



# **Keeping Pace II: Cleaning Up Maryland's Air**

## **Prepared for Senator Brian Frosh**

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# SECTION ONE: EXECUTIVE SUMMARY

## Overview

In the fall of 2004, State Senator Brian E. Frosh (D-Dist. 16) asked the Environmental Law Clinic at the University of Maryland to assess Maryland's progress in reaching the ozone National Ambient Air Quality Standard (NAAQS) under the Clean Air Act (CAA). Maryland is now categorized as a "severe" non-attainment area for ozone, facing deadlines for meeting the "one-hour" ozone NAAQS in 2005 and the "eight-hour" ozone NAAQS in 2007 and 2010. Ozone is one of only six "criteria" pollutants regulated under the CAA because it causes serious health problems, from potentially fatal respiratory diseases (including asthma), headaches, and nausea. Ozone is especially harmful to children, the elderly, and people with respiratory conditions. Ozone pollution also damages crops, harms forests, and undermines the development of healthy ecosystems. It contributes 30% of the nitrogen deposited each year into the Chesapeake Bay.

This report responds to Senator Frosh's request. It updates a 2002 Clinic report entitled *Keeping Pace: Maryland's Most Important Environmental Problems and What We Can Do to Solve Them*, also drafted in response to a request from Senator Frosh. The *2002 Frosh Report* considered not only ozone non-attainment but nutrient pollution of the Chesapeake Bay, Maryland's dwindling potable water sources, the cleanup of contaminated brownfields, and suburban sprawl's effect on the environment. It is available at <http://www.law.umaryland.edu/environment>.

After researching all readily available sources of data on the state of air quality in Maryland, examining the programs implemented to protect public health and to improve air quality, and interviewing a cross-section of key stakeholders involved in these efforts, we conclude that Maryland's efforts are a mixed picture of significant progress, notable failures, and, most important, daunting future challenges. Emissions of ozone precursors are substantially reduced, especially nitrogen oxides produced by out-of-state sources, and state officials say that Maryland is on track to attain compliance with the one-hour ozone NAAQS in 2005. Yet Maryland has a long way to go before air quality is healthy for all its citizens. According to the Clean Air Trust, Maryland ranks the fifteenth worst for mortality, hospital admissions, and heart attacks caused by air pollution. <http://www.cta.policy.net/dirtypower/docs/dirtyAir.pdf>. The American Lung Association estimates the Baltimore and District of Columbia metropolitan area had the eleventh worst ozone air pollution in the past year. [http://www.lungusa.org/site/pp.asp?c=dvLUK900\\_E&b=50752#graph6](http://www.lungusa.org/site/pp.asp?c=dvLUK900_E&b=50752#graph6).

The challenges ahead will require significant improvements in the Maryland Department of the Environment's (MDE) efforts to implement crucial regulatory programs, as well as a systematic toughening of federal and state pollution control requirements. MDE clearly lacks the resources it needs to do a good job, and has fallen

behind in carrying out its most basic responsibilities under the law. For example, the four monitoring sites used to track ozone levels inside the Baltimore City limits have not been functional since 2002, a fact posted on MDE's web site. Without comprehensive monitoring, Maryland cannot be sure where it stands on cleaning up the air. (The graphic depicting the monitors' status appears on page 14 of this report.)

Maryland's enforcement of existing pollution control requirements is also a problem. Only 18 inspectors are available to verify compliance at over 11,000 facilities. MDE insists that it has deployed its resources in a manner that focuses on the largest facilities, and therefore the largest polluters. But no veteran enforcement official was able to reassure us that the drastic funding cutbacks experienced by the Department in the last few years – a reduction from \$232 million in FY 2002 to \$169.38 million in FY 2004 – had not fundamentally undermined the MDE enforcement program. Further, the focus on major facilities leaves thousands of so-called “area sources” virtually uninspected, even though these sources produce approximately 63 tons of VOC emissions per summer day in Maryland. [http://www.mde.state.md.us/Air/air\\_information/toptenvoc.asp](http://www.mde.state.md.us/Air/air_information/toptenvoc.asp).

These problems are compounded by the fact that the task of reducing ozone grows ever more difficult. While new models of cars and trucks produce significantly lower emissions, the number of vehicle miles traveled (VMTs) continues to grow. The Maryland Department of Transportation (MDOT) projects that the number of trips made by each person will increase 42% by 2020, resulting in an additional 5.9 million trips per day. Although new cars operate with significantly improved control technologies, there are still a large number of older vehicles on Maryland's roads and increases in VMTs and numbers of drivers are likely to outpace the gains from better technology.

Though more advanced control technology has been placed on three Maryland power plants, the majority of plants have installed little, if any, powerful emission-reduction technology. Constellation Energy has voluntarily placed advanced pollution reduction technology on one of its plants and power plants owned by the Mirant Corporation are required by a government consent decree to take comparable steps. While these changes are a good start, Maryland's other coal and oil-fired plants must follow suit if the state is to achieve attainment with the eight-hour standard. Maryland utilities lag significantly behind the pollution control measures taken by their counterparts in other states.

For example, Virginia reached a settlement agreement with the Virginia Electric Power Company mandating a 70% reduction in NO<sub>x</sub> emissions from eight of the state's coal-fired plants. Pamela Major, *Virginia Firm Agrees to Major Reductions in NO<sub>x</sub>, SO<sub>2</sub>, Conversion of Two Coal Plants*, BNA, Vol. 31, No.46, Nov. 24, 2000. North Carolina has made some significant air quality improvements by enacting legislation that reduces emissions of ozone pollutants from 14 of its coal-fired plants. By 2009 the legislation is expected to curtail NO<sub>x</sub> emissions from these plants by 78%. [http://www.ncgov.com/xmlGOV\\_062002.asp](http://www.ncgov.com/xmlGOV_062002.asp).

Congress required Maryland, and the rest of the United States, to attain the health standard for ground-level ozone or smog in 1975 -- 25 years ago. Congress extended that deadline to 1982, then to 1987, and finally to 2005 for areas in severe non-attainment of the standard. As we explained at the outset, Maryland's air quality routinely fails to meet federal health standards. When new health standards for ozone go into effect, the state will fall even further behind. These problems are by no means limited to those counties in the Baltimore-Washington, D.C. metropolitan area. In fact, due to climate and geography, Harford and Anne Arundel counties have historically registered higher levels of ozone pollution than Baltimore City.

Although MDE predicts that Maryland will meet the 2005 statutory deadline for attaining the one-hour standard, this good news provides only short-term comfort. The state must comply with the new, more stringent eight-hour ozone standard in either 2007 or 2010, depending on whether it does in fact meet the 2005 deadline. This second set of deadlines, according to MDE officials, will be much tougher to meet, requiring the state to take great strides to improve air quality in order to meet the next deadline, imposing a series of additional controls that are likely to prove unpopular with its citizens and regulated industries. Compounding these difficulties, MDE officials add, is the fact that Maryland will continue to be dependent on initiatives launched by other states and the federal government.

In anticipation of these looming deadlines, this report outlines how far we have come in improving air quality and what steps we can take to make additional progress. Those recommendations include: (1) increasing the resources MDE has available for enforcement and implementation Clean Air Act regulatory programs; (2) repairing the air monitors in Baltimore City and expanding monitoring statewide; (3) requiring Maryland's power plants to install better pollution controls; (4) continuing the state's active involvement in the regional efforts of the Ozone Transport Commission; and (5) strengthening public transportation systems in Maryland.

## Research Methodology

We conducted our research in a step-by-step process designed to help us comprehend and evaluate large amounts of information within a relatively short period of time. As reflected in the following chart, we began with a review of print and cyber-based sources. We then moved on to interviews with a diverse group of stakeholders.

Steps	Strategy	Method	Report Components
Step One:	Characterize the nature and scope of the problems.	Historical and documentary research.	Scope of the Problem State of the Environment
Step Two:	Evaluate government response to problems.	Historical and documentary research.	Federal Response Maryland's Response
Step Three:	Identify stakeholder views regarding the problems.	Extensive, in-person interviews.	Stakeholder Views
Step Four:	Assess stakeholders' comments and government programs.	Summary, analysis, and synthesis.	Recommendations

## Ground Rules for Stakeholder Interviews

We were very concerned that stakeholders feel comfortable enough to give us candid views. Therefore, we adopted the ground rule of identifying the stakeholder by the interest group to which she or he belonged (government official, industry or business representative, and public interest or environmental group). Stakeholders were assured that we would not use their names in characterizing their perspective beyond attributing it to these categories.

## **Organization of This Report**

We begin with a discussion of the nature and scope of the air quality problem in Maryland. The report explains the adverse health effects that air pollution imposes on Marylanders. It explains the contributions made by the different sources of ozone precursors, including mobile, stationary, and transport pollution. We then discuss the federal and state responses to these sources. The report presents stakeholder views on all of the above. It concludes with a series of recommendations on how Maryland may improve its response to this problem.

# **SECTION TWO: NATURE AND SCOPE OF THE PROBLEM**

## **OZONE NON-ATTAINMENT STATUS**

### **One-hour Versus Eight-hour NAAQS**

Ground-level ozone is a man-made gas that forms when emissions of nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) combine with oxygen, sunlight and heat. NO<sub>x</sub> and VOCs are commonly referred to as ozone “precursors.” Ozone is one of the six most common and harmful “criteria” pollutants regulated by health-based National Ambient Air Quality Standards (NAAQS) under the CAA. EPA has issued two different ozone NAAQS: one in 1970 and the second in 1997.

The first version of the ozone NAAQS, known as the “one-hour” standard, was set at 120 parts per billion (ppb) and measured, as its name implies, over a one-hour period. Originally established in 1970, the one-hour standard sets the ozone level in the air that produces “acceptable” health risks, according to federal experts and policymakers. When an area exceeds this level, EPA designates it as a non-attainment area for ozone and requires the state to develop a State Implementation Plan (SIP) that will decrease ozone pollution to safe levels by a certain date. States may use a variety of techniques to reduce ozone levels, from requiring installation of more effective pollution control equipment to requiring that emissions from new sources be offset by even greater reductions at other facilities.

The Baltimore metropolitan area and adjacent counties are ranked as “severe” non-attainment under the one-hour standard, while the status of the Washington metropolitan area and adjacent counties was recently changed from “serious” to “severe.” The CAA set a 2005 deadline for areas like Washington D.C. and Baltimore to reach attainment under the one-hour standard, meaning that all monitors in Maryland must measure under 120 ppb in any given one-hour period.

The second version of the ozone NAAQS, known as the “eight-hour” standard, was developed when EPA concluded that smog was more harmful to human health and the environment than previously thought. The Agency lowered the level of acceptable ozone by 50%, to 80 ppb and required that monitors measure no more than that level of pollution over an eight-hour period. Or, in other words, while the one-hour standard protected against peak ozone exposure, the eight-hour standard is designed to protect against both ozone peaks and lower, chronic levels of ozone exposure.

Eight-hour ozone non-attainment areas that have attained the one-hour standard are considered “basic” non-attainment areas. These areas have more discretion in determining how to meet the eight-hour standard. EPA believes that many of these areas

will meet the eight-hour ozone standard by 2007 under existing programs. All areas that do not meet either the one-hour or the eight-hour ozone standard will have to meet the eight-hour standard utilizing the same statutory requirements that the one-hour non-attainment areas were required to implement. These include mandatory actions and specific emission reduction milestones.

Areas in the next most polluted areas, known as “marginal” non-attainment have until 2007 to reach attainment; “moderate” areas have until 2010; “serious” areas have until 2013, “severe” areas have until 2019; and “extreme” areas must attain the standard by 2024. To date, no areas have been designated as “extreme” and only one area has been designated as “severe.” (The CAA is based on the premise that the more polluted an area is, the more time it needs to implement abatement programs, even though public health in these areas is at greater risk.)

The Baltimore area is designated as moderate under the eight-hour standard, and portions of the state qualify for the marginal designation. While the attainment status of various Maryland areas appears less problematic than under the one-hour standard, the differences are deceptive because the standards target such different problems.

EPA issued the eight-hour standard in response to scientific research showing that long-term exposure to elevated ozone levels was decreasing lung function and causing respiratory problems, and that asthmatics in areas that met the one-hour ozone standard were still making emergency room visits for respiratory problems attributable to ozone pollution. EPA predicts that 111 million people live in the 290 counties that currently exceed the eight-hour standard. The Agency projects enormous health benefits under the eight-hour standard, including one million fewer cases of decreased lung function in children, hundreds of thousands of fewer instances of serious coughing and other respiratory problems, as well as thousands of fewer visits to emergency rooms and hospitals due to asthma complications.

Although the new, more stringent eight-hour standard was promulgated in 1997, its implementation was delayed by litigation that eventually was decided by the United States Supreme Court. The Court upheld the eight-hour standard in 2001 and remanded the case back to EPA, ordering EPA to use the statutory framework set out by Congress in the CAA to designate non-attainment areas and their non-attainment responsibilities. EPA designated eight-hour ozone non-attainment areas on June 15, 2004. As anticipated, EPA has designated more areas in non-attainment under the eight-hour standard than are currently designated as non-attainment areas under the one-hour standard because the eight-hour standard is more protective of public health.

EPA has announced its intention to revoke the one-hour standard as of June 15, 2005, instead focusing exclusively on implementation of the eight-hour standard. All states, including Maryland, must begin working to meet the eight-hour ozone standard as soon as the revocation takes effect. It is important to note that EPA’s revocation of the one-hour standard effectively sidesteps any consideration of imposing sanctions on those areas when those deadlines come due. The CAA sets deadlines for attainment of the one-

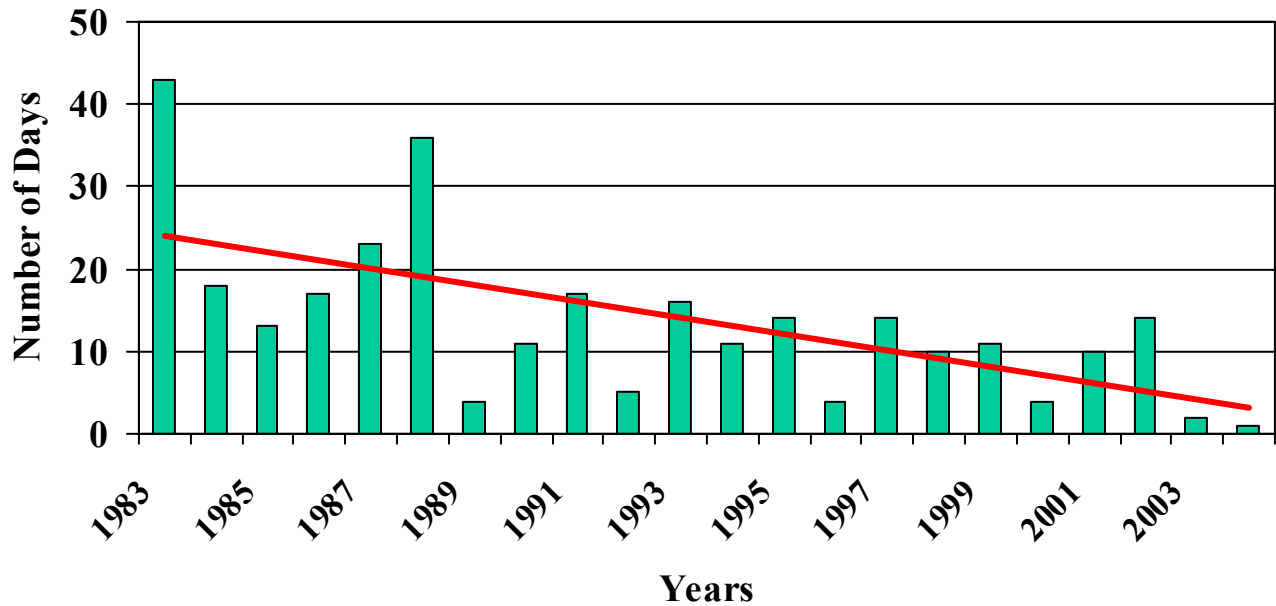
hour standard and does not provide a mechanism for revoking such standards until they are achieved. As a result, the decision is very controversial and a coalition of environmental groups has already challenged it before the D.C. Circuit Court of Appeals. <http://www.earthjustice.org/urgent/display.html?ID=216>.

## **Maryland's Status under the One-hour Standard**

Ozone levels in Maryland have gradually decreased under the one-hour standard over the past twenty years, demonstrating progress in cleaning up the air, albeit at a very slow pace. The data from the last two decades also indicate that weather patterns fluctuate considerably, and weather has a major impact on ozone levels. Therefore, if Maryland reaches attainment under the one-hour standard as a result of favorable weather patterns in the last few years, there is no guarantee it will reach the attainment deadline for the more stringent eight-hour standard.

In 2003 the EPA's Office of Air Quality Planning and Standards (OAQPS) developed and analyzed meteorologically adjusted ambient eight-hour ozone observations in the Baltimore metropolitan area from 1990-2002. OAQPS experts used a method that statistically adjusted raw ambient ozone observations to exclude the effects of variations in weather patterns on ambient ozone levels. The raw ambient ozone observations demonstrated a significant drop in ozone levels during 2000-2001. However, the meteorologically adjusted chart does not indicate a significant decrease in ozone for the same period, indicating that the drop in ozone levels was weather related. <http://www.epa.gov/oig/reports/2004/20040929-2004-P-00033.pdf>. The analysis of this data indicated that once weather had been excluded as a factor in ozone formation, the Baltimore metropolitan area had achieved little or no improvements in ozone levels over the 13-year period. This analysis indicates that as soon as the weather shifts, Maryland will once again suffer from severe ozone problems.

## One-Hour Ozone Exceedance Days by Year 1983-2004

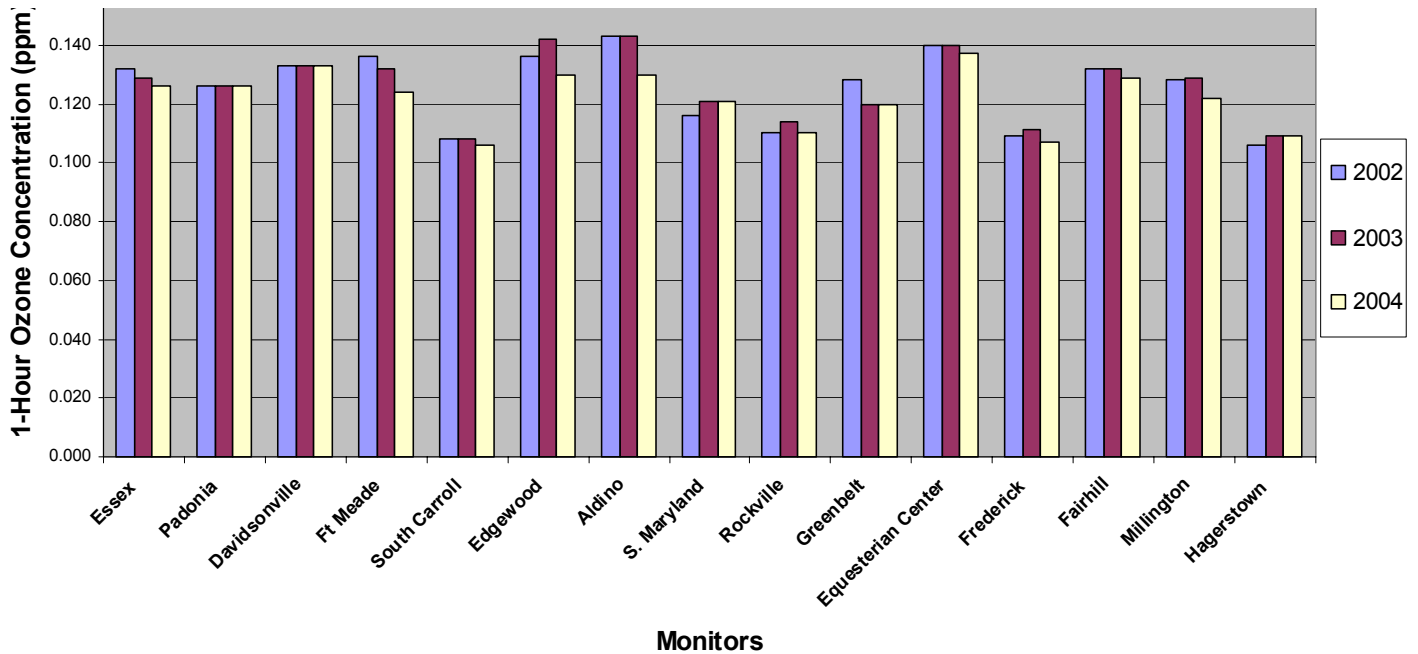


**Source: MDE Maryland's Ozone Trends 2004**

**Note: 2004 ozone data has not been quality controlled and is considered preliminary**

Though one-hour ozone exceedance days are decreasing, the amount of annual exceedances at each air monitoring station that is operational remains high. The chart listed below averages one-hour exceedances from air monitoring stations located throughout the state. At nearly every monitor that was operational, the one-hour standard of 120 ppb was annually exceeded in the last three years.

## One-Hour Ozone Design Values 2002-2004

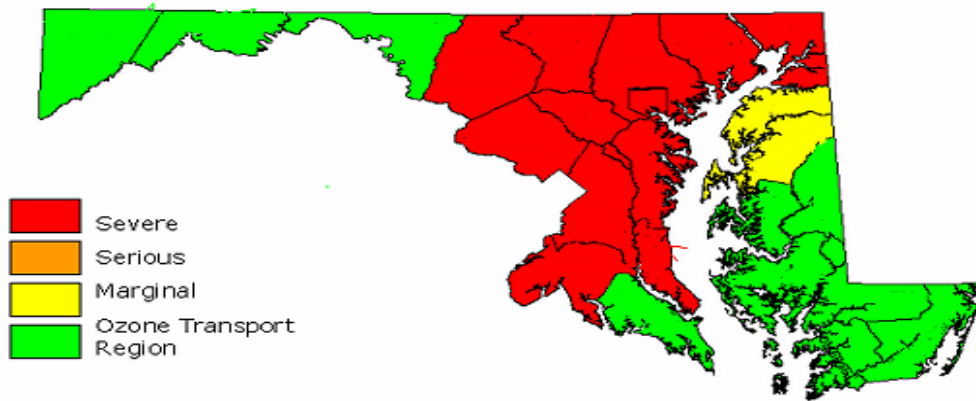


Source: MDE Basic Trends Report 2004

## Areas Affected under the One-Hour Standard

Maryland's central region (Baltimore City, Baltimore County, Anne Arundel County, Harford County, Carroll County, and Howard County), known as the Baltimore non-attainment area, is in severe non-attainment for the one-hour ozone standard. As part of the Philadelphia-Wilmington-Trenton area, Cecil County is in severe non-attainment for the one-hour standard. As part of the Washington, D.C., non-attainment area, Frederick County, Montgomery County, Prince George's County, Charles County and Calvert County are in severe non-attainment. In 2004, EPA downgraded the Washington, D.C. metropolitan region's classification from serious to severe. EPA reclassified Kent and Queen Anne's Counties as attainment under the one-hour standard during the fall of 2004.

## Non-attainment Areas under the One-Hour Standard

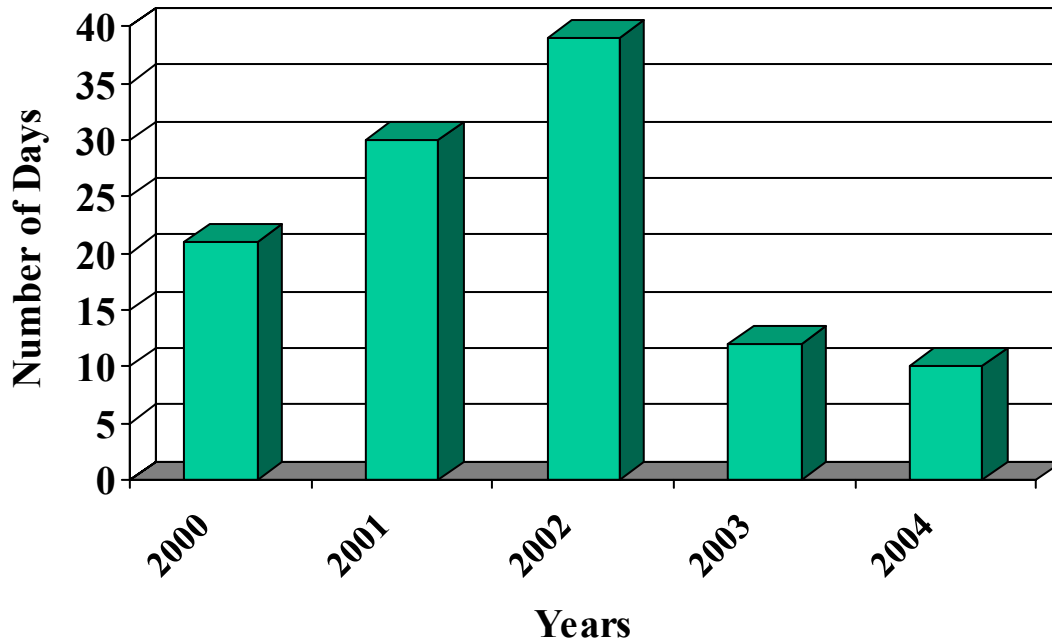


**Source: MDE Maryland Air Quality Report 2002 Status Report and Long Term Trends. Please note that although this map depicts them as marginal, in 2004 Queen Anne's and Kent Counties were reclassified as attainment.**

## Maryland's Status under the Eight-hour Standard

Maryland fares worse under the eight-hour standard compared to the one-hour standard with a projected increase in exceedance days.

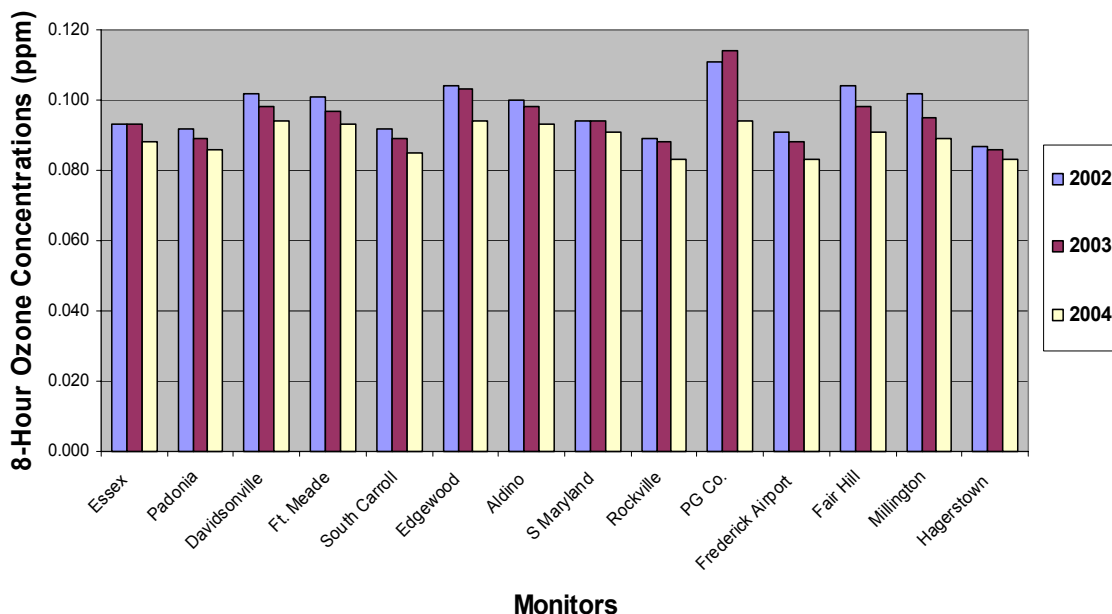
### Eight-hour Ozone Exceedance Days 2000-2004



Source: MDE Maryland's Ozone Trends 2004

Individual exceedances under the eight-hour standard are also significant under the eight-hour standard, with every monitor in Maryland recording an exceedance of the 80 ppm standard in the past three years. (For the same graphic depicting the state's status under the one-hour standard, see page 10.)

## Eight-hour Design Values 2002-2004



**Source: MDE Basic Trends Report**

For the same graphic depicting Maryland’s status under the one-hour standard, see page 11.

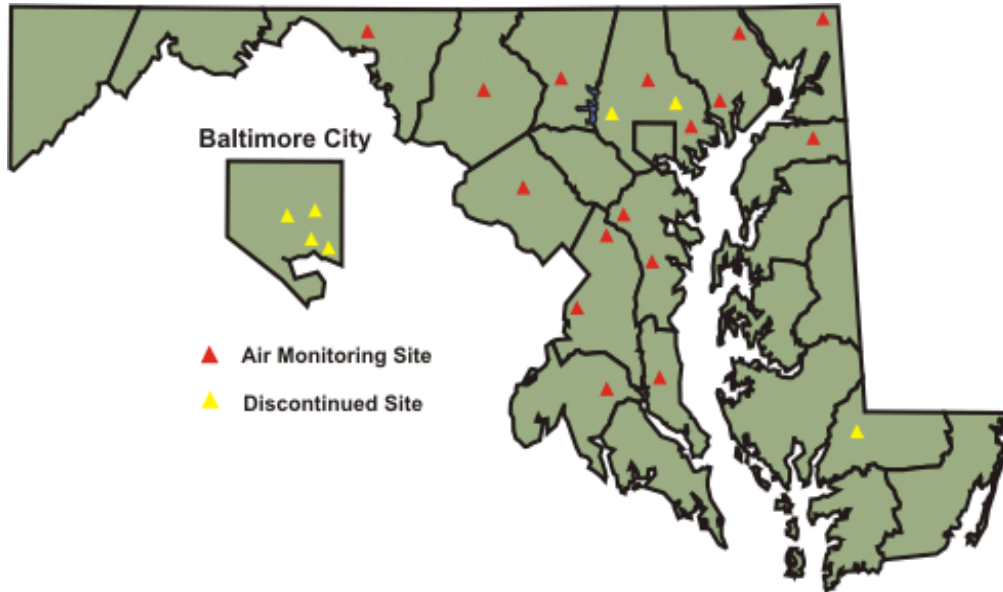
## Areas Affected under the Eight-hour Standard

Maryland’s central region (Baltimore City, Baltimore County, Anne Arundel County, Harford County, Carroll County, and Howard County), known as the Baltimore non-attainment area, is in moderate non-attainment for the eight-hour ozone standard. As part of the Washington, D.C., non-attainment area, Frederick County, Montgomery County, Prince George’s County, Charles County and Calvert County are in moderate non-attainment. As part of the Philadelphia-Wilmington-Trenton non-attainment area, Cecil County is in moderate non-attainment. Kent and Queen Anne’s Counties are in marginal non-attainment. Washington County signed an Early Action Compact with EPA, agreeing to implement pollution controls early in order to defer a non-attainment designation unless the County does not meet the eight-hour standard by 2007. <http://www.epa.gov/oar/oaqps/greenbk/gncs.html#MARYLAND>.

## No Monitoring in Baltimore City 2002-Present

Baltimore City is the most congested and heavily populated area in the state and, as a result, produces some of the highest NOx and VOC emissions. Unfortunately, while MDE provides up-to-date information regarding ozone exceedances in most of the state, it is unable to provide such information for Baltimore City because all four of the City’s

air monitoring stations have not operated since 2002. The following figure, showing the four “discontinued” sites -- as well as three more dysfunctional sites in the southern and western portions of the state – was posted on the MDE web site.



Source: MDE,  
[http://www.mde.state.md.us/Air/air\\_quality/HistoricalData/index.asp](http://www.mde.state.md.us/Air/air_quality/HistoricalData/index.asp).

## Health and Environmental Effects

### Public Health

**Ozone not only triggers asthma attacks in children with asthma, but also may cause the onset of the disease in children who live in areas with high ozone levels.**

Maryland’s non-attainment status for ground-level ozone affects the health of thousands of its citizens. Ozone causes airways to become swollen, inflamed and scarred, which reduces the amount of oxygen that is delivered to the body through each breath. The corrosive effect of exposure to ozone in the respiratory system increases susceptibility to bacterial infections. The young, old, and individuals with respiratory problems are most at risk for immediate and long-term ozone related respiratory problems. However, even healthy adults can experience coughing, wheezing, shortness of breath, headaches, nausea, and irritation of eye and throat tissues on Code Red days. The following figure indicates the large number of individuals in Maryland who are especially at risk when ozone levels reach non-attainment levels.

## Vulnerable Populations in Maryland

County	Total Population	14 & Under	65 & Over	Pediatric Asthma	Adult Asthma	Chronic Bronc.	Emphy-sema
<b><u>ANNE ARUNDEL</u></b>	503,388	104,791	50,857	10,460	30,881	16,651	5,423
<b><u>BALTIMORE</u></b>	770,298	148,795	111,532	14,969	48,166	26,458	9,757
<b><u>BALTIMORE CITY</u></b>	638,614	133,463	82,202	13,238	39,171	21,133	7,386
<b><u>CALVERT</u></b>	80,906	18,433	7,053	1,879	4,771	2,561	806
<b><u>CARROLL</u></b>	159,025	34,487	17,174	3,488	9,568	5,197	1,750
<b><u>CECIL</u></b>	90,335	19,950	9,574	2,000	5,419	2,929	976
<b><u>CHARLES</u></b>	129,040	29,662	10,148	2,995	7,618	4,043	1,218
<b><u>FREDERICK</u></b>	209,125	46,815	19,914	4,682	12,504	6,693	2,137
<b><u>HARFORD</u></b>	227,713	51,045	23,961	5,117	13,583	7,373	2,470
<b><u>KENT</u></b>	19,613	3,148	3,823	326	1,277	721	299
<b><u>MONTGO-MERY</u></b>	910,156	192,333	102,871	19,072	55,621	30,363	10,385
<b><u>PRINCE GEORGE'S</u></b>	833,084	187,148	66,236	18,405	50,111	26,489	7,914
<b><u>WASHINGTON</u></b>	134,246	25,492	18,897	2,573	8,434	4,598	1,662
<b>TOTAL:</b>	<b>4,705,543</b>	<b>995,562</b>	<b>524,242</b>	<b>99,204</b>	<b>287,124</b>	<b>155,209</b>	<b>52,183</b>

**Source: State of the Air 2004 Report, American Lung Association. Please note that these categories overlap, and a person may be in more than one (e.g., children suffering from pediatric asthma are also included in the population of people 14 and under).**

Numerous health effect studies have found that ozone is associated with a variety of adverse health outcomes, ranging from relatively minor symptoms, to hospital admissions, chronic illness, and even death. For example, a number of studies have linked ozone pollution with more frequent emergency room visits, including one study showing a 26% increase in the number of asthma patients admitted to New Jersey emergency rooms on summer days when ozone concentrations were high. Children are particularly vulnerable to ozone exposure as evidenced by a study conducted by Yale University scientists. The scientists followed 500 elementary school students for four years. The data they developed showed that living in an area with high levels of ozone and other pollutants contributed to the students' diminished lung function and other respiratory symptoms. *Environ Health Perspect* 1999; 107: 675-679.

A 13-year study recently publicized by the *Journal of American Medical Association* reported that short-term (daily and weekly) exposure to ozone is connected to

mortality in 95 urban communities, including Baltimore. Researchers investigated the relationship between ozone concentrations and the risk of mortality using statistical models for a single day as well as over a course of several days. On average, researchers found that a 10 ppb increase in the previous week's ozone concentration was associated with a .52% increase in daily mortality. A 10 ppb increase in daily ozone levels corresponds to an additional 3,767 premature deaths annually in these 95 communities.

Some 511,000 Maryland adults and 151,000 Maryland children have asthma, an illness that is debilitating at best and, in severe cases, fatal. In Maryland, asthma causes an average of 88 deaths each year. [http://www.fha.state.md.us/mch/pdf/Asthma\\_in\\_Maryland\\_2003.pdf](http://www.fha.state.md.us/mch/pdf/Asthma_in_Maryland_2003.pdf). Asthma costs Marylanders money in terms of hospital bills and lost days at work. In an average year, Maryland residents with asthma are hospitalized 8,000 times, and visit emergency rooms 31,000 times. In 2002, Marylanders paid \$33 million in charges for asthma hospitalizations and an additional \$28 million in charges for emergency visits. Adverse health outcomes due to ozone pollution harm Maryland in other ways as well. More than one-third of Maryland children with asthma have missed school due to their illness.

[http://www.fha.state.md.us/mch/pdf/Asthma\\_in\\_Maryland\\_2003.pdf](http://www.fha.state.md.us/mch/pdf/Asthma_in_Maryland_2003.pdf).

Besides harming human health, ground-level ozone is harmful to Maryland's environment. It interferes with a plant's capacity to produce and store food, and makes it susceptible to disease, infestation, pollution, and severe weather. Ground-level ozone damages foliage, reduces forest yields, and ruins urban, park, recreation and forest landscapes because it retards photosynthesis and growth, while accelerating aging and leaf drops. By distorting plant growth and photosynthesis, ozone reduces yields of economically important crops like wheat, soybeans, and cotton. In addition, the effects of long-term ozone exposure on trees are cumulative, eventually affecting entire forests and ecosystems. According to the EPA, ozone also harms "ecological functions such as water movement, mineral nutrient cycling, and habitats for various animal and plant species." U.S. EPA, <http://www.epa.gov/air/urbanair/ozone/hlth.html>.

## **Nutrients in the Chesapeake Bay**

The Chesapeake Bay, Maryland's most significant natural resource and a cornerstone of the state's economy, is also threatened by uncontrolled ozone precursors, especially air deposition of nitrogen oxide, which translates as extreme nutrient loading in Maryland's surface waters. More people are moving into the watershed today than ever before, bringing with them more vehicles and more demands on power plants for energy. Each year, nearly 97.5 million pounds -- about one-third of the Bay's total yearly nitrogen load -- comes from air deposition. Most of these emissions come from power plant smoke stacks and vehicle tailpipe exhaust.

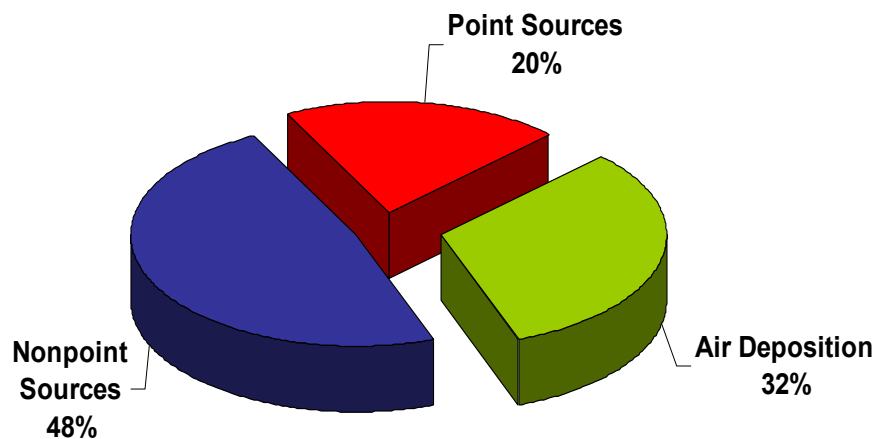
Through a process known as "air deposition," NOx emissions infiltrate the Bay, contributing to algal blooms, which cloud the water and absorb the oxygen. Low levels of dissolved oxygen result from the decomposition of algal blooms, producing "hypoxia"

that impairs the growth and reproduction of marine life. At their most extreme, such conditions create “dead zones” that do not support healthy ecosystems.

Over the last forty years, the volume of hypoxic water has more than tripled in the Chesapeake Bay. Dead zones comprise almost a quarter of the water in the mainstream of the Bay during the summer months. When sustained winds affect Bay circulation patterns, dead zones extend into shallow waters, killing fish and crab populations unable to escape those areas. Even when these populations manage to escape death, hypoxia increases the transmission of diseases, intra and inter-species competition, and predation. Immobile species such as clams and worms become stressed or die.

In order to alleviate deteriorating Bay conditions, the governors of Maryland, Pennsylvania, and Virginia, as well as officials from the District of Columbia, and the EPA Administrator signed the Chesapeake Bay 2000 (C2K) Agreement in June of 2000. One of the goals of C2K was to restore water quality in the Bay by 2010 by setting nutrient pollution reduction targets. Unfortunately, the targets were not aggressive enough to satisfy C2K’s commitment of correcting the Chesapeake Bay’s water quality problems. Moreover, the implementation strategies necessary to actually achieve the pollution reductions have still not been established although the deadline for doing so was in 2003. In order to meet the 2010 deadline, the next seven years will require dramatic reductions from nitrogen pollution sources such as power plant and motor vehicle emissions.

### Nitrogen Deposition in the Chesapeake Bay



Source: MDE,

[http:// www.mde.state.ms.us/assets/document/Transport%20in%20MD.ppt](http://www.mde.state.ms.us/assets/document/Transport%20in%20MD.ppt).

# SOURCES OF POLLUTION

## Nitrogen Oxides

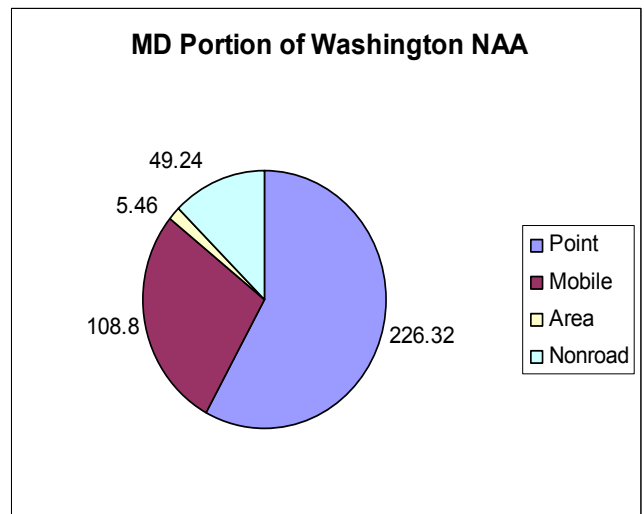
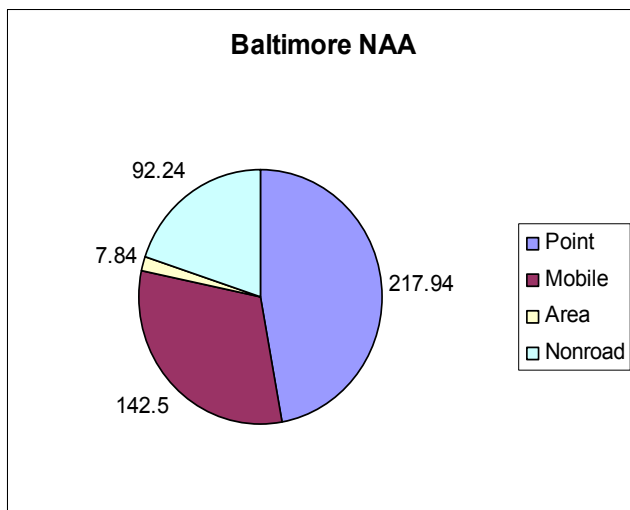
The primary sources of NO<sub>x</sub> emissions, as listed on the MDE website, are:

1. Utilities
2. Light Duty Gasoline Vehicles
3. Heavy Duty Diesel Trucks
4. General Manufacturing
5. Construction Equipment
6. Light Duty Gasoline Trucks
7. Industrial Equipment
8. Heavy Duty Gasoline Trucks
9. Railroads
10. Farm Equipment

**Source: MDE, Top Ten Sources of NO<sub>x</sub>, 1990**

Mirroring national trends, stationary sources, including “major” and “area” sources, contribute a greater percentage of NO<sub>x</sub> emissions than mobile sources in Maryland. Stationary sources include major manufacturing facilities and power plants, while area sources include smaller facilities like dry cleaners.

### NO<sub>x</sub> Emissions (tons/day)



**Source: MDE Update Determining Non-attainment Area Boundaries (NAA) in Maryland for EPA’s Eight-Hour Ozone Standard**

## Volatile Organic Compounds

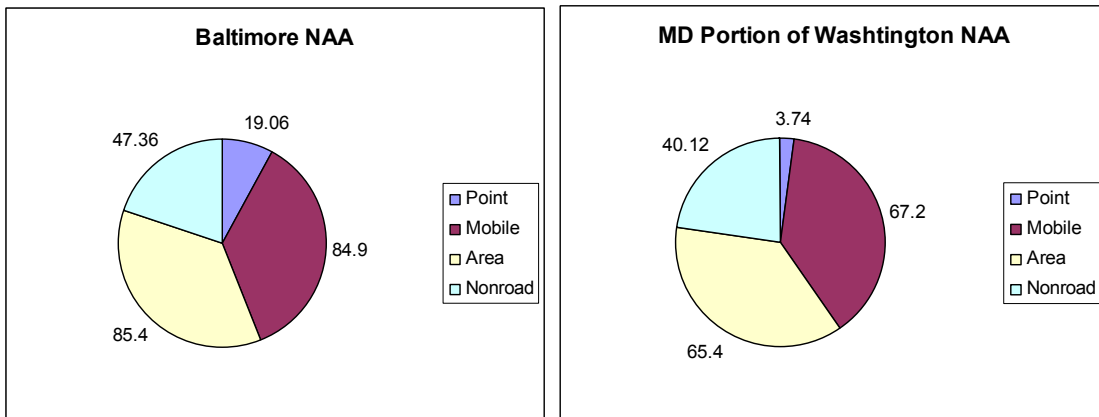
The primary sources of VOCs, again as listed on the MDE website, are:

1. Light Duty Gasoline Vehicles
2. Light Duty Gasoline Trucks
3. General Manufacturing
4. Paints and Coatings
5. Consumer Products
6. Lawn and Garden Equipment
7. Surface Coating Operations
8. Cold Cleaning Degreasing
9. Auto Refinishing
10. Petroleum Handling

**Source: MDE, Top Ten Sources of VOC, 1990**

In contrast to NO<sub>x</sub>, mobile sources contribute a greater percentage of VOC emissions than stationary sources.

### VOC Emissions (tons/day)



**Source: MDE Update Determining Non-attainment Area Boundaries in Maryland for EPA's Eight-Hour Ozone Standard**

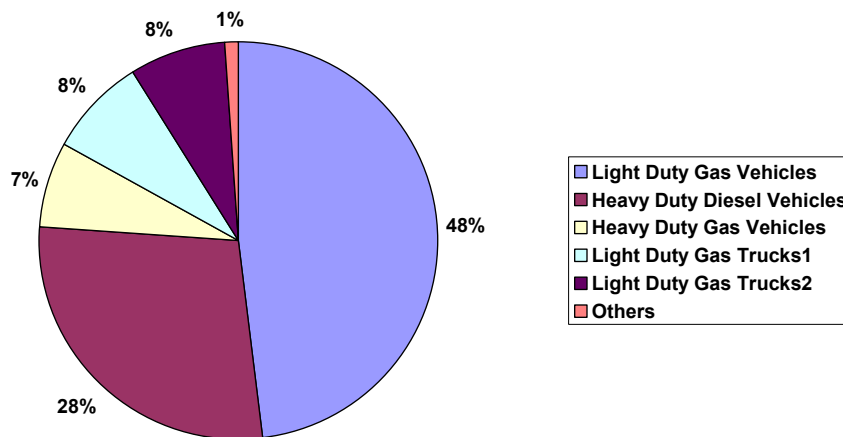
# SECTION THREE: MOBILE SOURCES

## Mobile Sources of Ground-level Ozone

Various mobile sources contribute to ground-level ozone in Maryland. Mobile sources are classified as Light Duty Gas Vehicles (passenger cars up to 6,000 pounds); Light Duty Gas Trucks One (pick-ups, Sports Utility Vehicles, mini-vans weighing up to 6,000 pounds); Light Duty Gas Trucks Two (heavier versions of the One category weighing up to 8,500 pounds); Heavy Duty Gas Vehicles (vehicles over 8,500 pounds that are equipped with heavy duty gas engines); and Heavy Duty Diesel Vehicles (heavy duty diesel vehicles that are equipped with heavy duty diesel engines and weigh over 8,500 pounds). Mobile sources such as motorcycles are classified as “others.”

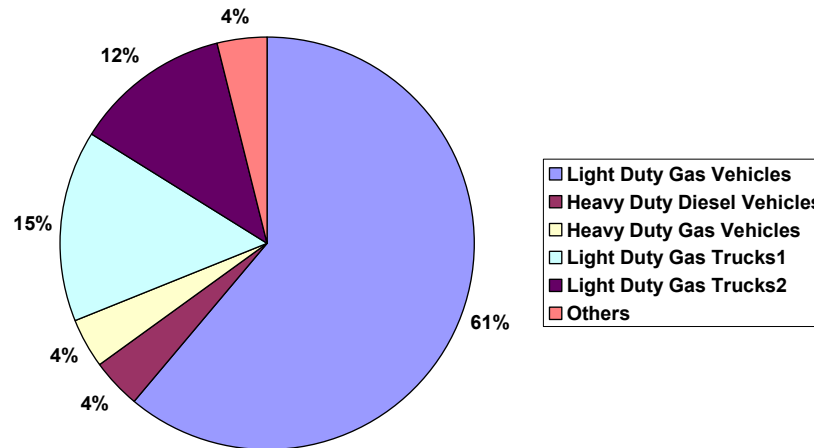
Of the various mobile sources, Light Duty Gas Vehicles contribute the most to emissions of NOx and VOCs in Maryland.

### NOx Emissions from Mobile Sources



Source: MDE, Emission Inventory 1999

## VOC Emission from Mobile Sources



**Source: MDE, Emission Inventory 1999**

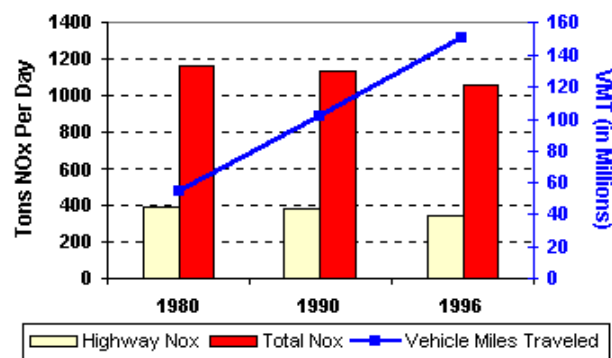
It is worth noting that the MDE Emission Inventory from 1999 was compiled using MOBILE5 modeling tool for predicting vehicle emissions. MDE currently uses the MOBILE6 modeling tool, which contains new and improved data regarding the use of new pollution control technologies, vehicle emission performance, and the effect of new regulations promulgated since 1992. MOBILE6 would therefore show lower emission levels than the MOBILE5 model.

The number of vehicles and vehicle miles traveled (VMT) are both growing at a faster rate than Maryland's population. The percentage of trips made by passenger vehicles in the last decade has increased while the percentage of trips made by mass transit has decreased within all portions of the state, except the commuting suburbs near Washington, D.C. These suburbs have maintained their overall percentage of transit use, making Washington, D.C. the highest ranked city in the nation for this attribute. However, the Maryland Department of Transportation (MDOT) projects that the number of trips made by each person will increase 42% by 2020, resulting in an additional 5.9 million trips per day. These factors indicate that Marylanders are becoming more dependent on their vehicles and traveling greater distances in them than ever before.

Vehicles with lower fuel economy rates generate more VOCs and NO<sub>x</sub> than vehicles with higher fuel economy. Analysis of national fuel economy trends indicates that the fuel economy for the average, new light vehicle has declined in recent years. After peaking at 22.1 miles-per-gallon (mpg) in 1987 and 1988, average light-vehicle fuel economy has declined nearly 8% to 20.4 mpg for 2001, lower than at any time since 1980. This decline is primarily due to the increasing market share of less efficient light trucks, increased vehicle weight, and increased engine size and performance.

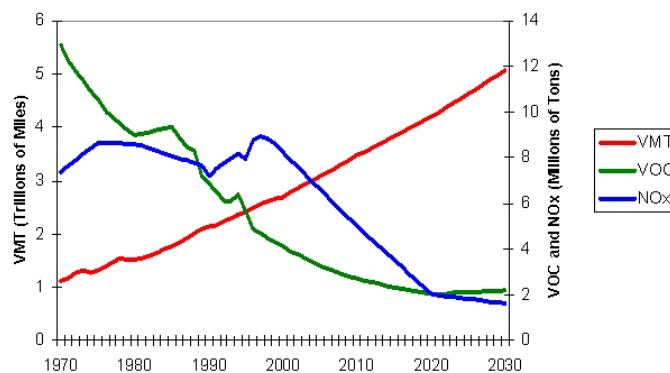
Sales of light trucks (SUVs, vans, pick-up trucks) have risen steadily over the last 20 years. As of 2001, they constituted nearly 47% of the U.S. light vehicle market. This market share is more than twice the 1983 figure. For model year 2001, cars averaged 24.2 mpg, vans averaged 19.3 mpg, SUVs averaged 17.2 mpg and pick-up trucks averaged 16.5 mpg. Therefore, as the number of light trucks on the road has increased, the average fuel economy of all vehicles on the road has decreased.

## Vehicle Miles Traveled and NOx Emissions



Source: MDE, Maryland Environmental Indicators Status Report, Summer 1999.

## Vehicle Miles Traveled and NOx and VOC Emissions



Source: FHWA, Vehicle Miles Traveled (VMT) and Vehicle Emissions, 2002.

## **FEDERAL RESPONSE**

Federal law establishes three very different regulatory programs to control pollution from cars and trucks. The first program involves a series of requirements instructing states to establish Motor Vehicle Emissions Budgets (MVEBs) for total motor vehicle emissions. This program also requires EPA to reject State Implementation Plans (SIPs) that contain road-building projects that would produce emissions in excess of the budget. The second program requires the reduction of emissions through controls on the content, burning, and dispensing of fuel, either through on-board controls built into the vehicle (such as catalytic converters) or controls on gas pumps. The third program focuses on a vehicle inspection and maintenance in ozone non-attainment areas. In addition to binding federal regulations, the federal government has established a variety of voluntary programs to educate and encourage the participation of industry and citizens to assist in reducing air pollution.

### **Transportation Regulations**

When Congress amended the Clean Air Act in 1990, it finally came to grips with the fact that the repeated failure of urban areas to attain the ozone standard was due in large measure to annual increases in mobile source emissions. The 1990 amendments made an unprecedented effort to force the transportation sector to reduce emissions by imposing “transportation conformity” requirements. These provisions impose an affirmative obligation on federal, state, and local agencies to consider transportation plans, programs, and projects in conjunction with the SIP’s requirements, giving priority to those projects that would result in decreases of VMTs or otherwise create air quality benefits and, as mentioned earlier, to ensure that those plans conform to the MVEB the state has established.

Once approved by the EPA, MVEBs remain in effect until a subsequent SIP revision is required or until the state submits a SIP revision that modifies the existing budget. Local and federal transportation planning agencies use MVEBs to make a “conformity determination.” This determination involves a comparison of the emissions that will be created by implementing the region’s plans for new roads and development, called a Transportation Improvement Plan (TIP), with the emissions budget identified in the SIP.

The process is analogous to everyday household budget and spending decisions: if the emissions in the TIP (the “spending” component) exceed the emissions in the MVEBs (the “budget” or “checking account” component), the FHWA and Federal Transit Administration (FTA) must withhold a conformity determination, sending the state and local governments back to the drawing board to find more reductions until the two sides of the books are balanced. Alternatively, a state may increase the MVEB side of the books by submitting a SIP revision to the EPA. However, increases in MVEBs need to be offset by equivalent reductions from other sources such as factories, power-plants, or small businesses.

## **Fuel Economy Program**

Fuel economy is defined as the average mile traveled by a vehicle per gallon of gasoline. Burning fossil fuels such as gasoline or diesel fuel emits NO<sub>x</sub> and VOC emissions to the earth's atmosphere. Vehicles with lower fuel economy rates generate more of these pollutants than vehicles with higher fuel economy.

In 1975, Congress established the Corporate Average Fuel Economy (CAFE) Program to require vehicle manufacturers to construct automobiles that burn fuel more efficiently. Beginning in model year 1985, Congress required the federal Department of Transportation (DOT) to administer the program for regulating the fuel economy of new passenger cars and light trucks. The CAFE program applies separately to each manufacturer's annual fleet of passenger cars and to its annual fleet of light trucks under 8,500 pounds. The values are obtained by combining city and highway fuel economy test results and computing an average that is weighted by vehicle sales. Thus, if a manufacturer sells more SUVs with lower fuel economy, it must work to achieve higher fuel economy for other vehicles in its overall fleet.

In addition, to discourage the production and purchase of fuel inefficient vehicles, a Gas Guzzler Tax is imposed on manufacturers on the sale of new model year cars (not minivans, SUVs, or pick-up trucks) whose fuel economy fails to meet certain statutory guidelines. The fuel economy figures used to determine the tax are different from the fuel economy values in the CAFE standards. The tax is collected by the Internal Revenue Service and paid by the manufacturer. The amount of the tax is displayed on the vehicle's fuel economy label (the window sticker on new cars), so that consumers are aware it was imposed.

## **Stage II and Vapor Recovery Program**

These two measures required the installation of Stage II vapor recovery nozzles at gasoline pumps and the installation of onboard refueling emissions controls for new passenger cars and light trucks beginning in the 1998 model year. The gas tank, fill pipe, gas dispensing systems are designed so that when refueling the vehicle, fuel vapors in the gas tank travel to an activated carbon packed canister, which absorbs the vapor. When the engine is in operation, it draws the gasoline vapors into the engine intake manifold to be used as fuel. The program is required on 40% of 1998 model year cars, 80% of 1999 model year cars, and 100% of 2000 model year and later cars. Light-duty trucks have a six-year phase-in period, starting in model year 2001. EPA estimates that when the program is fully phased in, an average of 78 million gallons of gasoline per year will be saved and the amount of VOCs in the air will be reduced by approximately 300,000 to 400,000 tons per year nationwide.

In Maryland, this program is implemented by requiring repair and retesting if a car does not meet the requirements the first time it is inspected. To date, MDE reports a 60 % improvement in visible smoke exhaust after such repairs.

## **Tailpipe Exhaust Standards**

Tailpipe exhaust standards for cars are achieved by the installation of “on-board” pollution control equipment such as catalytic converters. New, more stringent limits included the 1990 CAA Amendments were fully phased in with 1996 models. With the notable exception of California, the CAA preempts individual state authority to require on-board controls for mobile sources. Vehicles are manufactured on a national or global level, making it cost and time-prohibitive for a state to require manufacturers to alter a vehicle’s emission requirements based on individual state standards. Congress made an exception for California both because of that state’s acute air quality problems and because the state’s economy is large enough to make it reasonable for manufacturers to make cars that comply with more stringent state standards.

The CAA allows states to “opt in” to these more stringent “California car” standards. While Maryland has not adopted “California Car” standards, it has taken other steps to curb vehicle emissions, including encouraging the use of National Low Emissions Vehicles (NLEVs), using reformulated gasoline, and enforcing a diesel smoke program, as described below.

In December 1999, EPA announced the Tier 2 Program that establishes more protective tailpipe standards beginning with the 2004 model year for all passenger vehicles, including SUVs, minivans, vans, and pick-up trucks. This regulation marks the first time that SUVs and other light-duty trucks are subject to the same national pollution standards as cars. Other types of vehicles weighing less than 6,000 pounds will be phased in to this standard between 2004 and 2007. In addition to tighter emission standards, the Tier 2 Program establishes lower sulfur in gasoline standards, which is necessary to enable passenger vehicles to meet Tier 2 emission standards.

EPA and MDE officials both predict that the tighter Tier 2 emission standards will result in a decrease of vehicle emissions. MDE asserts that as a result of the Tier 2 standards, in 2004 manufacturers started producing passenger cars that are 77 % cleaner than those on the road today. EPA officials predict that by 2015 NOx emissions from mobile sources will decrease by 50% and VOC emissions will decrease by 30%. By 2025, NOx from mobile sources will decrease by 80% and VOC emissions will decrease by 50%. EPA estimates that when the new tailpipe and sulfur standards are implemented, Americans will benefit from the clean air equivalent of removing 164 million cars from the road.

## **National Low Emission Vehicle Program**

In 1998, nine Northeastern states, including Maryland, and 23 manufacturers opted into EPA’s voluntary NLEV program. This program was created in response to the need for the ozone-plagued Northeastern states to secure significant ozone precursor emissions reductions by adopting more stringent controls. As a result, in Model Year 1999, new cars and light-duty trucks were required to meet tailpipe standards that were

more stringent than EPA could have mandated prior to the 2004 Model Year. Motor vehicle manufacturers agreed to enter into the program if EPA and Ozone Transport Commission states agreed to certain conditions, including providing manufacturers with regulatory stability and reducing regulatory burdens by harmonizing federal and California motor vehicle emission standards.

Beginning in Model Year 2001, the program went national and all vehicles in the United States were required to meet these new tailpipe standards. The program provided substantial emission reductions to all states that otherwise would only be available through individual state-by-state adoption of California's motor vehicle regulations. MDE officials assert that the NLEV will result in substantial reductions in VOCs and NOx because new vehicles subject to the NLEV program will be 70% cleaner than 1998 models.

## **Reformulated Gasoline**

Reformulated Gasoline (RFG) is gasoline blended to burn cleaner and reduce smog-forming and toxic pollutant levels. A 1997 study concluded that RFG's retail price has been about three cents per gallon more than conventional gasoline. The 1990 CAA Amendments required that RFG be used in the most severe ozone non-attainment areas of the country. The first phase of the RFG program began in 1995 in Cecil, Anne Arundel, Baltimore, Carroll, Hartford, and Howard Counties along with Baltimore City. In 2000, Phase II of the RFG Program began. The new program will remove an additional 41,000 tons of smog-forming pollutants from the air, which is comparable to taking 6 million cars off the road nationally, and it will cut the release of VOCs by 27% and reduce NOx emissions by 7%. The 1990 CAA Amendments also allowed counties in non-attainment to voluntarily "opt-in" to the RFG program. Kent County and Queen Anne's County have both opted into the RFG Program.

## **Federal Inspection and Maintenance Requirements**

Inspection and Maintenance (I&M) programs are required in both ozone and carbon monoxide non-attainment areas. EPA requires that all states apply On-Board Diagnostic (OBD) checks as a regular part of their I&M programs. OBD can detect a system problem before the driver notices a drivability problem. It is a system of vehicle component and condition monitors controlled by a central, on-board computer running software designed to signal the driver when conditions exist that could lead to the vehicle exceeding its emission standards. The OBD system alerts the driver by turning on a dashboard warning light and storing fault codes and engine operating conditions that repair technicians can access to diagnose and repair the vehicle. An OBD diagnostic test is performed during regular vehicle inspection. By detecting these emission-related failures and alerting the driver to the need for potential repair, EPA hopes that vehicles will be properly repaired before emissions become a problem.

Federal OBD requirements apply to vehicles below 8,500 pounds. For light-duty vehicles and light-duty trucks, OBD technology was required beginning in 1994. For

vehicles between 8,500 and 14,000 pounds, requirements begin in 2004-2005, with differing phase-in schedules for diesel and gasoline-powered vehicles. There are no requirements for vehicles above 14,000 pounds.

## **Diesel Fuel and Engines**

Since 2000, EPA has implemented mandatory and voluntary programs to reduce both on- road and off-road diesel emissions. On October 6, 2000, EPA issued a final rule for the first phase of its two-part strategy to significantly reduce harmful diesel emissions from heavy-duty trucks and buses. In the first phase, EPA is finalizing new diesel engine standards beginning in 2004 for all diesel vehicles over 8,500 pounds. Additional diesel standards and test procedures in this final rule will begin in 2007. Heavy-duty gasoline engines were required to meet new, more stringent emission standards starting no later than the 2005 Model Year. The new standards required gasoline trucks to be 78% cleaner and diesel trucks to be more than 40% cleaner than today's models. The second phase, consisting of more stringent emission standards, will reduce air pollution from heavy-duty trucks and buses by another 90%.

On January 18, 2001, EPA established a comprehensive national control program that regulated the engine and fuel in heavy-duty vehicles. As part of the program, new emission standards will begin to take effect in Model Year 2007 and will apply to heavy-duty highway engines and vehicles. The standards are based on the use of high-efficiency catalytic exhaust emission control devices or comparably effective advanced technologies. Because these devices are damaged by sulfur, EPA is also reducing the level of sulfur in highway diesel fuel by 97% by mid-2006. As a result, diesel vehicles will achieve gasoline-like exhaust emission levels. This program will reduce NOx emissions from heavy duty engines by 90% to 95% below current standard levels, respectively. By 2030, EPA estimates that this program will reduce annual emissions of NOx by a projected 2.6 million tons.

The Clean Air Nonroad Diesel Rule was signed on May, 11, 2004. Nonroad vehicles are mobile sources of pollution not typically used on pavement such as agricultural equipment, trains, aircraft, snowmobiles, and large construction equipment. EPA estimates that affected nonroad diesel engines currently account for about 60% of total diesel particulate matter emissions and about 30% of total NOx emissions from mobile sources nationwide. The new rule combines cleaner engine technologies with cleaner fuel, similar to the on-road diesel program mentioned previously. It requires stringent pollution controls on nonroad diesel engines such as the use of catalytic converters. Also, EPA regulation requires refiners to lower the amount of sulfur in diesel fuel for nonroad diesel engines to 500 parts per million (ppm) by 2007 and to 15 ppm in 2010, reducing the amount of pollution coming out of the exhaust pipes. EPA asserts that the new standards will cut emissions from nonroad diesel engines by over 90%. This rule could lower NOx emissions in Maryland considering that construction equipment and agricultural equipment are two of the top ten sources of NOx in Maryland.

In June 2004, EPA established an in-use emissions testing program for heavy-duty diesel trucks and buses. Under this program, engine manufacturers will measure emissions from their diesel engines in highway applications using portable on-board emission measurement systems. Emissions from diesel engines will be calculated under real-world driving conditions. Non-compliance data will be used by EPA to determine whether further emission reductions are necessary. This proposal should advance EPA's clean diesel activities by helping to ensure that the benefits of more stringent emission standards are realized under real-world driving conditions.

EPA has implemented voluntary programs that encourage fleet owners to install pollution-reducing devices on the vehicles and to use clean-burning diesel fuel under the Voluntary Diesel Retrofit Program. Second, under the SmartWay Transport Partnership program, EPA and the freight industry partner to develop incentives for fuel efficiency improvements and greenhouse gas emissions reductions. Maryland received federal funding to advance these programs. On October 13, 2004, EPA announced that since the program's inception, partners have prevented the emission of more than 39 million tons of greenhouse gases, a figure comparable to removing 31 million cars from the road for one year.

As part of EPA's SmartWay program, EPA gave \$1 million in grants to nine states to study the effectiveness of using technologies such as truck stop electrification and shore power to decrease engine idling. In addition, EPA established the Clean School Bus USA program. This program encourages policies and practices to eliminate unnecessary public school bus idling, retrofitting buses that will remain in the fleet with better emission control technologies and/or fueling them with cleaner fuels, and replacing the oldest buses in the fleet with new, less polluting buses. While there are no demonstration projects in Maryland, the Clean School Bus USA program has established 41 demonstration projects throughout United States since 2003.

## **Alternative Fuels**

Alternative fuels include compressed natural gas, electricity, ethanol, methanol, methane, and propane. Alternative fuels reduce the amount of particulate matter, carbon monoxide, and ground level ozone that can form as the result of tailpipe emissions. The CAA stopped short of mandating the sale or use of alternative fuels. However there are a number of incentive programs at both the federal and the state level to encourage the purchase of alternative fuel vehicles.

The federal government offers tax credits to those who purchase an alternative fuel vehicle and to those who convert their vehicle's engine to be compatible with alternative fuels. Consumers purchasing a new clean-fuel vehicle by the end of 2005 may be eligible for a clean-fuel vehicle tax deduction of up to \$2,000. This deduction will be reduced to \$500 in 2006 and will expire in 2007. Clean-fuel vehicles include those vehicles powered by natural gas, liquefied natural gas (LNG), liquefied petroleum gas (LPG), hydrogen, or electricity (e.g., some gasoline/electric hybrids) and any other fuel that is at least 85% alcohol or ether. Purchasers of new electric vehicles may be

eligible for a one-time federal income tax credit of up to \$4,000. The credit will be reduced to \$1,000 in 2006 and will expire in 2007.

Up until recently, Maryland offered tax credits to alternative fuel vehicle owners whose vehicles weigh less than 26,000 pounds. However the legislation's provision establishing tax credits for alternative fuel vehicles owners expired on June 30, 2004. MDE officials said that it was unlikely that the Maryland legislature would renew these tax credits given Maryland's fiscal constraints.

In September 2004 Governor Ehrlich announced plans to lease Maryland's first fuel cell vehicle, a minivan from General Motors Corporation that runs on hydrogen and only emits water vapor. This vehicle will be assigned to a state agency and will run a fixed route in Prince George's County.

## **Green Vehicle Guide**

Managed by EPA, this guide helps consumers choose the cleanest and most efficient vehicle that meets their needs. The guide rates cars and trucks according to their emissions and fuel economy performance and provides consumers with information on how to make environmentally-informed choices when purchasing a vehicle. Consumers can select a vehicle model, determine how clean it is relative to other vehicles, and comparison shop for similar vehicles.

## **Best Work Places for Commuters**

Established by EPA and DOT the Best Work Places for Commuters program is designed to address limited or expensive parking, reduce traffic congestion, improve employee recruiting and retention, and minimize the environmental impacts associated with drive-alone commuting. EPA and DOT provide tools and guidance necessary to help U.S. employers of any size incorporate commuter benefits into their standard benefits plans, reap financial benefits, and gain national recognition.

## **It All Adds Up to Cleaner Air**

It All Adds Up to Cleaner Air is a public education and partnership-building initiative developed by DOT's Federal Highway Administration and Federal Transit Administration and EPA's Office of Transportation and Air Quality to assist with regional, state, and community efforts to reduce traffic congestion and air pollution. The program informs the public about the connection between their transportation choices, traffic congestion, and air pollution. The program also emphasizes convenient actions people can take to improve air quality and reduce congestion such as fueling in the evening and combining errands in a single car trip. Participating communities receive guidance and technical assistance for developing successful outreach campaigns, including free, high-quality promotional tools and evaluation resources to measure the effectiveness of the initiative.

## **MARYLAND'S RESPONSE**

Maryland's approach to addressing air pollution from mobile sources consists of emissions testing and vapor recovery technology on vehicles. Maryland also has a variety of voluntary programs that provide state and local governments with mechanisms to reduce air pollution from mobile sources.

### **Diesel Vehicle Emissions Control Program**

On July 10, 2000 Maryland State Police began testing heavy-duty diesel vehicles for exhaust smoke opacity. Diesel trucks and buses with a gross combination or gross vehicle weight rating of over 10,000 pounds are subject to testing of the vehicle's exhaust emissions. Proper maintenance of the vehicle can prevent excessive smoke. Smoke opacity is representative of the amount of particulate matter present in diesel exhaust.

### **Transportation Control Measures**

Under Section 110 of the CAA, states are credited with emission reductions for each successful Transportation Control Measure (TCM) they implement. TCMs are projects implemented by a locality to adjust traffic patterns or reduce vehicle use in order to reduce vehicular emissions of air pollution.

An example of a TCM in Maryland is the Guaranteed Ride Home program (GRH), which promotes voluntary employer-based programs to ensure employees who carpool or use mass transit have a ride home in case of emergency or unscheduled work need. Other examples include the traffic islands in Prince George's County that reduce vehicle speed and traffic volume in residential areas, measures replacing suburban transit buses with new diesel transit buses that are cleaner than older buses, and the construction of park and ride facilities to provide primarily suburban commuters a central place to park their cars as they use public transportation.

In addition to these established TCMs, there are a number of TCMs proposed in Maryland's most recent SIP. These projects include proposals to build 1300 park-and-ride spaces for a garage near the Grosvenor Metrorail Station, the construction of bike facilities in suburban Maryland, and buying new MARC coaches.

### **Transportation Emission Reduction Measures**

Transportation Emission Reduction Measures (TERMs) include ride-sharing and telecommuting programs, improved transit and bicycling facilities, and clean fuel vehicle programs. TERMS are included in a region's Transportation Improvement Program (TIP). The TIP reflects the goals of the region's long-range transportation plan. In Maryland, regional transportation organizations, which develop the TIP, include the Baltimore Metropolitan Council (BMC), comprised of elected executives from Baltimore

City and Anne Arundel, Baltimore, Carroll, Harford and Howard counties, and the Metropolitan Washington Council of Government (MWCOG), which is a regional organization of 19 local Washington government.

## **Mass Transportation Infrastructure**

Public buses and a light rail system comprise Baltimore's mass transportation infrastructure. MDOT is investigating and implementing projects that would improve the reliability of the public bus and light rail systems. For example, MDOT began the Light Rail Double Track Project on October 4, 2004. This project would double the light rail track 9.4 miles. MDOT asserts that this project would enhance service reliability, allow service to operate in either direction on one track if the other track is not operational, and allow for routine maintenance to occur during the day rather than at night.

The Maryland Department of Transportation (MDOT) is studying alternatives to Maryland's current mass transportation infrastructure by working on a new initiative called Bus Rapid Transit (BRT) which would integrate rail and bus services. Boston, Massachusetts; Pittsburgh, Pennsylvania; and Ottawa, Ontario have already implemented BRT projects. Buses may run on clean or alternative fuels and have special "running ways" that are free of conflicting traffic. BRT is being considered in several high volume areas throughout Maryland including a 14-mile corridor in Montgomery and Prince George's Counties that would connect Bethesda, Silver Spring, and other surrounding areas; a 10-mile Baltimore City and County corridor connecting Woodlawn to Baltimore to Fells Point; a four-mile Baltimore City corridor connecting downtown to northern areas such as Morgan State University.

## **Public Education**

Commuter Choice, Clean Air Partners, and Commuters Connection are three programs in Maryland that emphasize increasing public awareness and participation in reducing ozone. Employers who participate in the program may develop a commuter benefits program tailored to their individual needs. There are federal tax incentives available to employers through the Transportation Equity Act and state tax credits available through the Maryland Commuter Choice Tax Credit so that employers can offer employees tax-free transit and vanpool benefits for commuting to work.

Clean Air Partners program is a public/private ownership chartered by the Metropolitan Washington Council of Governments (MWCOG) and the Baltimore Metropolitan Council (BMC) to heighten awareness concerning individual contributions to air pollution and encouraging the public to take voluntary action to reduce ground-level ozone and to reduce exposure to ozone. Clean Air Partners is especially interested in the contributing factors that create ground level ozone and particulate pollution: automobile emissions, gasoline-powered lawnmowers, garden equipment, solvent-based consumer products and oil based paints. The partnership focuses on voluntary actions that people can take to reduce exposure and production of ozone and particle pollution. Some of the recommended measures include limiting driving during Code Red days,

using public transportation, deferring mowing lawns with gasoline-powered mowers, and avoiding the use of solvent based products and oil based paints.

Finally, Commuter Connection is a regional network of transportation organizations coordinated by the MWCOG. Commuter Connection provides information for commuting options for those individuals who work or live in the Metropolitan Washington, D.C. area, to allow them to make an informed decision about how they travel to work. Also, Commuter Connection helps employers in the Metropolitan Washington D.C. area establish commuting benefits and assistances program for those employees. Commuter Connection supports various commuting programs such as teleworking, vanpooling, and carpooling.

## **SECTION FOUR: STATIONARY SOURCES**

### **Overall Contributions**

Roughly 48.3% of Maryland's VOC emissions and 60.8% of Maryland's NOx emissions are from stationary sources. The majority of NOx emissions are derived from coal, oil and natural gas-fired power plants. The majority of VOC emissions are derived from dry cleaners and the use of paints and solvents.

### **Power Plants**

Maryland's largest stationary source contributors to NOx pollution are its 16 coal, oil, and natural gas-fired power plants. Power plants use general types of technologies used to reduce NOx emissions: staged combustion and post combustion removal. Staged combustion involves the use of low NOx burners (LNBs) to reduce NOx emissions by 30 to 55%. Advanced stage combustions use overfire air and gas or coal reburning to achieve more substantial reductions. The post-combustion removal process involves the use of Selective Catalytic Reduction (SCR) technology which reduces NOx emissions up to 90%. Selective Non Catalytic Reduction (SNCR) technology is a less effective post-combustion removal process that reduces NOx emissions up to 50-60%.

SCR is the most effective pollution reduction technology. It is required on all new power plants, but older plants are exempt, or "grandfathered." One Maryland power plant has installed SCR voluntarily. Some of the largest emitters of NOx pollution, such as the CP Crane and Chalk Point plants, have failed to install SCR technology. Although state officials have praised the Mirant consent decree (discussed in more detail below) as a breakthrough on NOx pollution, the decree requires Mirant to install SCR on one plant located in Morgantown. The other Mirant plants, Dickerson and Chalk Point, are required to install additional pollution controls. However, the specifics of these controls, such as what types of controls will be used and how effective they will be, has not yet been developed.

Although SCR has not been placed on many Maryland plants, it will be placed on plants in other states that contribute to Maryland's transport pollution problem (further discussed below). MDE believes the placement of SCR on more than 50% of the coal-fired operations in five Midwest states by 2005 will help alleviate air quality degradation in Maryland.

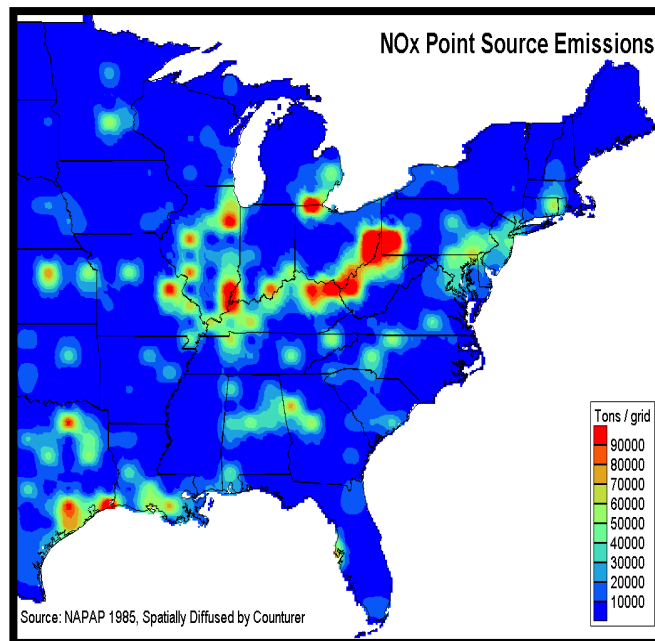
Rather than SCR, other Maryland plants have installed low NOx burners or other forms of "reasonably available control technology" (RACT) on utility, industrial, and commercial fuel burning equipment. However, there are several Maryland plants that have not installed any pollution control technology. While it is important to reduce emissions from the main contributors of NOx pollution, Maryland must control pollution from its smaller facilities as well in order to make significant air quality improvements.

<b>Maryland Facility</b>	<b>Facility Owned by</b>	<b>NOx emissions tons per year for 2003</b>	<b>NOx Pollution Reduction Technology</b>
AES Warrior Run	AES Enterprise	483	Selective Non Catalytic Reduction
Brandon Shores	Constellation Energy Group	13043	Low NOx Burner Technology
CP Crane	Constellation Energy Group	10849	Overfire Air and Combustion Modification/Fuel Reburning
Chalk Point	Mirant Corporation	13450.8	Low NOx Burner Technology
Dickerson	Mirant Corporation	5561	Low NOx burner technology
Gould Street	Constellation Energy Group	77	None
Herbert A Wagner	Constellation Energy Group	6298	Selective Catalytic Reduction
Meadwestvaco Luke Mill	Westvaco Corporation	3809	Selective Non Catalytic Reduction
Morgantown	Mirant Corporation	17830	Low NOx Burner Technology
Panda Brandywine	Panda Energy	82	None
Perryman	Constellation Energy Group	91	None
R Paul Smith	Allegheny Energy Group	987	Low NOx burner technology
Riverside	Constellation Energy Group	28.5	None
Rock Springs Generating Facility	Old Dominion Electric Cooperative	41	Dry Low NOx burners
Vienna	NRG Energy	199.2	None
Westport	Constellation Energy Group	.9	None

**Source: U.S. EPA Clean Air Market Programs, <http://cfpub.epa.gov/gdm/index.cfm?fuseaction=emissionquickreports.FacilityEmissionsByState>.**

## Transport Pollution

In addition to in-state power plants, transport pollution is a significant contributor to ozone problems in Maryland. There are three types of transport pollution: long-range, short-range, and night-time. Long-range pollution from power plant emissions in the Ohio River Valley and other parts of the Midwest is transported into Maryland by wind and weather patterns. Maryland's geographic location places it the "air pollution crossroads" since air pollution floats into the state from the west and the south. Sometimes the air pollution Maryland transports to the north actually "re-circulates" back to us.



### Source: MDE Role of Ozone Transport June 2004

Short-range ozone pollution, which circulates from Central Virginia to Baltimore and then to Pennsylvania, comes from car emissions, area sources, and stationary sources which float to the Northeast and add to high ozone levels downwind. Night-time transport pollution originates from low level jet plane emissions created in the Southeast that are funneled northward by the Appalachians from the west and the Atlantic Ocean from the east. Wind speeds of up to 40mph can move ozone pollution hundreds of miles overnight.

In power point presentations and newsletters, MDE officials note that during the ozone seasons, 69% of the air pollution contaminating Maryland comes from long-range transport. This assertion creates the impression that the state's ozone problems are primarily caused by long-range transport from out-of-state sources. Because of the 69% figure's importance in MDE officials' explanation of the state's ozone problems, we

asked for an explanation of how it was calculated from both MDE and EPA experts. MDE officials stated that they believe the overall figure and the conclusions drawn from it are accurate, although they acknowledged that transport pollution may fluctuate between 50-80% on any given day. They said that the calculations done to support the 69% figure were originally done by the University of Maryland Meteorology Department, using EPA models and data, and they urged us to contact those scientists for a further explanation of these figures. Unfortunately, our efforts to set up an appointment with the scientists were not successful.

Since MDE officials attributed the underlying data and modeling to EPA, we asked EPA officials about their view of the 69% figure. EPA expressed serious reservations both about the figure and the implications MDE draws from it. They said they are unable to verify the information and models used to derive the 69% estimate, although the data is likely to be outdated because of improvements made by Midwestern utilities pursuant to the NOx SIP call. EPA officials agreed that transport pollution could range between 50 to 80%. However, they emphasized that the lower end of this range is the most typical.

EPA officials observed that MDE's concern about transport pollution should not distract attention from the fact that Maryland could do more not only to improve air quality within the state but to reduce Maryland's export of pollution to other locations. In particular, EPA officials stated that Virginia was taking stronger measures to control pollution from power plants than Maryland and that officials from the two states had argued about these disparities in a meeting with EPA officials.

## **Area Sources of Pollution**

Area sources are also a large contributor of ozone precursors. Area sources are defined as sources that emit less than 10 tons per year of criteria or hazardous air pollutant or less than 25 tons per year of a combination of pollutants. The majority of these emissions come from facilities such as dry cleaners, small boilers, and degreasing machines, as well as from consumer and commercial use of paints, solvents, and household products. Although area sources individually generate a small amount of emissions, their collective emissions are detrimental, particularly because a large number of sources are located in heavily populated areas such as Baltimore.

A large majority of state resources are spent on inspecting and monitoring 200 of the largest emitters (more than 95%) of all stationary source pollutants. These large emitters consist of power plants, paper mills, and incinerators. Meanwhile so-called "low impact" facilities are routinely neglected. There are 10,909 such facilities in Maryland and only 714 were inspected in fiscal year 2004. [http://www.mde.state.md.us/assets/document/AboutMDE/enf\\_comp\\_04.pdf](http://www.mde.state.md.us/assets/document/AboutMDE/enf_comp_04.pdf). That translates into 10,195 uninspected low impact facilities with MDE officials meeting only a 7% inspection coverage rate. MDE officials say they would do more but are constrained by available resources. MDE's operating budget was cut by about 2% in fiscal year 2005. For the past three

fiscal years, the enforcement appropriation has remained at around 10% of the operating budget. [http://www.mde.state.md.us/assets/document/AboutMDE/enf\\_comp\\_04.pdf](http://www.mde.state.md.us/assets/document/AboutMDE/enf_comp_04.pdf).

MDE has targeted certain low impact facilities, such as gas stations and dry cleaners, for increased inspections. The results show high levels of non-compliance at these facilities, particularly with record keeping and reporting requirements.

## **FEDERAL RESPONSES**

### **NOx SIP Call**

States are required to amend their SIPs when additional emission reduction measures need to be implemented. CAA § 110(k)(5) further authorizes EPA to call for SIP revisions whenever it finds an existing plan is “substantially inadequate to attain or maintain the relevant [NAAQS], to mitigate the interstate transport of pollution, or otherwise to comply with the Clean Air Act.”

EPA issued the most recent NOx SIP Call in 1998 at the urging of eastern states that could not achieve NAAQS simply by controlling emissions within their own state. The NOx SIP Call requires 19 states and the District of Columbia to revise their SIPs to employ more stringent control strategies aimed at reducing NOx emissions. The SIP Call seeks to reduce NOx emissions by 1.2 million tons by 2007; EPA estimates that it will reduce affected power plant emissions by 80% during the ozone season.

The rule gives each state an emissions target, but also gives the states the flexibility to determine how to meet these reductions, so that the states can select the most cost-effective control options. All affected states are required to implement emissions controls by 2004, but Maryland, along with other Northeastern states, began reductions in 2003. Affected states had the option to participate in the NOx Budget Trading Program. Under this program, a NOx cap is established that can be met by trading. The affected sources can buy or sell pollution credits to meet their requirements.

### **Ozone Transport Commission**

The 1990 CAA Amendments created the OTC to address transport pollution that plays such a central role in causing non-attainment. The OTC is comprised of state air pollution control officials from eleven Northeast and Mid-Atlantic states including Maryland and the District of Columbia. Congress recognized that ozone travels freely across state lines and for the first time mandated by statute that regional approaches be used to reduce ozone levels. The role of transport pollution in causing Maryland's ozone problems make regional efforts like the Ozone Transport Commission (OTC) absolutely critical for the states.

The OTC's most significant contribution to date in reducing interstate ozone pollution from stationary sources occurred in September 1994, when it adopted a Memorandum of Understanding (MOU) signed by all member states (except Virginia) to reduce NOx emissions from utilities and large industrial boilers. In early 1999, a significant phase of the MOU was put into motion with the initiation of the OTC NOx Budget Program, which helped member states reduce NOx emissions through a cap and trade program. In 2003, the OTC program was replaced by the larger OTC NOx Budget Trading Program (NBP). The NBP involves an allowance trading system which harnesses free market forces to reduce pollution, similar to the U.S. EPA's Acid Rain Program. Under this program, covered sources were allocated allowances by their state governments. Each allowance permits a source to emit one ton of NOx during the control period (May through September). Allowances may be bought, sold, or banked. Any person may acquire allowances and participate in the trading system. Each source must comply with the program by demonstrating at the end of each control period that actual emissions do not exceed the amount of allowances held for that period. However, regardless of the number of allowances a source holds, it cannot emit at levels that would violate other federal or state permit limits.

Twenty-one states and the District of Columbia are participating in the program or will do so in future years. States participating in the NBP during its first year of operation reduced NOx emission by more than 30% from 2002 levels. This reduction represents a 90% decrease from 1990 levels when NBP reductions and other NOx control programs are considered. States that did not enter the program until 2004 reduced NOx emissions 50% compared to 1990 levels.

As described above, the OTC has also taken action to reduce motor vehicle emissions by implementing the California Low Emission Vehicle (LEV). In both instances, the OTC's regional approach helped states muster the necessary leverage to achieve significant emissions reductions. The OTC's LEV efforts have not only benefited member states, but ultimately led to a national LEV Program. In 1998, EPA issued a final rule requiring all vehicle manufacturers to implement the LEV Program by Model Year 2001. EPA estimated that LEV vehicles would be 70% cleaner than earlier models.

The OTC routinely files comments on EPA regulatory initiatives and these comments have proved far more influential than individual state comments would have been. For example, in January 2002, the OTC submitted comments to EPA on the proposed non-road engine rule covering large spark ignition, recreation, and marine diesel engines. The OTC strongly urged EPA to establish standards that would give manufacturers an incentive to develop better pollution control devices, adequately protect public health, and move toward cleaner engines. In September 2002, EPA adopted first-time emissions standards for non-road diesel engines, adopting most of the OTC's suggestions.

## **Technology Standards**

Under the CAA, any new stationary source constructed in a non-attainment area must employ Lowest Achievable Emissions Rate (LAER) technology. In addition, the new emissions (for the non-attainment pollutant) must be offset by even greater emissions reductions from existing sources elsewhere in the area. In other words, emissions from one source must be offset by reduced emissions at another location. As the degree of severity of non-attainment increases, the amount of required offsets increases. These offsets range from a 1.1 to 1 ratio for marginal ozone non-attainment areas, to 1.5 to 1 for extreme non-attainment areas.

All existing major emissions sources in a non-attainment area must employ Reasonably Available Control Technology (RACT), installing a minimum level of pollution control technology. In addition, when existing major sources that were built many years ago make significant modifications to their facilities, they must upgrade to the technology-based standards that apply to new sources. This process is called “New Source Review” or NSR.

The CAA originally exempted (or “grandfathered”) many of these plants from adding pollution control technology because it thought that they would close down within a reasonable timeframe. However, utilities have managed to keep such plants operating, often by making major modifications and repairs. Utilities resist the application of NSR to such modifications because installing pollution control technology is more expensive. Under the Clinton Administration, EPA brought an enforcement action against several utilities, alleging that they had illegally avoided NSR. NSR regulations and efforts to enforce these regulations by EPA and Northeast states, including Maryland, against Midwest power plants have helped to reduce ozone transport from that region. However, under the Bush Administration, EPA has substantially relaxed regulatory controls.

## **Clear Skies and the Clean Air Interstate Rule**

The cornerstone of the Bush Administration's CAA policies is a proposal called the Clear Skies Initiative. The Initiative would set nationwide pollution caps on sulfur dioxide, NO<sub>x</sub>, and mercury. EPA predicts that the Initiative will result in major cuts in pollution from electric generators: reducing sulfur dioxide by 73%, NO<sub>x</sub> by 67%, and mercury by 69%. The proposal is controversial for a number of reasons, including the fact that the Initiative would exempt public power plants from NSR, and would allow mercury trading. In addition, internal EPA assessments demonstrate that the Initiative will allow more than one and one-half times as much NO<sub>x</sub> for nearly a decade longer than the current CAA (2010-2018) and one-third more NO<sub>x</sub> after 2018.

When legislation to implement the Clear Skies Initiative did not make progress in the last Congress, EPA announced that it would attempt to implement the key provisions of the proposal administratively. The primary product of these efforts is the Clean Air Interstate Rule (CAIR) which would allow states to meet SIP requirements using a cap-

and-trade program. Under the new rule, EPA will require each state to submit a SIP showing attainment of the specified emission reductions using any controls the state prefers, including trading programs. If a state wants to impose controls on electric utilities, however, it must do so through a trading program. According to EPA, by 2015, NOx emissions from the electric power sector would be 65% below today's levels.

EPA's proposed rule specifically addresses interstate transport of ozone and sulfur dioxide. The rule requires 29 upwind states, including Maryland, and the District of Columbia to create a SIP that specifically meets the Act's requirement of not contributing significantly to sulfur dioxide and NOx non-attainment in downwind states. EPA proposed the rule because it predicts that many areas that implement local ozone controls will still be unable to meet the eight-hour ozone standard by 2010 unless upwind emissions are controlled.

In the wake of the 2004 Presidential election, the Bush Administration has revived its efforts to get Congress to adopt the Initiative. Recent trade press reports indicate that the EPA has put CAIR on hold, fearing that it might take pressure off Congress to enact such legislation. Federal efforts to further control NOx and sulfur dioxide are therefore once again in flux, a circumstance that will provide additional motivation to states to pursue their own initiatives.

## **Permitting Programs**

The CAA created a comprehensive permitting system for all major and minor stationary sources of air pollution. Major sources are distinguished from minor sources solely on the basis of the total tons of emissions they release annually. In general, major sources emit more than 100 tons per year, and minor sources emit less than 100 tons per year, but in some non-attainment locations in Maryland, major sources are defined as sources emitting more than 25 tons annually. Title V of the CAA establishes a new permitting program for major sources, which is designed to strengthen the accountability and enforceability of standards set under the Act.

EPA initially approved MDE's Title V program in 1996 and granted final approval of the program in 2003. As of June 30, 2004, 138 of the 165 facilities requiring Title V permits had been issued permits. Eighty-four percent of such facilities have received Title V permits while 16% of such facilities have not been issued Title V permits. Maryland has issued the lowest percentage of Title V permits among EPA Region 3 states (Maryland, Pennsylvania, Virginia, and West Virginia) and the District of Columbia.

## **MARYLAND'S RESPONSES**

### **OTC and NOx Budget Program**

As explained above, the NOx Budget Program was originally established by the states in the OTC to reduce NOx emissions region-wide as a part of each state's effort to attain the national ambient air quality standard (NAAQS) for ground level ozone. OTC supports a cap and trade program for NOx which would cap NOx emissions at 1.87 million by 2008. This program is a top priority for MDE. In 2003, NOx emissions were 18% less than the number of allowances allocated. These emissions were also 30% less than 2002 emissions. MDE also supports OTC's approach to multi-pollutant legislation for electrical generating units.

### **Mirant Consent Decree**

After Mirant's Alexandria plant violated its NOx emissions limit in 2003, several federal and state air quality claims were brought by Maryland, Virginia, the EPA, and the Department of Justice against the company. The decree was significant since all three jurisdictions worked cooperatively to enforce air legislation against a private company. The consent decree requires Mirant to install SCR technology on the Morgantown plant starting in 2004. It also establishes a declining cap on NOx emissions for all four plants and annual reductions are required from each plant until 2010. In addition, Mirant has agreed to pay a civil penalty that will be divided between Virginia and the federal government.

Since two of the Mirant plants are the biggest sources of NOx pollution in Maryland (Chalk Point emitted 13,450.8 tons of NOx and Morgantown emitted 17,830 tons of NOx in 2003), MDE estimates that the consent decree will reduce annual Maryland emissions from coal-fired plants by nearly 65% and by over 70% during the summer ozone season.

Mirant filed for bankruptcy protection in July of 2003 and later suspended its property tax payments to local jurisdictions in Maryland and Virginia. However, Mirant officials claim the company's financial troubles will not prevent it from paying the civil penalty or complying with the pollution control requirements under the consent decree. The consent decree must first be approved by the federal bankruptcy court handling Mirant's case before it can be enforced.

### **Area Source Regulations: Consumer Product Rule**

As described earlier, air pollution from area sources originates from small industrial and commercial sources as well as individual activities performed by the

general population. Consequently, MDE has developed several VOC-reduction regulations.

For example Maryland's open burning ban is primarily done to dispose of brush, trees, and yard waste by developers and citizens. Emissions from such burning are controlled by an MDE regulation prohibiting open burning during the peak ozone period from June to August. Cold degreasing is an operation that uses solvents and other materials to remove oils and grease from automotive parts, machined products, and metal components. In 1995 MDE established regulations that require small degreasing operations (such as gas stations and auto body paint shops) to use less polluting degreasing solvents in "serious" and "severe" non-attainment areas.

One particular initiative that will help Maryland greatly reduce VOCs is the consumer products rule. Many consumer products sold for household and automotive use along with products intended for wholesale distributors emit VOCs from the evaporation of solvent contents in the products. A recent MDE measure requires the reformulation of these products to reduce their VOC content. Finally, the implementation of OTC rules for cleaner paints, consumer products, and gas cans requires the reformulation of about 80 different types of consumer products to reduce VOC content. The rule includes stipulations for labeling and reporting. Products affected by this rule include items such as air fresheners, carpet and upholstery cleaners, aerosol deodorants, general purpose cleaners, hairsprays, some laundry products, metal polishers, spot removers, and tire sealants.

## **Legislation**

The Maryland General Assembly passed renewable energy legislation earlier this year requiring a certain percentage of retail energy sales to be derived from renewable sources and this legislation is divided into two tiers. The Renewable Energy Portfolio Standard and Credit Trading Act states that Tier 1 sources may include solar, wind, and geothermal energy while Tier 2 sources include hydroelectric and poultry litter incineration. Tier 1 will require a 1% increase in 2006, followed by a 1% increase each year until 2018. The Tier 2 requirement will remain at 2.5 % until 2019 when Tier 1 will be increased to 7.5 %. Suppliers who fail to meet these requirements will have to pay 2 cents for each kilowatt hour shortfall from Tier 1 sources and 1.5 cents for each shortfall from Tier 2 sources.

## **SECTION FIVE: STAKEHOLDER VIEWS**

A crucial component of the methodology used to write this report was interviews with representatives of the public and private sector groups most concerned about Maryland's implementation of the law's requirements regarding ozone. We asked all of the stakeholders similar questions, with the understanding that their answers would be reported by the category of stakeholder to which they belong (e.g., MDE official, industry representative, environmentalist) without identifying the name of the individual who made the comment. Stakeholders expressed views on four facets of the ozone problem: (1) the state's status in achieving attainment; (2) the role of transport pollution in creating Maryland's problems; (3) the efficacy of state programs designed to achieve attainment; and (4) the role of federal programs in accomplishing these goals.

### **Status of Ozone Pollution**

Government and industry stakeholders contended that Maryland is making reasonable progress towards improving air quality and predicted that the state will reach attainment with the one-hour ozone standard by November 2005. In contrast, environmental groups predicted that Maryland will fail to achieve this goal. While environmentalists acknowledged that Maryland has taken several noteworthy steps to reduce ozone pollution, they argued that, overall, the state has not adequately addressed emissions of ozone precursors from either stationary or mobile sources.

Government officials and industry groups acknowledged that the decrease in ozone exceedances during the last two years is attributable to mild weather patterns. However, they also noted the importance of new technology controls that will be installed on Maryland and Midwest power plants in response to the NO<sub>x</sub> SIP call and NO<sub>x</sub> Budget Trading Program. In addition, these stakeholders believe that the state will continue to make good progress as existing programs or programs that are near implementation compel relevant sources to further lower their emissions.

Despite this optimism about the near-term, government and environmental stakeholders said that much more must be done to achieve compliance with the deadlines for the eight-hour standard in 2007 and 2010. State officials in particular expressed deep concern about Maryland's ability to meet the 2010 moderate non-attainment deadline for the eight-hour standard in the Baltimore and Washington, D.C. metropolitan areas. While they emphasized that overall emissions should decrease once new technologies and new regulations are implemented, federal and state officials added that it is difficult to predict to what extent ozone pollution will decrease until these new requirements are actually in place. State officials explained that since most of the larger sources of pollution are already under control, further reductions will require deeper incursions into the lifestyle of individual consumers and small businesses.

Industry stakeholders argued that large stationary sources have already done everything that can reasonably be asked of them to reduce emissions of ozone precursors, and warned that any further reductions should be extracted from other sectors, especially mobile sources. They said that cracking down on large stationary sources, including manufacturing facilities and power plants, would exacerbate the state's already negative business climate. Industry stakeholders uniformly believe that the primary source of Maryland's difficulties in meeting ozone deadlines is transport pollution from the Midwest, arguing that there is very little the state could or should do to address those problems.

Environmentalists disagreed, arguing that Maryland stationary sources both can and should reduce their emissions further, noting that there are only three power plants in Maryland that have installed Selective Catalytic Reduction to curb NOx emissions. Notably, EPA officials agreed with this assessment, pointing out that power plants in Virginia were far ahead of those in Maryland in taking steps to install this important technology. Environmentalists added that the failure to attain ozone standards cost the state large sums of money in lost productivity and health care costs. They also said that retrofitting power plants in a deregulated climate would have only a negligible effect on consumer electricity rates, although they acknowledged that for some plants, it might be difficult to install new technologies and maintain profitability.

## **The Role of Ozone Transport**

All stakeholders agreed that ozone transport contributes significantly to Maryland's air quality problems. They disagreed, however, about the extent of its effect on ozone non-attainment. As explained above, state government officials and industry groups contended that the primary reason Maryland is not reaching attainment is transport pollution from Midwestern power plants in the Ohio River Valley. Some industry stakeholders stated that because ozone transport is such a large contributor to Maryland's non-attainment problem, Maryland should not impose any new controls on its ozone sources. Federal officials and environmentalists said that while the impact of transport pollution was clearly a major problem for Maryland, its role had been exaggerated by state and industry representatives.

Environmentalists believe that government officials are dramatically overstating the role of transport pollution in an effort to avoid further regulation in Maryland. One environmentalist also pointed out that Maryland counties suffering the highest levels of ozone -- such as Garrett, Allegany, and Washington Counties -- are far from the path of transport pollution, and it therefore seems unlikely that Maryland's ozone problem can be fairly blamed on transport pollution. Environmentalists further argued that Maryland's positions on transport pollution exhibit a troubling double standard because Maryland does not acknowledge how much pollution it exports to neighboring states. MDE was unable to provide any concrete information on this point.

While they are convinced that MDE overemphasizes the importance of transport pollution, environmentalists said that Maryland and the federal government needed to

take a more proactive stance in persuading Midwestern states to address these issues. They noted the importance of Maryland's active participation in the Ozone Transport Commission, a consortium of Northeastern and Mid-Atlantic states working to achieve these and other goals. Environmentalists also said that the federal government must play a larger and more aggressive role in addressing transport pollution because, while the importance of the OTC is clear, it is difficult for the OTC to change behavior of states not participating in the commission.

## **Efficacy of Maryland Implementation**

Both MDE officials and industry groups argued that Maryland has adequately addressed the reduction of NO<sub>x</sub> emissions from stationary sources. MDE officials praised Constellation Energy for installing SCR technology at two of its plants, and also praised the reductions produced by the NO<sub>x</sub> SIP call. They further argued that the Mirant consent decree will provide additional reductions from power plants.

EPA officials agreed that the NO<sub>x</sub> SIP call had been effective in reducing emissions. However, they pointed out that the large majority of Maryland power plants had not installed SCR, in sharp contrast to plants in such neighboring states as Virginia. They noted that Virginia officials had expressed their frustration about this track record to MDE officials during a meeting with EPA officials.

While the Mirant consent decree has been hailed as a good step forward, one environmental organization pointed out that the company had just filed for bankruptcy and that, given its severe financial difficulties, there was no telling when officials at the plant would install the SCR technology required by the consent decree. Even if the provisions of the consent decree are satisfied, environmental organizations asserted that the majority of power plants in Maryland still do not have SCR or pollution-reduction technology.

As for emissions of VOCs, the other major category of ozone precursors, industry and environmental groups said that area sources, such as dry cleaners, metal refinishing shops and other relatively small businesses, are not regulated stringently enough. Industry stakeholders contended that MDE inspects most large facilities at least once a year and those facilities holding a Title V permit are inspected more often. But smaller area sources can go years without an inspection. Environmental groups expressed similar sentiments stating that there is little evidence that Maryland is stringently monitoring or enforcing the CAA against area sources. In response, MDE state officials emphasized that regional regulations have been enacted to reduce area source emissions. Several major rules such as the OTC Consumer products Rule and the Gas Can Rule have been adopted by MDE and placed in Maryland's SIP.

All stakeholders agreed that one of the biggest hurdles the state faces in improving air quality is MDE's lack of resources. State officials acknowledged that they could use more money for enforcement and compliance procedures since there is a disproportionate ratio between the number of air inspectors, about 18, and the number of

facilities requiring inspection, more than 11,000. Federal officials agreed with this sentiment, stating that Maryland has always strived hard to meet environmental regulations, but that MDE has never had enough money, resources, and manpower to do an effective job of implementing regulatory and enforcement programs. Environmental groups confirmed this assessment, noting that economic constraints and a lack of inspectors to monitor and enforce ozone regulations hobble Maryland's efforts to reach ozone attainment goals. Environmental groups also stated that resource constraints were a direct result of the Ehrlich Administration's lack of interest in addressing ozone pollution. One industry stakeholder stated that the MDE needs to recruit from a better pool of candidates by offering more competitive salaries, although the stakeholder admitted that the idea was not fiscally possible at this time.

Industry and environmental groups strongly agreed that more could be done to regulate mobile emissions. One industry stakeholder commented that even if all possible NOx reduction controls were installed on Maryland utilities, Maryland would still not attain ozone standards because without the VOC contribution of mobile sources, ozone would not be formed in the first place. Some industry stakeholders advocated doing more to get older cars off the road such as offering a guaranteed trade-in value for the car. One industry stakeholder suggested that Maryland should use the Virginia idea of allowing hybrids carrying single passengers to use HOV lanes.

Both groups agreed that the expired tax credit for the purchase of hybrid vehicles should be reinstated by the state. These stakeholders have also noted that one problem preventing people from buying more hybrids is the long waiting list to purchase them, stating that car companies should make more hybrids to meet the demand. All the environmental groups also advocated for the passage of clean car legislation that requires stronger tailpipe emission standards. The legislation did not pass during the last session of the General Assembly but is expected to be reintroduced this January. State officials contended that the federal standards adopted by Maryland, which include the Vehicle Inspection Emission Program and the National Low Emission Vehicle Program and Tier II emissions standards, are working well enough so there is not a strong need for adopting additional reduction measures. While state officials supported controlling mobile emissions, they opposed the Clean Car Bill in the last session of the General Assembly because they believed that more regional efforts are needed to address air pollution. State officials also stated they were reluctant to support the bill because it would be difficult to implement.

Environmental groups stated efforts must be made to curb sprawl and to minimize transportation projects that will result in a substantial increase in vehicle miles traveled (VMT). One environmental organization cited the Inter-County Connector as an example of a transportation project that would result in an increase of VMTs and ozone pollution. Environmental groups argued that Maryland should rely less on passenger vehicles and more on mass transportation.

By contrast, many industry stakeholders do not believe that Maryland's public transportation structure is convenient or cost-effective enough to serve most Marylanders.

Unlike the Washington, D.C., area, most Marylanders do not live close enough to light rail, subway, or MARC trains to make public transportation an efficient option.

State officials have discussed expanding and furthering improvements to public transportation options as well as improving commuter choice programs. In fact, Maryland will be spending \$2.5 million dollars on advertising commuter choice options on the radio, on buses, and in the local newspapers during the next year. However, they acknowledged that some of these avenues have been pursued in the past without much success because Marylanders enjoy driving their cars and are not too enthusiastic about using public transit options.

Some industry officials agreed with this assessment, stating that while the public claims to care about air pollution, its behavior does not conform to these clean air concerns. For example, one industry representative noted that on Ozone Action Days many people would still rather drive their cars than take the bus. Another industry stakeholder stated that short of social engineering, it would be very difficult to get the public to stop contributing to ozone pollution via mobile sources.

## **Efficacy of Federal Implementation**

While a broad cross section of stakeholders agreed that the implementation of federal programs have helped reduce ozone levels in Maryland, they emphasized the need for a more powerful federal role.

Federal officials strongly believe that programs such as the Tier II standards will play a large role in reducing mobile source emissions. EPA officials estimate that Tier II regulations will result in cutting mobile source emissions in half even if VMTs are incorporated into the estimate. By 2015, EPA officials also predict that there will be a 50% reduction of NO<sub>x</sub> emissions and 30% reduction of VOC emissions. In 2025, they say that NO<sub>x</sub> emissions will decrease by 80%, and VOC emissions will decrease by 50%. EPA officials also noted that if these trends continue, they could further reduce ozone pollution.

State officials emphasized the need for more national and regional efforts in reducing ozone pollution. They said that programs such as NO<sub>x</sub> Budget Trading Program are steps in the right direction, but state officials emphasized the need for uniform federal regulations that level out the playing field for all industries. Environmental groups agreed, stating that without the support of an active federal government in addressing ozone pollution, Maryland would not be able to adequately address ozone pollution. They suggested that the federal government provide Maryland with grants to expand monitoring of compliance with air pollution regulations.

Industry stakeholders supported the NO<sub>x</sub> Budget Trading Program, finding that it gave the biggest “bang for the buck” in terms of providing the largest amount of reductions at the least expense. Most industry stakeholders also mentioned that the Clean

Air Interstate Rule (CAIR) will significantly reduce ozone pollution because it will expand NOx trading. Between the NOx Budget Trading Program, the Tier 2 automobile standards and the CAIR rule, many industry stakeholders believe we should wait to see what pollution reductions can be made under these programs before new controls are imposed.

## SECTION SIX: RECOMMENDATIONS

Millions of Marylanders breathe unhealthy air that does not meet federal air quality standards. The 1990 CAA requires severe non-attainment areas to come into compliance by November 15, 2005. If an area fails to achieve this goal, the CAA triggers stringent penalties, including the imposition of mandatory fees on major stationary sources in non-attainment areas and possibly the imposition of the more onerous NSR requirements for extreme non-attainment areas, such as mandating highway construction bans or withholding highway funds. EPA, in an action that environmentalists challenged in June 2004, has decided to excuse severe non-attainment areas from compliance with the one-hour standard, asserting that the CAA gives the Agency the authority to replace the one-hour with the eight-hour standard. This interpretation of the statute means that the Baltimore and Washington, D.C. non-attainment areas are now focused on meeting deadlines for the eight-hour standard in 2007 and 2010.

Federal and state officials are cautiously optimistic that Maryland will, in fact, achieve attainment with the one-hour standard in 2005. They are far more concerned about the state's ability to improve air quality to the point that the state can meet the 2007 and 2010 deadlines for the eight-hour standard. The following recommendations are provided to assist Maryland in achieving those reductions. They fall into three major categories:

1. **Implementation.** Steps MDE must take immediately to improve its enforcement of CAA requirements.
2. **Legislation.** New authority MDE must have to carry out the CAA effectively.
3. **Federal and Regional Initiatives.** Steps Maryland, working with other states, and the federal government must take to improve air quality.

### Implementation

*The Maryland Department of the Environment needs significantly more resources to implement the Clean Air Act effectively.*

While recognizing the substantial strides the state has made toward improving air quality, this report documents what can only be described as daunting future challenges that will confront the state as we work toward achieving compliance with the eight-hour standard. The report also focuses on several shortcomings in MDE's efforts to implement existing requirements, casting doubt on its ability to expand such efforts.

Given the grave impact air pollution has on public health, there are few areas more deserving of additional resources than MDE's clean air programs. We urge the Governor and the General Assembly to consider raising permit fees or to find other revenue sources to bolster these programs. Even relatively small amounts of money would make notable differences. In the absence of such increases, we hope that MDE will consider reassigning its own scarce resources to make these programs more effective.

***MDE must repair its air monitoring stations in Baltimore City and expand monitoring in other counties where air pollution is a serious problem.***

Monitoring is the only objective method for verifying air quality. Maintaining and expanding the state's monitoring stations is the only way we can ensure that calculated pollution reductions are actually realized. While we understand the pressure MDE is under from a broad spectrum of interested parties, and we recognize the severe constraints on its resources, we recommend that it redouble its efforts to collect comprehensive monitoring results from across the state.

***The information provided on MDE's website regarding the monitoring stations must be updated far more regularly because the most recent information is derived from 2002.***

The worldwide web has become a vital tool for evaluating environmental conditions and the success of agencies like MDE in improving environmental quality. With so few years between CAA deadlines, posting up-to-date information on the web is crucial if it is to be used to achieve these goals.

***MDE must significantly improve its enforcement of air quality standards by increasing the number of inspectors in MDE's Air and Radiation Management Administration (ARMA).***

MDE has only 18 inspectors to monitor compliance at over 11,000 stationary sources. It does not have enough inspectors to adequately inspect sources for criteria pollutant emissions, New Source Review violations and, especially, the emission of VOCs and other hazardous air pollution. For instance, in FY 2004, air quality inspectors visited only 428 of Maryland's 11,000 sites, bringing only 22 penalty actions. MDE reported that it focuses on monitoring the major pollution sources since these sources contribute to 95% of the problem. However, the cumulative impact of area sources is a major factor in producing ozone non-attainment.

***MDE should provide more incentives to existing and potential employees to improve their performance.***

As we have repeatedly noted in other reports, Maryland's cumbersome civil service system is a major impediment to effective implementation of MDE's admittedly complex and challenging statutory mandates. Not only are state employees significantly

underpaid in relationship to counterparts in the federal and even the county government, senior managers can be fired at will, undermining their willingness to stay in public service. In our 2002 *Keeping Pace* report, for example, we noted that some technical experts employed by Maryland counties earned considerably more than the state officials who supervise them. *Keeping Pace*, <http://www.law.umaryland.edu/environment> at 132. These circumstances must be addressed if Maryland is ever to achieve full compliance with the major federal environmental laws.

MDE should also take advantage of its nationally ranked universities, providing incentives in recruitment of the best and the brightest from engineering, science, and law programs throughout the state. MDE should consider instituting an honors internship program to bring in students from a variety of graduate and professional programs to MDE for a summer. Successful students could be offered a job at the end of the summer.

***Maryland, as well as the federal government, should increase public education about the effects of mobile source pollution.***

Government has great difficulty in regulating consumer choices, but it can provide information to the public explaining the negative consequences of driving vehicles that are not fuel efficient and the detrimental consequences of not participating in emission reducing strategies. The public often does not make the connection between buying certain vehicles and negative environmental impacts. For example, several surveys indicate that the public overwhelmingly supports a cleaner environment. However, each year the percentage of individuals driving light trucks (SUVs, vans, pick-up trucks) increases. If citizens were better informed about light trucks' poor fuel economy, they might change their vehicle buying habits and purchase a greater percentage of fuel-efficient cars.

One novel way to encourage people to buy fuel efficient cars is by asking EPA to require all car manufacturers to estimate and display the projected fuel costs of each vehicle over a ten year period. This cost could be based on today's fuel prices and would be required to be displayed on the sales sticker on each car at all car dealerships. In addition, these programs should begin to dispel some of the criticisms about hybrid vehicles by, for example, explaining that they are as safe as SUVs or other vehicles. Finally, if MDE wants to increase public awareness regarding air quality issues, it needs to follow through and update its website on air quality information. Some of the information posted on the website is sufficiently outdated that it is not even applicable anymore.

***Maryland should consider reducing congestion through other planning methods and not by building or expanding highways throughout the state.***

In 2003, the transportation priorities for the Ehrlich Administration were the Inter-County Connector (ICC) and the Purple Line, to be constructed either as an "inner" light-rail route from Bethesda to New Carrollton or as an "outer" subway route circling the Capital Beltway. While it seems clear that the ICC will be constructed, the development

of the Purple Line seems to have stalled. Exclusive focus on projects such as the ICC will only increase the VMTs in Maryland, producing emission increases. To comply with the eight-hour attainment deadlines, Maryland must consider alternative transportation projects that do not increase VMTs such as the Purple Line.

***Maryland should make its public transportation system more efficient and more convenient.***

Maryland needs to make its public transportation choices more attractive to its residents and those who live in surrounding communities. For example, running the MARC train on the weekends as well as weekdays would relieve some of the traffic congestion on the highways between Baltimore and Washington, D.C. The light rail system in Baltimore City should require all users to pay before riding in order to increase public transportation revenues. Maryland should also increase the amount of parking space available at light rail stops.

## **Legislation**

***Maryland should follow Virginia's example and impose stricter standards for NOx on coal-fired power plants that have yet to install Selective Catalytic Reduction (SCR).***

In 2003, Maryland emitted more NOx than it was allotted under the NOx Budget Trading Program and had to acquire credits from other states. When we questioned this practice, MDE officials said that the power plants are entitled to buy credits under the SIP call and there is no reason to require further controls. However, Virginia took a more hard line approach in the Mirant consent decree. Virginia enjoined the Mirant power plant in Alexandria from buying any more credits until it stopped contributing to the pollution problem. If Maryland wants other states to cooperate in its efforts to clean up transport pollution, it must follow the golden rule of doing unto others as it would want others to do unto it. The state should implement similarly stringent measures for remaining power plants that have yet to install SCR.

***Maryland should pass the Clean Car Bill.***

Clean Car legislation modeled on California's more stringent requirements for motor vehicles sold in that state would build upon existing mobile source emission regulations and continue to significantly reduce emissions from mobile sources in Maryland. Given the difficulties the state will face in achieving necessary reductions from mobile sources in time to meet the 2007 deadline, deferring this legislation will only compound these problems.

One novel way to encourage people to buy fuel efficient cars that has not appeared in the Clean Car Bill is by asking EPA to require all car manufacturers to estimate and display the projected fuel costs of each vehicle over a ten year period. This

cost could be based on today's fuel prices and would be required to be displayed on the sales sticker on each car at all car dealerships. MDE should also provide current information concerning air pollution in Maryland.

## **Federal and Regional Initiatives**

***Maryland must stay actively involved in the Ozone Transport Commission (OTC).***

Because a significant portion of Maryland's ozone non-attainment results from nitrogen oxides (NOx) and volatile organic compound (VOC) emissions drifting across state boundaries, and because Maryland acting alone does not have sufficient political or economic clout to force out-of-state emissions reductions, only a regional approach to reducing interstate ozone transport has proven effective. The OTC's success in shaping regional and national policy results from the cumulative economic and political clout of its members.

***In order to develop a comprehensive picture of transport ozone pollution, Maryland must investigate how much ozone Maryland exports to surrounding states.***

Ozone transport into Maryland is an important component of ozone non-attainment. However, telling a one-sided story may distort an analysis of ozone transport. Maryland also exports pollution to other areas, including Pennsylvania and Delaware. While Maryland officials have an estimate of much transport pollution is coming into Maryland, there is no similar estimate for the amount of transport pollution being exported. In order to develop a comprehensive picture of transport ozone pollution and its effects on the state, Maryland should quantify how much ozone the state exports to surrounding states.

***Maryland should continue to exert all of its influence (alone and through the OTC) to prevent the federal government from delaying Clean Air Act enforcement and proposing rollbacks to the Clean Air Act.***

On November 22, 2002, EPA announced a final rule that effectively rolled back the CAA's New Source Review (NSR) program by relaxing air pollution control rules for 18,000 industrial sources. The enforcement of NSR, especially in the Midwest, is critical to improving Maryland's air quality. NSR requires older facilities to install modern pollution controls when making major modifications that substantially increase pollution. Maryland, along with 13 other states and several environmental groups, brought suit challenging this rule late last year. Maryland's participation in this multi-state litigation is a positive first step to prevent the implementation of this new rule. Maryland should continue to challenge and exert its influences over any other federal rules that will negatively impact air quality in Maryland.

***EPA and Maryland should encourage all states in the Chesapeake Bay Program to incorporate NOx reductions into Bay Program objectives.***

Even though air deposition accounts for nearly one-third of the nitrogen pollution causing impairments in the Chesapeake Bay, there has yet to be any coordinated effort between Bay states to decrease NOx both to improve air quality and water quality. Under the Chesapeake 2000 agreement, Bay states agreed to establish reduction goals for airborne nitrogen compounds. This goal has not been met. EPA and Maryland should ask all Bay states to reaffirm this commitment with specific deadlines and milestones.

***The U.S. Congress should expand the tax credits for utilities using renewable energy sources.***

The U.S. Congress should extend and expand the renewable energy tax credits for electric utilities set out in the Economic Security and Recovery Act of 2001. This law extended tax credits to utilities developing energy from wind, closed-loop biomass, and poultry waste facilities through December 31, 2003 and should be extended and expanded.

***EPA should impose stronger enforcement measures for not meeting attainment deadlines.***

If states fail to comply with the eight-hour standard and do not reach attainment, EPA should impose penalties or sanctions against them. Without any real penalty, some states will continue to procrastinate in making real ozone pollution reductions. For example, areas in severe and extreme non-attainment of the one-hour standard will be allowed to delay their achievement of ozone standards when the one-hour standard is revoked in June 2005. Imposing actual consequences for not meeting attainment deadlines would modify the CAA which only requires EPA to impose sanctions or other penalties if states do not show that they will meet the attainment deadlines. Sanctions should take the form of a reduction in federal highway funds and construction bans for those areas that do not meet the eight-hour standard due primarily to mobile source pollution.

Industry and government stakeholders will undoubtedly argue that such measures would gravely damage the state economically. Yet these objectives overlook the crucial fact that the adverse health effects caused by ozone pollution impose a tremendous, unacknowledged drag on the state's economy in terms of health care costs and lost productivity. Air pollution also threatens the heart of the state's economy, the Chesapeake Bay. In sum, bad air is very bad for business, as well as Marylanders' quality of life.

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## Appendix A: List of Acronyms

ALA	American Lung Association
CAA	Clean Air Act
CAFÉ	Corporate Average Fuel Economy
CAIR	Clean Air Interstate Rule
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
LEV	Low Emission Vehicle Program
LNB	Low NOx burner
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MVEB	Motor Vehicle Emission Budget
NAAQS	National Ambient Air Quality Standard
NLEV	National Low Emission Vehicle
NSR	New Source Review
NOx	Nitrogen Oxides
OTC	Ozone Transport Commission
PPB	parts per billion
RACT	Reasonable Available Control Technology
RFG	Reformulated Gasoline
SCR	Selective Catalytic Reduction
SNCR	Selective Non Catalytic Reduction
SIP	State Implementation Plan
TCM	Transportation Control Measure
TERM	Transportation Emission Reduction Measure
TIP	Transportation Improvement Plan
VMT	Vehicle Miles Traveled
VOCs	Volatile Organic Compounds

# Appendix B: List of Stakeholders

## GOVERNMENT

### FEDERAL:

#### US EPA Region III

Donald Welsh, Regional Administrator

Thomas Voltaggio, Deputy Regional Administrator

Judith Katz, Air Protection Division Director

### STATE:

#### Maryland Department of the Business and Economic Development

Arlis Melissartos, Secretary

#### Maryland Department of the Environment

George (Tad) Aburn, Program Manager, Air Quality Planning and Monitoring Program

Diane Franks, Deputy Program Manager, Air Quality Planning and Monitoring Program

Angelo Bianca, Deputy Director, Air and Radiation Administration

Brian Hug, Division Chief, Air Quality Planning and Policy Division

#### Maryland Department of Transportation

Office of Planning and Capital Programming

Nat Bottigheimer, Assistant Director

## INDUSTRY

#### Constellation Energy

Mary Dempsey, Manager, Public Affairs

Keith Cunningham, Director, General Communications

Ken Johnson, Manager, Environmental

#### Gordon, Feinblatt, Rothman, Hoffberger & Hollander, LLC

Michael Powell

**Maryland Chamber of Commerce**

Heather Hamilton, Vice President, Government Affairs

**Nelson & Associates**

Ron Nelson

**Perdue Farms, Inc.**

John Chlada, Vice President, Environmental Affairs

**Piper Rudnick LLC**

Deborah Jennings, Partner & Chair, Environmental Practice Group

**Potomac Electric**

James Potts, Vice President, Environment

**PUBLIC INTEREST GROUPS**

**Audubon Naturalist Society**

Neal Fitzpatrick, Executive Director

Dolores Milmoie, Maryland Conservation Associate

Brian Henry, ICC Campaign Coordinator

**Chesapeake Bay Foundation**

Kim Coble, Maryland Executive Director

**Cleanup Coalition**

Terry Harris, President

**MaryPIRG**

Chris Fick, Field Organizer

**Sierra Club of Maryland**

Charles Garlow, Political Chair