and poor quality maintenance. Their rate of deterioration cannot be predicted by the FTP. Thus, the small improvements in certified emissions that Drive Plus attempts to achieve may not be a significant factor in determining on-road emissions of cars.
  - It is difficult to establish correct prices for automobile emissions without being able to predict deterioration rates.
  - As long as a vehicle has potential to emit (has a tail pipe), its emission level over time is not predictable. Therefore, the only way that Drive Plus could assume a certain level of emissions reductions may be by assigning fees to cars if they have potential to emit and assigning rebates to cars if they do not (i.e., if they are electric or solar vehicles that do not have a tail pipe).

- Although the effect of Drive Plus on criteria pollutant emissions may be difficult to determine, the program does encourage people to buy more fuel-efficient cars. (FTP measurements of fuel economy provide more accurate measures of on-road fuel economy than emissions of criteria pollutants.) In addition, Drive Plus provides information to consumers regarding auto emissions. Over time, the program is expected to cause reduced fleet carbon dioxide (CO<sub>2</sub>) emissions, as people buy cars with better fuel economy.

#### ◆ Cost of Drive Plus Program

- It is difficult to estimate how much money Drive Plus will cost to implement. The program can be started with funds from the General Fund. Such programs might also be started with funds from a vanity license plate fund. Once implemented, the program could be self-supporting. Drive Plus program administrators may need to periodically adjust Drive Plus credit/surcharge schedules to ensure that surcharges cover the credits and program operating costs.
- Surveys indicating how fees and rebates influence vehicle choice have already been conducted. These initial surveys will help Drive Plus program administrators set surcharge and credit levels so that Drive Plus revenues just offset Drive Plus credits and program costs.
- Drive Plus may increase the average price of cars because manufacturers would have an incentive to build cars with more sophisticated pollution-control and fuel-economy technologies.
- Based on the relative amounts of Drive Plus credits and surcharges for particular vehicle models, it is expected that consumers would decide whether to alter their preference of vehicles within and among vehicle classes.
- Surcharges and credits could be set to reflect the societal cost of vehicle emissions. There is concern as to whether surcharge levels are likely to be large enough to affect consumer behavior. The Drive Plus legislation currently being considered in California would impose surcharges roughly as large as \$1,000 and credits roughly as large as \$2,000. The amount of fee or rebate would depend on the estimated vehicle model emissions, based on application of the FTP to a few test cars of each model. If people respond to the Drive Plus program by buying cars with lower certified carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), hydrocarbons (HC), and CO<sub>2</sub> emissions, the zero-point would decrease. Furthermore, as the differences among cars decrease, the rebates and credits could decrease.

◆ **CAFE Standards Versus Feebate Program**

- Some individuals believed that market-based programs usually work best when there are no restrictions on the market. Some economists believed that, in theory, it would be better if Drive Plus were not layered on top of Corporate Average Fuel Economy (CAFE) Standards.
- However, others believed that CAFE Standards should be used to establish a floor and feebates used to move above that floor level. Yet others believed that once prices are established, the CAFE Standards could be removed.
- Feebates are also designed to give information to the consumer and to put a value on pollution. Window decals could supply information on car emissions as well as fuel economy. The CAFE Standards do not require dealers to display information on emissions to the consumer.

◆ **Feebate Programs and Car Size Class**

- Drive Plus credits and surcharges could be calculated within car-size classes or among all classes.
- However, setting Drive Plus credit/surcharges according to car-size class sends a mixed message to the public. A relatively high-emitting large car may get a lower fee than a relatively low-emitting subcompact.
- Industry voiced concern that feebates can sway consumers to change their preference from one car class to another.
- However, Drive Plus is designed to make all types of vehicles manufactured more fuel efficient, regardless of their size.

**OTHER PROGRAMS**

◆ **Gasoline Tax**

- Although Feebate programs are designed to improve fuel economy, and thereby reduce fuel consumption, a gasoline tax might be as or more effective.
- However, a large tax would be needed to affect consumer behavior. In the present political climate, a large gasoline tax is not likely to be adopted.
- Some studies show that a gasoline tax would be 10 to 30 percent less successful in altering consumer behavior than an initial tax associated with vehicle purchase.
- Fuel costs constitute 10 to 15 percent of the operating cost of the car.

- There is disagreement on whether consumers realize how much money fuel-efficient cars save over time through reduced gas consumption.

#### ◆ **Inspection and Maintenance (I&M) Programs**

- Nontraditional I&M programs (using remote-sensing technology) could target both old cars and new cars with high emission levels. These programs could provide disincentives to tamper and incentives to better maintain serviceable vehicles.
- New monitoring technology can record emissions of 1,000 cars per hour by using a remote sensor and a video snapshot of the license plate.
- The majority of high-polluting cars flagged by sensors are cars that have evidence of tampering.
- There is disagreement over the effectiveness of remote sensing.

#### ◆ **SCRAP™ Programs**

- Unocal's SCRAP™ program paid people in the Los Angeles basin \$700 to junk pre-1971 cars in an effort to reduce vehicle pollution. The results of the Unocal program revealed that:
  - High emissions are not directly correlated with age, but rather with tampering and neglect.
  - The total of 1975 cars account for more vehicle emissions than the total of cars from any other model year. That this total is a function of the average emissions of cars in that model year, the number of vehicles of that model year on the road, and the average miles driven by cars in that model year.
  - The dirtiest 10 percent of the cars account for over 50 percent of auto air emissions.

#### ◆ **Registration Fees**

- Registration fees could be used to collect money to buy old cars.
- Cars could be registered and fees determined according to certified emissions level. However, the reliability of certified emissions levels is an issue.
- Registration fees would affect cars currently on the road, but not vehicle sales.

#### ◆ **Pay As You Drive Auto Insurance (PAYD)**

- The PAYD concept could be used in conjunction with other programs to create incentives to encourage drivers to choose alternate forms of transportation and to reduce the number of miles driven.

◆ **Automobile Safety**

- Feebates could be used to achieve policy objectives other than fuel efficiency and emissions reductions. They could be used, for example, to encourage vehicle safety.
- Vehicle safety information is available to consumers in magazine/book stores. However, this information is not made readily available to consumers while in the car lot looking at a car.

**FUTURE DIRECTIONS**

◆ **Complexity versus Simplicity**

- A combination of programs would seem to resolve the issue of reducing emissions levels associated with polluting older cars and new cars.
- Some believed that a collection of programs would confuse the consumer and that the best program would be the simplest one.

◆ **Other**

- Some regulators argued that feebate programs need to focus on criteria pollutant emissions reductions.
- An overall question remaining after the discussion was whether the regulatory focus should be on new cars or on old cars, and if both, whether the two objectives should be accomplished through the same or separate programs.
- In addition, programs need to be evaluated to ensure that the consumer is aware of a vehicle's emissions and any resulting costs.





## **ALTERNATIVE FUELS: First Discussion Group**

### **INTRODUCTION**

The group that attended this discussion appeared to be interested primarily in current developments concerning alternative fuels. There were approximately 10 attendees in this group. Most were from State environmental agencies. The fuel industry and a foreign auto-maker were also represented. The bulleted items below reflect comments expressed by individuals during the discussion.

### **HIGHLIGHTS**

#### **◆ Resources**

- The costs of converting and installing alternative fuel stations depend on the type of station and fuel used. For example, quick-fill stations, which operate like gas stations, are more expensive to install than slow-fill stations. Slow-fill stations, on the other hand, can refuel vehicles over night, and thus are appropriate for fleets.
- Fuels to Drive our Future (National Research Council, Commission on Engineering and Technical Systems. Washington, DC: National Academy Press, 1990) is a good assessment of alternative fuels; useful resource for evaluating capital costs, but not for evaluating fuel distribution costs.
- Organizations, such as the American Gas Association, can provide information about the costs and savings of using different alternative fuel options.

#### **◆ Emissions**

- Two theories on how areas can move out of nonattainment status:
  - Use newer, cleaner cars; and
  - Use cleaner fuel with lower vapor pressures.
- Adoption of California's low emission vehicle (LEV) program is not necessarily cost effective in all areas. Some States (e.g., Connecticut) may not receive enough emission credits initially to make it a worthwhile venture.
- Transferability of alternative fuels programs is difficult. Cost effectiveness and actual emissions reductions will vary among geographical and socio-economic regions.
- Need to evaluate alternative fuel choices in regard to specific air pollution problems.

- Compliance can result not only from converting existing vehicles, but also by replacing gasoline vehicles with alternative-fueled vehicles.
- Compressed natural gas (CNG) conversion equipment can be transferred between cars.

◆ **Market**

- Arizona has tried different alternative fuels. The usefulness and availability of fuels in different areas within the State are determining their market niche.
- Conversions are only a bridge strategy until dedicated-fuel vehicles are more accessible.
- Some alternative fuel theories assert that all fossil fuels will need to be replaced.
- Some thought that successful fuels will compete in the marketplace regardless of whether incentives are offered.
- Others thought that CNG may be the only fuel able to compete in the marketplace without incentives.

**OTHER PROGRAMS**

- Mobil Corporation is in the process of opening a natural gas filling facility in Brooklyn, New York. It will cost \$300,000 to install two pumps.
- Oklahoma's alternative fuels program was developed for two reasons.
  - Both environmental and energy groups supported it.
  - The State needed a new market for natural gas production.
- Oklahoma's program began in 1987 and includes several incentives. Legislation was proposed in 1989, and the bill passed both houses with no votes against it in 1991. The program includes all alternative fuels and requires emissions testing of vehicles. The changes in air quality since the program began have not been quantified because the area reached attainment before the legislation was passed.
- Northeast States for Coordinated Air Use Management (NESCAUM) sponsored an alternative fuel road rally this past fall with a route traveling through the capitals of the northeastern States.
- The Solar/Electric 500 race in Arizona brought people together, thus serving as a forum for exchange of ideas. The race now has corporate sponsors and is expected to be held annually.

- Arizona also educates the public on tax incentives, which include reductions in vehicle tax and registration tax for alternative-fueled vehicles.
- In Arizona, solar-powered cars may be successful in off-grid areas where there is no access to electricity and no charging capabilities.
- The State of New York provides dedicated parking for alternative-fueled vehicles.
- McDonell Douglas will circulate alternative-fueled vehicles among its employees.
- Toyota is conducting research on alternative-fueled vehicles in Japan and in the U.S., and demonstrating alternative-fueled vehicles in Japan.

## **FUTURE DIRECTIONS**

- There was general agreement on the following points:
  - The public needs to be educated on safety issues concerning natural gas. Those who have provided this type of education believe that public perception can be changed.
  - Guidelines for the equipment used with alternative fuels are needed. Some equipment does not burn fuel as cleanly as expected.
  - Some group members thought that programs should not endorse any particular fuel, but should remain "fuel-neutral" to avoid providing incentives for the wrong fuel (one that may not significantly reduce emissions or may not be cost effective in the end).
  - A clearinghouse for information exchange on alternative fuels would be helpful.
  - Some thought that money should be allocated directly to alternative fuels programs, rather than to State offices.



## **ALTERNATIVE FUELS: Second Discussion Group**

### **INTRODUCTION**

The second discussion group on alternative fuels consisted of 12 participants -- from State agencies, EPA Regional Offices, industry, and public interest groups. Although there appeared to be group consensus on the types of issues associated with alternative fuel use (fuel accessibility, user considerations, compliance, incentives, costs, and regulatory factors), varying viewpoints on the specifics of these issues were expressed by participants.

### **HIGHLIGHTS**

#### **◆ Fuel Accessibility Issues**

- Group members generally agreed that an infrastructure is needed to promote the use of alternative fuels. State representatives in the group cited the following issues that need to be addressed when developing an infrastructure:
  - Fuel delivery.
  - Fuel availability and guaranteed vehicle use. An individual needs to know that fuel is available before making an investment in a vehicle. Conversely, fuel suppliers need a guarantee that demand exists before spending money on a fueling station.
  - Emissions from the total fuel cycle need to be evaluated, including fuel production.
  - Ability to obtain repair parts.
  - Insurance considerations.
  - Parking and driving considerations, e.g., whether alternative-fueled vehicles are allowed in parking garages, car washes, and tunnels.
  - What happens to obsolete gas stations?
  - Eventually, one fuel would emerge as the cleanest fuel and the cheapest to operate. If so, a plan for transition to this "winner" would be needed.
  - Niche markets (such as methanol for transit buses) would probably emerge, influenced by regional characteristics and the availability of different fuel types.
  - Altitude and other regional factors influence carburetor settings and air-to-fuel ratios. These differences make transporting fuel from one region to another difficult.
  - The need for flexibility.
  - Rate structures need to be determined.

- The group members generally agreed that supply and market issues can be factors. Individual group members cited the following issues:
  - Long-term supply of alternative fuels.
  - Rationale for interfering in the market includes expenditures, reduction of dependence on foreign oil, and diversification of fuel options.
  - Criteria for determining which fuels to promote (e.g., climate differences, CO<sub>2</sub> issues, region-specific issues).

#### ◆ User Issues

- One State representative noted that the performance criteria that alternative-fueled vehicles must meet include acceleration, passing speed, driving range, and fuel tank size (e.g., propane tanks are large).
- An industry representative gave two reasons why industry is changing to alternative fuels.
  - Concern for adequate supply of currently-used fuel.
  - A way to reduce their costs.
- A State representative responded by stating that more information is needed about performance, including the pros and cons of each available alternative fuel. For example, California assumes that natural gas vehicles will be cleaner, but New York believes that is not necessarily the case.

#### ◆ Compliance

- It was noted that standards are needed to ensure that garages are retrofitting State fleets and individual vehicles correctly. Certified conversion kits, enforcement action, or Federal motor vehicle standards are needed.
- The group generally agreed that guidance is needed to monitor compliance. Individuals in the group cited the following possibilities:
  - A system approach (e.g., fuel evaporation).
  - Monitoring techniques need to be applicable for all fuels and for the total fuel cycle.
  - Current I&M programs do not accurately measure tailpipe emissions from vehicles fueled by CNG, so other monitoring techniques are needed for this fuel type.
  - A Stedman laser measures emissions and takes a photograph of the license plate.
  - Tuning up high emitters is probably the cheapest way to reduce emissions.
  - Innovative Offsets -- a bill planned to be introduced in California in January 1992.

- Although clean fuel vehicles are exempted from complying with transportation control measures (TCM) under the Clean Air Act Amendments (CAAA), they still contribute to traffic congestion.

◆ **Incentives**

- Most of the group thought that incentives are needed for alternative fuels to be selected over current fuels. Individuals suggested the following:
  - Emission Feebates.
  - Coordination of incentives for alternative fuel use with gasoline programs, otherwise States would lose gasoline tax revenues.
  - Taxes on imported oil (Japan and Great Britain, where fuel costs are four times greater than those in the United States [~\$5/gallon] are increasing fuel efficiency).
  - Preferential parking for alternative fuel cars.
  - One State representative questioned whether the market would develop anyway, citing Kansas as an example, where Amoco is selling CNG despite the absence of any incentives.

◆ **Costs – The group generally agreed on the following cost issues:**

- User costs include those at the pump, conversion costs, and the costs to own, maintain, and operate alternative fuel vehicles.
- Societal costs and benefits also should be considered. Individuals cited the following as examples:
  - Environmental.
  - Fuel supply.
  - Political.
  - Balance of trade.
  - Secondary economic impacts (increased costs of transportation passed on to consumers).
  - Consumer - (costs of building new alternative fuel stations will increase fuel rates).
- Short- and long-term costs should be considered.
- One participant noted that current demand for alternative-fueled vehicles in the South Coast area (a result of the rules requiring fleets to have a certain number of low-emitting vehicles) is not high enough to cover the automobile manufacturers' production costs. For this reason, the vehicles needed to meet the regulations will have limited availability until the demand for them increases dramatically.

◆ **Timing and Regulatory Issues – State representatives were concerned with the following issues:**

- To get State implementation plan (SIP) credit, a program must provide real, quantifiable, and enforceable reductions. The following concerns were cited:
  - Fairness of current rules.
  - Transferability.
  - Need for criteria for mobile sources; stationary source criteria are not appropriate for mobile sources.
  - Possibility of mobile source credits being traded to stationary sources.
- Reevaluation of criteria for obtaining SIP credit for TCM's, including alternative fuel use.
- Flexibility to deal with regional differences.
- Effect of regulatory issues on market development.
- Feasibility of large-scale alternative fuel programs to meet the CAAA mandates for mobile sources. Will States be able to meet the approaching SIP deadlines? If not, they will lose highway funds or receive a sanction. Alternative-fueled vehicles may not be available soon enough to be an option for meeting mandates.



**SESSION II**

**MARKETABLE PERMITS FOR  
STATIONARY, MOBILE, AND AREA SOURCES**

## **MARKETABLE PERMITS MARKET MECHANISMS: First Discussion Group**

### **INTRODUCTION**

The first market mechanisms discussion group had approximately 30 attendees. There appeared to be an even distribution of group members from industry and regulatory agencies. Several group members were from regulatory agencies in foreign countries, including the Netherlands and Canada. Information on the California Marketable Permits Program was of most interest to the group. Specifically, the attendees were interested in how the program was being set up to avoid market problems or failure. The following is a summary of comments and concerns expressed by individuals in the discussion. All comments below that refer to a specific program are referring to the SCAQMD proposed program, much of which is still evolving.

### **HIGHLIGHTS**

#### **◆ Adequate Market/Type of Market**

- Will limited market activity still produce program benefits? Most group members believed the activity would not be limited, and that not allowing credits to be banked for more than 1 year will force activity. The SCAQMD does not consider holding credits an asset.
- Under the currently-proposed California Marketable Permits Program, all facilities covered under the program must have enough emissions credits to cover all emissions including credits for current operations and any increases.
- The following is a typical transaction under the currently-proposed program: a plant plans for a major modification, which includes installing a boiler and increasing emissions above the significance level. A permit modification package is put together and submitted to SCAQMD. The SCAQMD office gives the plant a list of potential sources of credits. Next, the plant uses the list to call brokers/representatives to find a company willing to sell their emissions credits. If a sale occurs, a contract with terms and conditions would be drawn up. No actual review of trading transactions will be conducted as they occur; however, a yearly audit is expected. The SCAQMD will review and process permits. If they are acceptable, the SCAQMD does not need to get involved. The "new" source gets the emissions credits and the "old" source removes the credits from its ledger. The process can take from 30 days to 3 years.
- Under the currently-proposed South Coast program, money gained from sale of an emission credit is an off-book asset and is not taxable. California is working with the Internal Revenue Service on tax implications.

◆ **Community Banks**

- If community banks are adopted, one possibility would be to require larger sources to donate a small percentage of their credits to a community emissions credit bank. Small facilities could apply for credits from the community bank. It would be a "welfare bank" for those who could not afford to buy the credits, including municipalities.
- One suggestion was to allow each large source to contribute 1.2 percent of its credits into the community bank.
- The question of who can use the community bank is still to be addressed.

◆ **Where Do Credits Come From?**

- Presently, 85 percent of available emissions credits are expected to come from plant shutdowns. There are also opportunities to receive credits from retrofitting.
- Market prices will determine the cost of credits resulting from retrofits.
- Under the proposed SCAQMD program, existing sources can install additional control to receive tradeable credits. Allowing this type of credit should encourage the development of new technology.
- Although it is generally believed that the SCAQMD already requires such high levels of control that surplus credits are limited, further reductions and regulations have already been identified. The SCAQMD constituents -- or sources located in SCAQMD -- generally agreed that stringent baseline controls cause the burden to fall on large sources.
- The SCAQMD may include some restrictions on what qualifies as a shutdown.

◆ **Geographical Restrictions/Meeting Reductions Schedule**

- It is anticipated that the SCAQMD program will allow trading across geographical areas. However, this issue is not resolved.
- Industry does not generally expect the SCAQMD program to result in companies selling their credits and moving elsewhere, thus causing a migration of jobs out of the area.
- The SCAQMD plans to develop a monitoring program to flag when migration of emissions may become a problem.

- California is looking at a 3-year "reconciliation" program for shifts in emissions. Emissions levels in various geographical areas will be examined every 3 years to determine whether regional shifts in emissions have occurred.
- The percentage annual decline can be increased if the reasonable further progress (RFP) requirement is not being met.
- If SCAQMD wants to reduce emissions and stay on schedule for reaching attainment status, some argue that they should consider buying emissions credits and retiring them.

◆ **Commodities/Overlap**

- The proposed SCAQMD Marketable Permits Program may encourage quick use of credits to prevent hoarding.
- Because traders will probably have only 1 year in which to use their credits under the current proposal, a futures market is unlikely.
- It appeared that the SCAQMD Marketable Permits Program would apply to reactive organic gases (ROG) and nitrogen oxide (NO<sub>x</sub>), but questions remain about the applicability to air toxics.
- The Marketable Permits Program may overlap with maximum available control technology (MACT), new source performance standards (NSPS), lowest achievable emission reduction (LAER), best available control technology (BACT), or other technology-based standards. It is assumed that those facilities subject to technology-based standards will not be participating in the Marketable Permits Program to meet these technology standards. New sources and existing sources not subject to the above standards will be able to use the trading system under the current proposal.
- Facilities regulated under the National Emissions Standard for Hazardous Air Pollutants (NESHAP) for hazardous organic pollutants (HON) may be allowed to average emissions among emissions sources within a given facility.

◆ **Market Failure**

- Due to industry's ability to develop new technologies, it is unlikely that the market would fail.
- If baseline emissions (lbs/unit time) are incorrect, they may be reallocated under the proposed "reconciliation" program.
- It was generally believed that a market-based program can work, given that a sound regulatory approach and a workable enforcement program exist.

- As an emissions trading program becomes larger in scope and transaction and administrative costs become higher, a less than perfect market structure is likely to develop.
- ◆ **Issue for Comment:** One of the main issues facing SCAQMD is the trading of agency certificates versus allowance trading.

#### OTHER PROGRAMS

- Canada is considering a market-based NO<sub>x</sub> trading program for Ontario and part of British Columbia. They are also considering a sulfur oxide (SO<sub>x</sub>) trading program.
- Houston, Texas, will start setting up a community bank for modifications or new sources.
- The Netherlands has a voluntary compliance program and an unsuccessful manure trading program. Futures are traded between dairy farmers and people who need fertilizer. However, transportation costs made this program unsuccessful.

## **MARKETABLE PERMITS MARKET MECHANISMS: Second Discussion Group**

### **INTRODUCTION**

Approximately 35 people attended the second discussion group on marketable permit mechanisms. Of these, about half were from State and local agencies. Industry, Federal, and service corporation participants made up the remainder of the group. While almost everyone contributed to the session, primary participants in the discussion were three economists, a representative of California's South Coast Air Quality Management District, and a lawyer.

### **HIGHLIGHTS**

#### **◆ Elements Crucial for Program Success**

- Most participants agreed that the following key elements of a marketable permit program are crucial to its success.
  - An emissions cap -- preferably one that is well defined and stable over time.
  - Differences in marginal control costs among potential participants -- adequate supply and demand.
  - Well-defined property "rights" -- term and quantity of permit, and provisions for banking.
  - An adequate system for information dispersal and transaction recordkeeping.
  - Adequate monitoring, tracking, and enforcement.
- There was a general consensus to define the commodity being traded as either "the right to emit" or "compliance opportunities."

#### **◆ Uncertainties and Risks**

- There was much discussion concerning the uncertainties associated with the marketable permit program, for both suppliers and consumers. Continual upgrading of program trade rules and emissions caps (which audit and monitoring results may show are necessary) may discourage emitters from participating. A risk-averse firm may opt for the perceived certainty of investing in BACT rather than "risk" buying credits in a potentially unstable market.

- The group identified the following as potential sources of permit uncertainty (i.e., issues that may require program revision as more information becomes available):
  - Incremental VOC reactivity factors.
  - Ambient ozone impacts by location in air shed, time of day, and season.
  - Monitoring technology.
- It was noted by several participants that some form of short-term grandfathering of permits may help to hedge risk. It was also generally agreed that the uncertainties and risks noted above are present regardless of whether or not a system is a market-based one.
- One major uncertainty associated with a marketable permits system is transaction costs for potential participants. Several people speculated that an incipient program would only see trades within facilities at first. Inter-company and industry trades will become common only after companies become more comfortable with the new permitting system and more familiar with their own control costs and opportunities for further reductions.

#### ◆ Equity Issues

- Equity issues discussed how initial permit allocations are made, burdens to new and smaller sources, stationary versus mobile sources, exclusions from the program, and potential monopolizing of permits.
  - It was generally agreed that initial allocation rations (not quantities) should remain constant over time for equitability and market stability.
  - No consensus was reached on potential inequities to new and smaller sources, though extending offset options to include mobile sources was mentioned.
  - Most agreed that mobile sources should be integrated into a program to relieve the stationary source burden, if possible.
  - Although most felt that the market would be strong and diversified enough to avoid monopoly problems, a few were skeptical.
- It was noted that new sources probably would not be more disadvantaged under the SCAQMD Marketable Permits Program than under current New Source Review (NSR).

◆ **Market Character and Effects**

- A few anticipated that the continual decreasing of the emissions cap proposed in the SCAQMD program will drive up permit prices, allowing only the highest value operations to remain within nonattainment zones. Many others noted that this last speculation is highly dependent upon control technology innovations.
- Most agreed that even after most stationary sources have achieved their maximum control levels, the ever-present demand for offset credits by new sources may continue to force the development of new technologies to reduce emissions.
- There was general agreement that a marketable permits program should be a free market, open to speculators. The presence of speculators may help distribute information and thus achieve market equilibrium quicker than if the market were limited to a set number of participants. Also, most participants thought that a short-term (e.g., 2-year) banking limit should help minimize hoarding and other abuses (e.g., monopolizing).
- One person noted that the volume of trades alone should not be used to judge the success of a program. Emissions reductions should also be considered.

## **FUTURE DIRECTIONS**

Areas requiring further study were addressed throughout the session on a topic-by-topic basis. Although there was no formal wrap-up at the session's end, there was general consensus of the group on future directions.

The group generally believed that there are many uncertainties remaining, but most can only be resolved by establishing programs and tracking their results.

- How successful these programs will be in promoting control innovations is unknown.
- Administrative, enforcement, and transaction costs are all unknown. These costs must, however, be measured against the command-and-control approach costs (e.g., BACT analyses, legal costs, etc.) that are avoided. The costs of demonstrating compliance deserve a careful look.
- Regulators should watch for the development of environmental "hot spots," adverse impacts on small business dynamics, and the inability of bureaucratic systems to change with new and better information.



## EMISSIONS TRADING PROGRAMS: ENFORCEMENT

### INTRODUCTION

A group of about 30 participants discussed enforcement issues. This was a diverse group -- including participants from State agencies, the EPA, environmental groups, industry, and special interest groups. The group agreed that enforcement will need to be different for a market-based regulatory approach. However, the suggestions expressed by individuals varied widely. Not much agreement was reached, but the discussion raised many questions and ideas for future research.

### HIGHLIGHTS

- ◆ **The group agreed that there are many differences between Marketable Permits and Prescriptive Approaches. Individuals cited the following specific differences:**
  - Enforcement and compliance for a marketable permits program should differ from that of command-and-control type regulations. Emissions trading programs are not self-enforcing.
  - Since market permits programs can trade credits or allowances, compliance needs to be high enough to enable them to be traded as commodities.
  - Enforcement will change from source-by-source compliance measures (e.g., work practice, rate-based, technology standards) to compliance measures for the entire facility and massive emissions caps.
  - Because compliance will not be measured directly from concrete and observable events, but will instead be measured after a series of complicated accounting events, new opportunities for violation may emerge, which may make violations harder to detect. Thus, increased accountability measures will be appropriate. If no new accountability measures are instituted, the number and types of violations will probably tend to increase. Examples were given from lead phasedown.
  - The market-based approach needs tighter accountability. Because parties will rely on others' credits for their own compliance, trading programs will require more confidence in the accuracy of reported emissions. Better measuring methods are also needed.
  - New requirements needed.
    - Tracking of trading transactions.
    - Feasibility of on-line computer monitoring.

- Unlike command-and-control approaches, marketable permits programs will consider capacity utilization and hours of operation of the facility. Previous command-and-control regulations avoided limiting production.
  - Cost/Benefit analysis should be different. In developing market-based programs, the EPA must consider whether the efficiency gains will be greater than the administrative cost increases necessitated by increased monitoring.
- ◆ **The group generally agreed that costs would be different under the marketable permits approach. Individuals cited the following concerns and questions about costs:**
- The costs of control may be lower for a market approach rather than for the current command-and-control regulatory scheme; however, the cost of monitoring measures may be much larger.
  - How will this increased cost be assessed?
  - Will enforcement costs be financed through emissions fees collected annually?
  - Does a trade constitute a permit amendment? If so, what is the EPA's cost to review each transaction?
  - Will penalties reduce incentives for facilities to remain in compliance?
  - New industry will have to purchase emissions credits prior to operation before they can participate in the proposed SCAQMD Marketable Permits Program. All offset and NSR requirements will also apply.
- ◆ **There was concern among some about how to deal with criminal enforcement. Individuals asked the following questions:**
- Do existing criminal statutes apply, or would a criminal element need to become part of the code?
  - Would the burden of proof shift to the regulatory agency to defend?
  - Would individuals who knowingly violate SIP requirements be criminally prosecuted?
  - How would falsification of records and bogus trades be penalized?
  - Would holder-in-due-course sanctions apply to the buyer or would the seller be penalized when falsified or counterfeit emissions credits are traded?
  - Will bulk of enforcement be civil enforcement, as is currently the situation?

- ◆ **The members of the group generally believed that guidance for averaging is needed. Individuals expressed the following concerns:**
  - Would daily, weekly, or 30-day averaging be required?
  - A daily cap is more stringent, as books need to be cleared each day. If an upset occurs, the facility would have to buy additional allowances before midnight.
  - With a longer averaging time, more people may be operating closer to their emissions cap, as the market will allow them to operate without a margin of safety. Will this cause aggregate emissions to increase?
- ◆ **Several group members mentioned the emergency upset provision and questioned the interface with marketable permits. Specific concerns of individuals included the following:**
  - How will previously exempted malfunctions, upsets, shutdowns, and start-ups be treated under emissions caps?
  - Will the EPA give only 80 percent compliance credit?
  - Some thought industry in the SCAQMD seems willing to give up the malfunction/upset/shutdown/start-up exemption to get a longer averaging time period (monthly).
  - Upsets (accidental, unexpected events) are counted as violations under the CAA Operating Permits Program, but they can be used as defense in violation of an enforcement act.
  - If upsets are used as a defense in violation of an enforcement act under the proposed South Coast Marketable Permits Program, then the market may not work.
  - How should sources on the edge of the attainment/nonattainment areas be treated? California Edison, which is shifting its demand into an attainment area, is one such source.
  - The market needs to be tight so that industries cannot invent "side games" to avoid compliance.
  - Some thought the penalty under emissions trading should equal or exceed the market value of the permit plus its time value for the period of delayed compliance. If not, incentives to violate would be built into the program.

- ◆ **Several group members had questions about recordkeeping.**
  - What frequency will be adequate?
  - What happens if records are not there? Need sanctions for failure to monitor.
  - How will "reportable quantity" be defined? The larger the quantity, the greater the need to adhere to the trading system.
  - What triggers a violation?
- ◆ **Other group members were curious how the SCAQMD Marketable Permits Program would be integrated with current regulatory requirements. They had the following specific concerns:**
  - What happens if an individual unit's emissions are in violation of its permit? Would mini-emissions caps be used?
  - How will the SCAQMD Marketable Permits Program be integrated with NSR and prevention of significant deterioration (PSD)?
  - In the California program, current regulations are not being eliminated; rather, exemptions can occur through permit revisions.
- ◆ **Some group members questioned how public participation would be incorporated when using the SCAQMD Marketable Permits Program. They asked:**
  - How will public input be accommodated every time a trade takes place?
  - Under Title V, the CAA Operating Permits Program, public participation is required for all new permits and permit modifications. This requirement means permit issuance will take time. Will this process be required for all marketable permits transactions?

## **FUTURE DIRECTIONS**

Although many unanswered questions were raised during the first part of the group discussion, at the end, the group generally agreed on specific future directions needed to help address some of the issues.

- Certify nongovernment groups for monitoring.
- Publish a schedule of fees for various violations so penalties will be known in advance.

- Develop protocols for measuring credits and evaluating emissions reductions.
- Work out legal details.
- Define what triggers a violation. Need to achieve near-perfect accountability for a marketable permits program to work.
- Evaluate the legality of netting emissions.
- Develop a protocol to show emissions are 5 percent less each year, even if no trading takes place.
- Set up a program; give it time to work to evaluate its performance. Make expectations realistic.
- Instill confidence in this new commodity. Industry is hesitant to buy emissions credits because they are not sure the program will work.

## MARKETABLE PERMITS: TECHNICAL ISSUES

### INTRODUCTION

Eighteen individuals participated in this small group discussion. The group was a diverse cross-section of Federal and State regulators, industry, and other groups. The group explored a number of technical issues that must be addressed if a marketable permits program is to be successful. The discussion focused on issues that have emerged in the development of the SCAQMD Marketable Permits Program. The issues of applicability, establishing baseline emissions, emissions averaging, quantification, design and implementation, regulatory considerations, and enforcement are outlined below. The group considered applicability and baseline emissions to be particularly critical issues to be resolved. In addition to technical issues, the group also discussed political considerations and adaptability issues impacting program implementation.

### HIGHLIGHTS

#### ◆ Applicability

- Sources to be included in the SCAQMD program (one of the most important considerations). Comprehensive applicability including all sources is desirable, but potentially difficult to administer. There is limited authority to regulate area sources, which account for approximately 25 percent of the ROG emissions in the South Coast. Expanding the program's applicability to include new, mobile, and stationary sources is desirable, but difficult to implement. A larger universe of sources creates a better market for trading, but a more limited number is easier to manage. The universe of sources to be included in the program will be restricted by political reality, resources, authority, and enforceability.
- Size of a program primarily depends on available resources.

#### ◆ Baseline

Establishing both facility and SIP (district) baseline emissions is potentially problematic and raises the following questions.

- Will actual or allowable emissions be used?
- What baseline will be acceptable for SIP purposes?
- What recordkeeping systems are needed?
- How are fugitive emissions accounted for in the baseline?

## ◆ Averaging

- What emissions averaging period will be used--monthly, quarterly, or annual? The EPA policy has been to perform daily averaging, but the SCAQMD Marketable Permits Program may propose periods ranging from 30 days to 1 year for emissions averaging. Annual reductions may be more consistent for determining RFP. On the other hand, long-term averaging may not capture varying emissions due to differences in production, and therefore must be demonstrated not to have a negative impact on the national ambient air quality standards (NAAQS).
- Feasible long-term approaches for achieving reductions through a marketable permits program include the following:
  - Maximum daily emissions caps.
  - Production/throughput limitations.
  - Declining emissions caps.

## ◆ Quantification

It was generally agreed that quantifying emissions is necessary to establish a baseline and to inventory progress. Reliable, credible quantifications for monitoring and enforcement are essential. Simplicity is a key requirement. If a market-based approach succeeds in quantifying total emissions, enforcement efforts could be greatly simplified.

## ◆ Design and Implementation Issues

- The VOC reactivity may need to be considered when designing a program and implementing emissions trades. The SCAQMD plans to track trades and any resulting shifts in VOC reactivity.
- Interpollutant trading is not allowed, and a one-to-one emissions offset ratio is being proposed for the South Coast. Should interpollutant trading be allowed? At what ratio?
- Trading across stationary and mobile sources needs to be addressed.

## ◆ Regulatory Considerations

- Relationship of a marketable permits program to CAA Air Toxics and NSR Programs.
- Conformity with CAA and State regulations, and existing SIP's.

- Integration with existing programs.
  - Does it preempt or supersede existing programs?
  - How does a program relate to the CAA Air Toxics, and Operating Permits Programs, as well as to Reasonably Achievable Control Technology (RACT) and LAER requirements?
- Use of economic theory (marketable permits programs) to obtain emissions reduction through SIP's.
- Guidelines needed on the use of prescriptive command-and-control approaches and/or market-based approaches to facilitate RFP and achieve attainment. State regulations should not preclude the use of market-based approaches. The long-term impacts of a Marketable Permits Program are not known, but some participants believed that the Marketable Permits Program would both reduce overall costs and force the development of improved technology to accommodate a decreasing emissions limit.
- ◆ **Enforcement**

How are marketable permits enforced? Costs of penalties need to be directly related to severity of emissions.
- ◆ **Political Considerations**
  - How to avoid creating disincentives when designing a program.
  - How to build consensus with political, environmental, legislative, and public groups.
  - How to distribute responsibility for emissions equitably across mobile, area, and stationary sources.
  - How to change the perception of a marketable permits programs. Public tends to view programs as allowing industry to increase its emissions through trading.
- ◆ **Adaptability Issues**
  - How big is the problem in other areas and can the marketable permits approach be adapted to fit the need? It may only be applicable for nonattainment areas.
  - Can a program be designed for larger geographical areas, including multistate areas? What is the best balance between program simplicity and a larger district or multistate nonattainment area?



- Have prescriptive command-and-control approaches been exhausted?
- What sources and emissions should be included?
- How good is the established permit system and monitoring approach?
- How precise does the measurement of emissions need to be?
- How will marketable permit programs interface with SIP's?
- How good is the current emissions inventory?

## LOCOMOTIVE EMISSIONS TRADING

### INTRODUCTION

The group discussion on Locomotive Emissions Trading was attended by approximately 20 individuals, from Federal, State, and industry organizations. Overall, the discussion did not focus on locomotive emissions trading, but rather on mobile source emissions trading in general. The bulleted points are, in general, the opinion of the individual commenter, and not necessarily the consensus of the group.

### HIGHLIGHTS

#### ◆ Scope Issues

- Transportation is composed of two groups: goods and people. The transport of goods must be handled differently from the transport of people.
- Locomotive emissions trading should be considered in the broader scheme of mobile sources.
- Ideas for transporting people include making alternative transportation mechanisms cheaper and more convenient, and making automobile companies responsible for their fleets. However, some thought quantifying emissions could be a problem if auto manufacturers are responsible for fleet emissions. Lack of maintenance and tampering can increase vehicle emissions.
- Transportation of goods should focus on efficiency of transportation. Compare the efficiency of airplane, truck, and car transport to train transport. Consider transporting freight from city to city on trains instead of trucks.
- Breadth of program (global vs. local) should be considered. The bigger the bubble, the more cost effective, but the more complex. For example:
  - If we start with smaller, local programs, we could then see the bigger picture and try to fit the programs together.
  - Starting with the big picture disregards all the unique, area-specific characteristics of local structures. The politics far exceed the technical issues.

## ◆ Regulatory Issues

- Adding market incentives on top of command-and-control programs raises certain concerns:
  - It could be inefficient and more expensive. Industry may not be able to afford inefficient pollution control programs. Industrial plants leave areas that are too expensive.
  - Many do not fully trust market incentives. Skepticism keeps regulators from leaping towards a market-based program. Regardless of inefficiency, however, adding market-based incentives to command-and-control programs will probably be an improvement. Small steps to a market-based program rather than an immediate changeover will be necessary.
  - Contradiction may exist between requirements of command-and-control and market-based programs. Market-based programs will require associated mechanisms to avoid the constraints associated with the CAA (i.e., RACT approval requires 2 years for review; yet, meanwhile, trading is occurring).
- Regulatory uncertainty. Some people believed there is more regulatory uncertainty associated with command-and-control programs than with market-based incentive programs. Instead of worrying about a new standard being created, industry has flexibility to act according to what the market dictates. However, others pointed out that regulatory uncertainty also exists with market-based incentives, but in different forms. Any regulation has its associated uncertainty.
- Local versus State control. Even though local agencies would rather control their local (basin) programs, the State needs to control mobile source programs because they cross local boundaries.
- Use of mobile source emissions reductions as offsets for stationary sources: the offset program probably should not require exact emissions (i.e., estimates will have to do).
- Penalties must be very high for cheaters in order to avoid program misuse.
- Market strategies for mobile sources may need more latitude than is seen in stationary source market programs.
- One participant offered the idea of allowing an offset program within existing TCM's. Specifically, the participant suggested a consortium of businesses that would spend their TCM monies on an emissions reduction program such as electrifying mass transport rather than trying to coerce their employees to carpool, etc.

◆ **Geographical Issues**

- Topography changes, geographical differences, location, and timing make creating a bubble over mobile sources difficult.
- Consider putting a bubble over a route instead of over an area (basin). However, California needs to put bubbles over a basin to control localized air pollution problems.

◆ **Equity Issue**

In establishing a locomotive emissions trading program, no advantage should be given to those who have not tried to clean up their emissions in the past.

◆ **Safety Issue**

May be conflicting objectives. For example, adding a car to a train for safety purposes might conflict with a goal to reduce emissions.

**SESSION III**  
**OTHER INNOVATIVE STRATEGIES**  
**FOR AIR POLLUTION CONTROL**

## MEDIA PROGRAMS

### INTRODUCTION

The media programs discussion group attracted approximately 25 participants. The participants were primarily from local, State, or Federal agencies, or from special interest groups. During the discussion, many different media approaches and socio-behavioral theories were described. A summary follows of individual comments and ideas mentioned during this discussion.

### HIGHLIGHTS

#### ◆ Socio-Behavioral Issues

- Local governments often do not use social or behavioral methodologies appropriately. Some governments try to take measurements later, without first testing for a baseline. These programs cost money and without adequate testing, it is hard to show that they are economically feasible.
- Sophisticated methodologies that can quantify the influence of media-based programs do exist.
- Socio-behavioral models, as well as engineering practices, should be used to comply with the new CAAA. The EPA should develop evaluation criteria for incentive programs to be considered for SIP credits.
- Most people seem to want to participate in solving air pollution problems. Communication to a group of people rather than individuals will have a more quantifiable impact.

#### ◆ Motivation

- Alternative strategies for air quality programs were compared to the "No Smoking" campaign. People may not be as motivated to carpool as they are to stop smoking. Some feel the recycling program, which was introduced in acceptable phases, is a better analogy. The key to a successful program of any kind is offering a convenient substitute.
- School children usually make the best subjects.
- Transportation in the Los Angeles area is inconvenient. Most people in Southern California do not use shuttles because they are less convenient than driving. Air quality managers should consider convenience when planning programs, because most people will choose the least inconvenient option.

- The cost saved by not operating individual vehicles is critical and should be used to evaluate total program costs and benefits. There should be no wasted environmental effort.
- Comfort will motivate more people to use mass transit. Asking people what would motivate them to use mass transit is also helpful.
- What is fair compensation for using mass transit instead of individual vehicles? Survey to determine preferences.
- The Walt Disney Company program and other high visibility programs can get the message out to many people.

## **OTHER PROGRAMS**

- Atlanta has van pooling, which goes to individual homes or pick-up points. This program has high administrative costs.
- Colorado's Eco-Pass program allows employers to sign up all of their employees for bus passes at a cost of \$12 per year. The program began to fill the previously empty buses and ridership increased 30 percent.
- Riding mass transit in downtown Pittsburgh is free. A drawback to this program is that people must drive their vehicles into the downtown area to use the service.
- Dash shuttles in California are convenient. They also work well when they are sufficiently available. To make them more available, demand must be increased.
- Van pooling in the San Francisco area took passengers away from the mass transit system rather than away from their individual cars.

## **FUTURE DIRECTIONS**

- Marketing programs require time and money. Rely on the experience of the experts, such as advertising agencies.
- Consider long-term approaches. We are living with past mistakes of strategies that caused more problems. Need to assess long-term costs.
- Share media expense through corporate or interest group sponsorship to raise public awareness.

## **EMPLOYER-BASED TRIP REDUCTION PROGRAMS**

### **INTRODUCTION**

Twenty-eight individuals from various organizations participated in this small group discussion. Several programs to reduce single occupancy vehicle travel were highlighted: SCAQMD, Pima County Association of Governments, Bay Area Economic Forum, State of Washington, and University of Washington. While some participants believed that employer-based programs were not the most effective method of reducing emissions, others emphasized that mandated trip reduction programs are relatively easy to develop, and that they do encourage other beneficial changes in individual behavior. Political considerations and technical issues impacting program implementation were also discussed.

### **HIGHLIGHTS**

#### **◆ Additional Information About the SCAQMD Employer Trip Reduction Program**

- An on-site coordinator is required. The coordinator usually is someone who has other responsibilities and only devotes part of their time to coordinating the Trip Reduction Program. This requirement was controversial.
- A staff of 33 is required to review the implementation plans, which usually takes 2 to 3 hours per plan.
- Approximately 7500 plans per year are submitted.
- With preliminary information, SCAQMD estimates company costs at \$40 to \$1000 per employee per year.

#### **◆ Technical and Program Design Issues of Employer-Based Trip Reduction Programs**

- Employer-based programs have a limited span of control. They do not reach the 70 percent of trips that do not involve commuting to and from work.
- Trained staff should be available when a program is implemented.
- Nonsolo driving options should be rewarded proportionately to their ability to increase Average Vehicle Ridership (AVR).
- Elected, private sector review boards enhance the credibility and success of the travel reduction program.
- A guaranteed ride home should be available to anyone using an alternate transportation mode; otherwise trip reduction programs may be subject to union activity for benefitting some workers and not others.



- Options to driving a single occupancy vehicle need to be available before a travel reduction program is implemented.
- Employer incentives become an employee benefit in some circumstances and thus are taxable.
- Changes in individual behavior are difficult to achieve and are most likely to occur when there is a change in an individual's life, such as moving or switching jobs. Rewards also motivate behavior changes.
- Implementing trip reduction programs is more difficult in areas where there is no mass transit system. Whether a well-developed mass transit system exists significantly impacts whether innovative travel reduction programs are successful.
- Gains in trip reductions have been achieved through ridesharing. Telecommuting has also been effective in some areas.
- Determining the baseline against which to measure travel reductions can be problematic. The Metropolitan Planning Office initially set the AVR for the Los Angeles area, but the SCAQMD is now building a database on which to base AVR. Census Bureau data and specific employer data were used in Seattle.

#### ◆ Political Considerations

- For programs to be equitable, previous good environmental behavior needs to be rewarded. To use 1992 as a baseline year for AVR would ignore the past efforts of employers to reduce ridership.
- Authorities are influential in shaping program development. Developing programs that are legislated are easier than developing programs that are not, but legislated programs may not be the most effective.
- Some participants believed that employer-based trip reduction programs were not the most effective or appropriate approach to reducing air pollution. There is evidence, however, that changes in behavior resulting from employer-based programs may be transferrable to other decisions that individuals make.
- Motivating individual and group behavioral changes is difficult, but a key factor in achieving program success.
- Federal laws taxing employer benefits and allowing collective bargaining can impact employer-based programs.

- Impacting mobile source emissions, the largest source of some emissions, is difficult. Mobile source emissions result largely from individual behavior, but sufficient political and economic factors to encourage reaching the individual are not currently available. It is questionable whether employers should be accountable for employee behavior outside of the workplace.
- Air regulatory standards need to be attainable. For example, SCAQMD would have to achieve 60 percent nonsolo ridership by the year 2010 in order to meet CAA requirements. They currently are at 4 percent, and expect implementation of a mass transit system to increase nonsolo ridership to 10 percent.
- Collaboration of industry, labor, transportation planners, and the regulated community is essential for program success.

## OTHER PROGRAMS

### ◆ Pima County Association of Governments

- The Pima County Association of Governments is the Metropolitan Planning Organization (MPO) coordinating the local ordinance based Travel Reduction Program for the Tucson regional area. The 1988 local ordinances require that employers with more than 100 full-time equivalent employees at a site to participate in the travel reduction program to increase employee alternate mode usage and decrease vehicle miles traveled in the daily work commute.
- Program began in 1989. In its third year, the alternate mode usage has increased by 20 percent and the weekly vehicle miles traveled have decreased by 3 percent.
- Local employers use a combination of approaches to reduce employee ridership. Approximately 180 employers are involved.
- A key feature of the program is an elected task force of employer participants that establishes policy and reviews appeals.
- Yearly costs to implement the program are estimated to be \$13 per employee for the corporation and \$4.50 per plan for the government. Fixed administrative costs account for 70 to 80 percent of the expenditures, while approximately 25 percent of the costs are variable.

◆ **Bay Area Economic Forum**

The Bay Area Economic Forum, a partnership of business and government leaders, has proposed a market-based approach to reducing traffic congestion in the San Francisco area. Their recommendations include the following.

- Smog Fees: Charging smog fees based on actual vehicle emission levels, proportional to miles driven.
- Enhanced Vehicle Inspection Program: Requiring more frequent vehicle inspections to bring vehicles up to standard.
- Bridge and Highway Tolls: Charging new or higher tolls on bridges, new highways, and congested sections of existing highways, particularly at peak periods.
- Employee Incentives: Instituting travel allowances for employees instead of free parking, as an incentive to use options to driving alone.
- High Occupancy Vehicle (HOV) Lane Network: Creating a regional network of HOV lanes.
- Gas Tax Increase: Significantly increasing the gasoline tax to finance transportation improvements and improve options to driving alone.

◆ **Bay Area Air Quality Management District**

Currently developing a travel reduction plan.

◆ **State of Washington**

Local ordinances to implement travel reduction programs are required by October 1992 under Washington State law. A task force of public and private sector representatives met together to develop the rules, which included performance objectives. The task force actively put pressure on the legislature to develop the package, having anticipated the need for travel reduction programs under the CAAA.

◆ **University of Washington**

The University has increased parking fees to reduce travel in single occupancy vehicles. Parking fee revenues are used to provide additional transit services. The increased parking fees have been politically acceptable because there is an obvious benefit (the convenient location of their vehicles) to the individuals who paid the fees.

## UNOCAL OLD CAR BUYBACK PROGRAM

### INTRODUCTION

The group discussion on the Unocal Old Car Buyback Program was attended by approximately 50 individuals from Federal, State, and industry. The discussion focused on the logistics of this program, including its strengths and weaknesses. There was also discussion on if and how the program might be adopted in different States, given regional differences. The group did not come to a consensus as to the overall effectiveness of this program for offsetting emissions.

### HIGHLIGHTS

- ◆ **Clarification by Unocal representatives on the SCRAP™ Program.**
  - Gasoline was drained and sold; fluids, batteries, and tires were removed. Exhaust systems were removed in cars to be recycled to prevent lead contamination.
  - Hydrocarbon emissions at the tailpipe ranged from 2 grams per mile to 87 grams per mile.
  - Program seemed to be best suited for regions with the following characteristics (e.g., Southern California, Houston).
    - Moderate climate (no salt on the roads).
    - Wide range of income distribution.
    - High stationary source control costs.
  - Instead of receiving emission credit for this project, Unocal received a compliance extension. In a separate incident, a California cogeneration plant scrapped 50 cars in response to a court settlement for an emission violation.
  - The program bought cars that were manufactured before 1971 (California had no NO<sub>x</sub> standard then).
  - Remaining Questions
    - How might a SCRAP™ program be combined with an I&M program? Maintenance fees could provide an incentive to scrap cars.
    - How many cars were headed to the junk yard anyway? Did this program remove any additional ones?

- Other possible years to choose for the program could have been pre-1975, when catalytic converters were added in California. Catalytic converters were required in other parts of the country in 1975 or 1976.

◆ **Use of remote sensors as an alternative to the SCRAP™ Program.**

- Remote sensors could be tested under normal driving conditions at a cost of about 50 cents per test. Based on this screening, high-emitting cars could be scrapped or repaired. This approach would target high-emitting cars instead of just old cars.
- Concern was expressed that the remote sensors are not completely reliable because they measure emissions under uncontrolled conditions.

◆ **Concerns about SCRAP™ and similar programs.**

- Vehicles taken out of circulation might be replaced with imports from neighboring States. The SCRAP™ program could work in Los Angeles, a major city, where the mountains and other terrain provide geographical isolation. Program might not work in a State such as Tennessee, which is easily accessible by other States.
- In the SCRAP™ study, cars were considered not to be in the retirement stage if they could be driven and if they were registered.
- Is this pilot test statistically valid considering the uncertainty surrounding whether many of the cars would have been retired anyway? A way to find out would be to sign up a certain number of vehicles, scrap a few, and then hold a lottery on the remainder. A longitudinal study on the remainder could be done to determine the fate of the remaining cars. Are they taken to the junkyard? How much longer are they driven?
- Both small-volume and long-term programs can be problematic. The Unocal program was implemented quickly and only lasted a short time, so people did not have time to abuse the program. Long-term programs would allow people to have time to exploit the program.
- Choice to consider only old cars was questioned. New cars can have high emissions not only due to neglect of maintenance and tampering, but also because they are driven more.
- Did the program actually take any cars off the road? First people who volunteer would be scrapping their cars anyway.

- Alternate approach might be to give a coupon to use on the purchase of a new car. However, a coupon approach might be ineffective because it has no measurable impact on air quality. Another possible approach could be to have tough standards like they have in Japan, where inspection fees for old cars are so expensive that it is difficult to keep cars on the road, especially tampered ones.
- To use a car buyback program to gain emission offset credits, the buyback program would need to demonstrate how many years a given car had been on the road and, thus the displaced vehicle miles traveled (VMT).
- Car buyback programs may be unsuccessful at reducing VMT. As older cars are scrapped, they are replaced with new cars that result in higher VMT. On the other hand, \$700 is not enough to stimulate new car sales in a 1:1 ratio.

◆ **Equity Issues**

- A program like SCRAP™ might increase the price of old cars as they become more scarce, thus making it more difficult for low income people to purchase used cars. The \$700 rebate may not be sufficient to replace the old car.
- The impacts of a program like SCRAP™ should be considered along with other possible pollution reduction programs and their effect on low income people (e.g., more stringent regulations result in a refinery closing down and people losing their jobs).
- Louisiana representatives believed a program like SCRAP™ might receive less response in their State, as people there depend on old cars for transportation.
- The age of a car might not be the best basis for inclusion in such programs. However, a program based on the car's age is easy to implement and minimizes cheating.
- The potential for car importation for profit must be addressed along with other "gaming" potential.
- The I&M requirements for currently operating vehicles might need to be increased. Costs could be minimized by having students in technical schools repair cars.

**SESSION IV**

**DIALOGUE ON ISSUES  
LEADING TO FUTURE RESEARCH**

## **DIALOGUE ON ISSUES LEADING TO FUTURE RESEARCH AGENDA**

The following list is a summary of ideas expressed in the general discussion session on issues leading to future research. The list is organized only by topic; there is no prioritization of ideas nor agreement on the feasibility of accomplishment within a meaningful timeframe.

Approximately ninety persons participated in this session. The discussion was conducted as a "brainstorming session." Thus, an attempt has been made to report all ideas expressed on the "next steps" in the further development of innovative regulatory strategies.

### **HIGHLIGHTS**

#### **◆ Taxes and Fees**

- Need to estimate elasticities of substitution for inputs and elasticity of demand for emissions.
- Need to get data and set baseline emissions for taxes.
- Evaluate how to implement rulemaking and statutory processes.
- Determine how to select the process to establish the program.
- Assess how to value and monetize environmental externalities. Utility sector efforts to evaluate environmental costs and benefits, as well as regulatory impacts, may be useful.
- Examine how often to change the structure of, and taxes for, the program.
- Are tax revenues politically acceptable?
- Would use of a revenue-neutral tax plan be appropriate?
- The proper universe of sources to achieve maximum impact needs to be determined.
- How do taxes impact various segments of the population, especially the poor?
- Income tax implications of parking fees should also be identified.
- A mechanism linking fees to emission reduction goals is needed.
- Better program evaluation, including baseline data and progress over time, is needed.



- Fees should support both the infrastructure and the development of services that those who pay fees will use.
- The academic and economic community should be involved in applied research.
- If a good mass transit system is in place, parking fees can be externalized; the amount of fees should reflect the real value of the parking place. For example, a car in which three people rode should cost less to park than one in which one person rode.
- Establish the relative net levels of classes of pollutants so that proposed rates will reflect proportional changes.
- The link between land use and transportation needs to be recognized; a land use fee may be appropriate.
- The interface between the CAA, the Transportation Act, and SIP planning should be carefully examined. Air quality regulators should be involved; all planning should not be done by transportation managers. The Federal highway bill has provisions that may be used to assist in achieving air quality goals, and should be utilized.

◆ **Marketable Permits**

- The EPA's BACT/LAER Clearinghouse is a useful source of information.
- Social, behavioral, political, and operational differences between command-and-control and market-based approaches need to be considered.
- A government's role in establishing market-based programs should be to define the market, help start the market, define market success, and intervene when early indications of problems appear.
- An analysis of all social costs of a market-based approach, including who is bearing the costs, should be conducted to ascertain that no group is unfairly impacted.
- A strategy to include mobile and area sources, as well as stationary sources, in marketable permits programs needs to be developed.
- Research into long-term, market-based approaches is not viable at present.
- It should not be assumed that command-and-control approaches have a higher probability of success than market-based approaches.

- Establishing appropriate values for credits under the marketable permits program is difficult. Credit values must be justifiable. Marketable permits programs should focus on emissions that are not regulated.
- The EPA and the States should work together to solve complex problems in order to avoid litigation. An example would be the implementation of SIP demonstration requirements.
- Command-and-control approaches have been developed by engineers and lawyers. Refocusing this entrenched culture to understand the economic market-based approaches will require training. Examining successful market-based programs such as the acid rain program is one approach. Additional pilot studies also need to be developed.
- Public education regarding market-based approaches is needed.

◆ **Other Innovations**

- A mechanism for researchers in the field to share information should be established.
- What features of voluntary programs are successful in motivating change? Do altruism and self-interest motivate change?
- Transportation sector expertise and pollution prevention options should be utilized.
- Cradle-to-grave options for mobile sources should be investigated.
- Reducing single occupancy vehicle travel requires significant behavioral changes; complex solutions by multiple groups are needed to effect such change.
- Industry needs stability and assurance that voluntary programs will work.
- Conducting joint workshops with other organizations, such as State and Territorial Air Pollution Program Administrators (STAPPA), may be valuable.

**APPENDIX**  
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