



# VOLATILE ORGANIC COMPOUND EMISSIONS: AN EVOLVING INFLUENCE ON THE REGULATORY LANDSCAPE AND ON PAVEMENT PRESERVATION

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# Outline

- Why & how air quality reg's continue to evolve
- Volatile organic compounds (VOC's): ozone, air quality, & human health
- History of AEMA interaction with Ozone Transport Commission (OTC)
- International Technical Committee reaction to OTC
- Examples of air quality management agency responses to shareholder concerns
- Summary: new business opportunities



## Why air quality reg's continue to evolve

### Economic impact of poor air quality & human health

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- Abundant academic research correlates air quality with human health
- 2007: 52 MM suffer from asthma worldwide
- 2007: 15 MM asthmatics in the U.S.; estimated annual care cost is \$1.5 B
- Federal & state air quality control agency decision making may be influenced by results of research from many quarters: academia, policy institutes, industry



## Regulatory agencies measure VOC's impact in health \$'s

### Public Health Benefits of Reducing Ground-level Ozone and Fine Particle Matter in the Northeast U.S.

A Benefits Mapping and Analysis Program  
(BenMAP) Study

Prepared by  
NESCAUM  
For  
The Ozone Transport Commission and  
The Mid-Atlantic/Northeast Visibility Union

January 15, 2008

**This two-year old BenMAP study used recognized models (CalGrid) to project the monetary benefit of more stringent (than current CAIR) restrictions on permitted levels of monitored air pollutants.**

**Findings indicated that over \$1.5 billion benefit (human health: mortality, hospital respiratory admissions, ER emergencies, school absences, worker productivity).**



Government view is:  $VOC = Health = Cost$

Regulatory agencies measure VOC impact in health dollars

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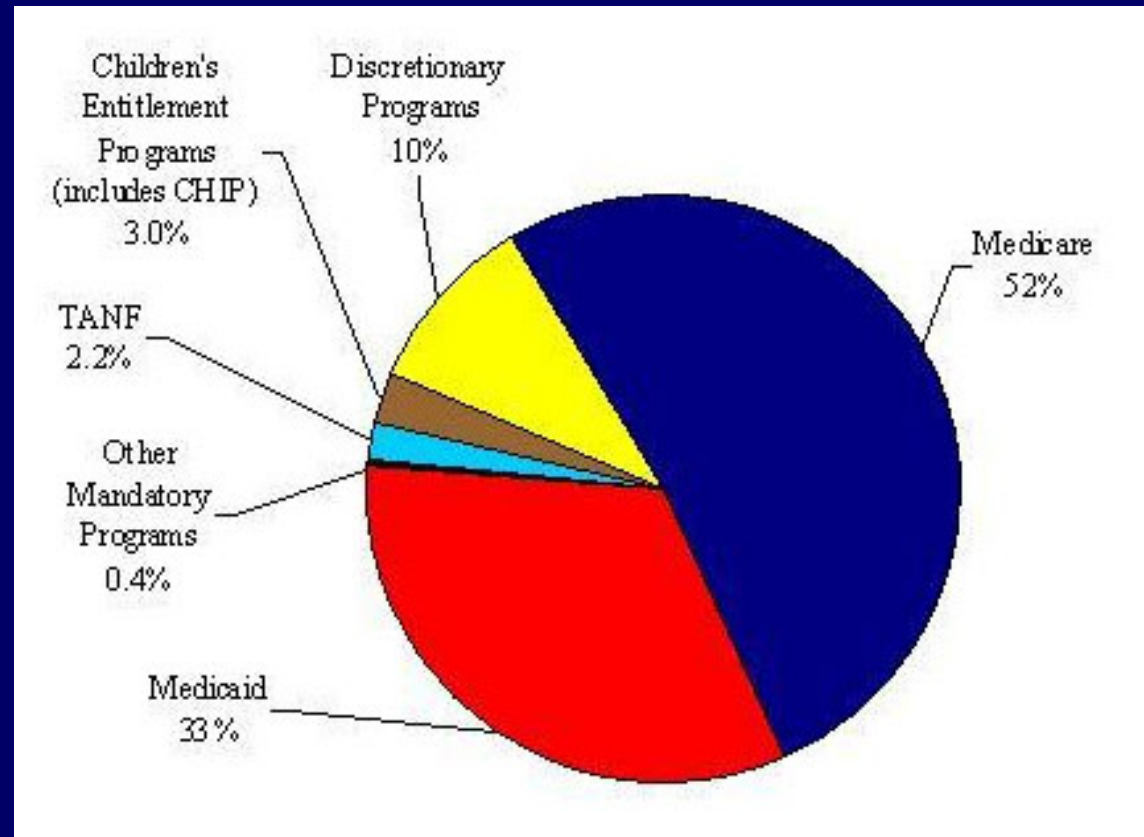


# Government view is: VOC = Health = Cost

Regulatory agencies measure VOC impact in health dollars

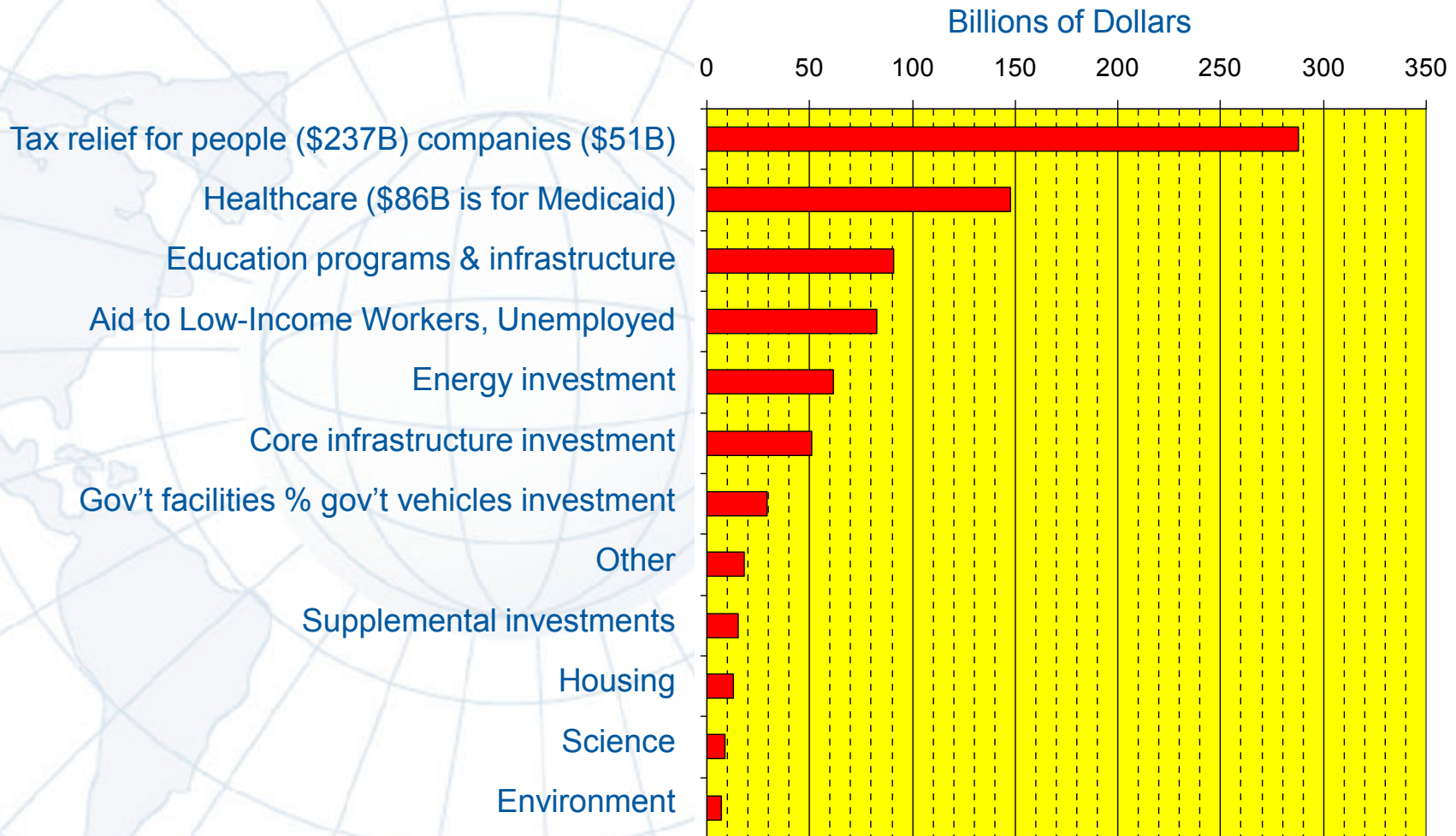
**President Obama's budget for the Dept. Of Health & Human Services FY 2010 includes**

**\$454 B to Medicare + \$288 B to Medicaid**





# FUNDS DISTRIBUTION TO MEET OBJECTIVES



Objectives of Stimulus

Where & how funds distributed

Funds for highways

Funds for maintenance

Caltrans example

What is next





# FUNDS DISTRIBUTION TO MEET OBJECTIVES

Tax relief for people (\$237B) companies (\$51B)

Healthcare (**\$86B is for Medicaid**)

Education programs & infrastructure

Aid to Low-Income Workers, Unemployed

Energy investments

**Core infrastructure investment**

Gov't facilities % gov't vehicles investment

Other

Supplemental investments

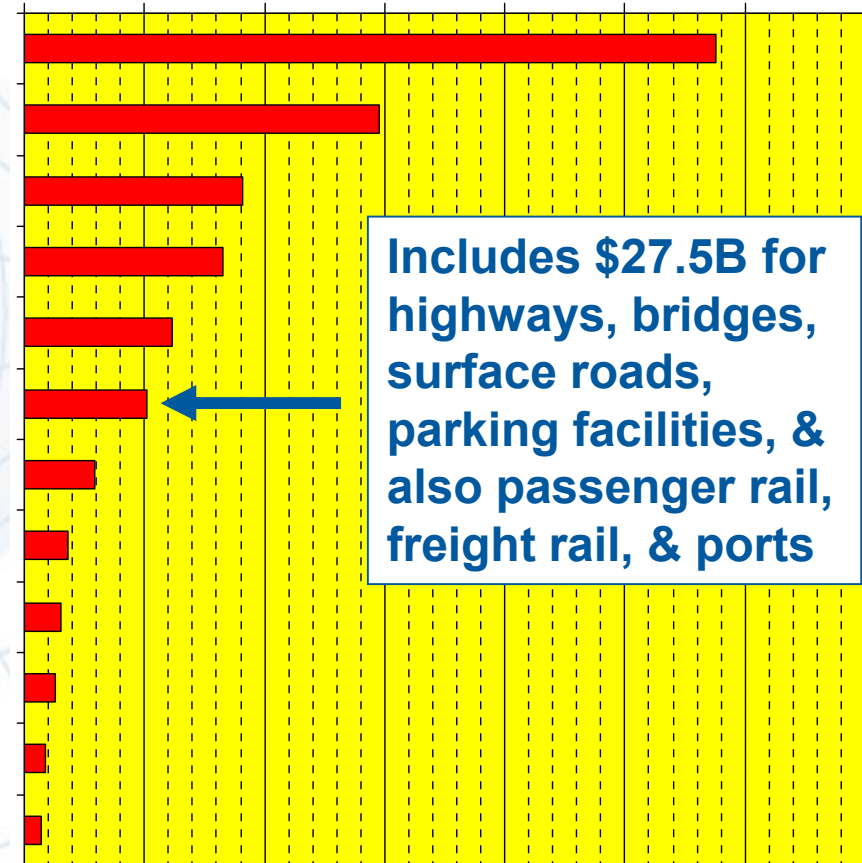
Housing

Science

Environment

Billions of Dollars

0 50 100 150 200 250 300 350



**Includes \$27.5B for highways, bridges, surface roads, parking facilities, & also passenger rail, freight rail, & ports**

Objectives of Stimulus

Where & how funds distributed

Funds for highways

Funds for maintenance

Caltrans example

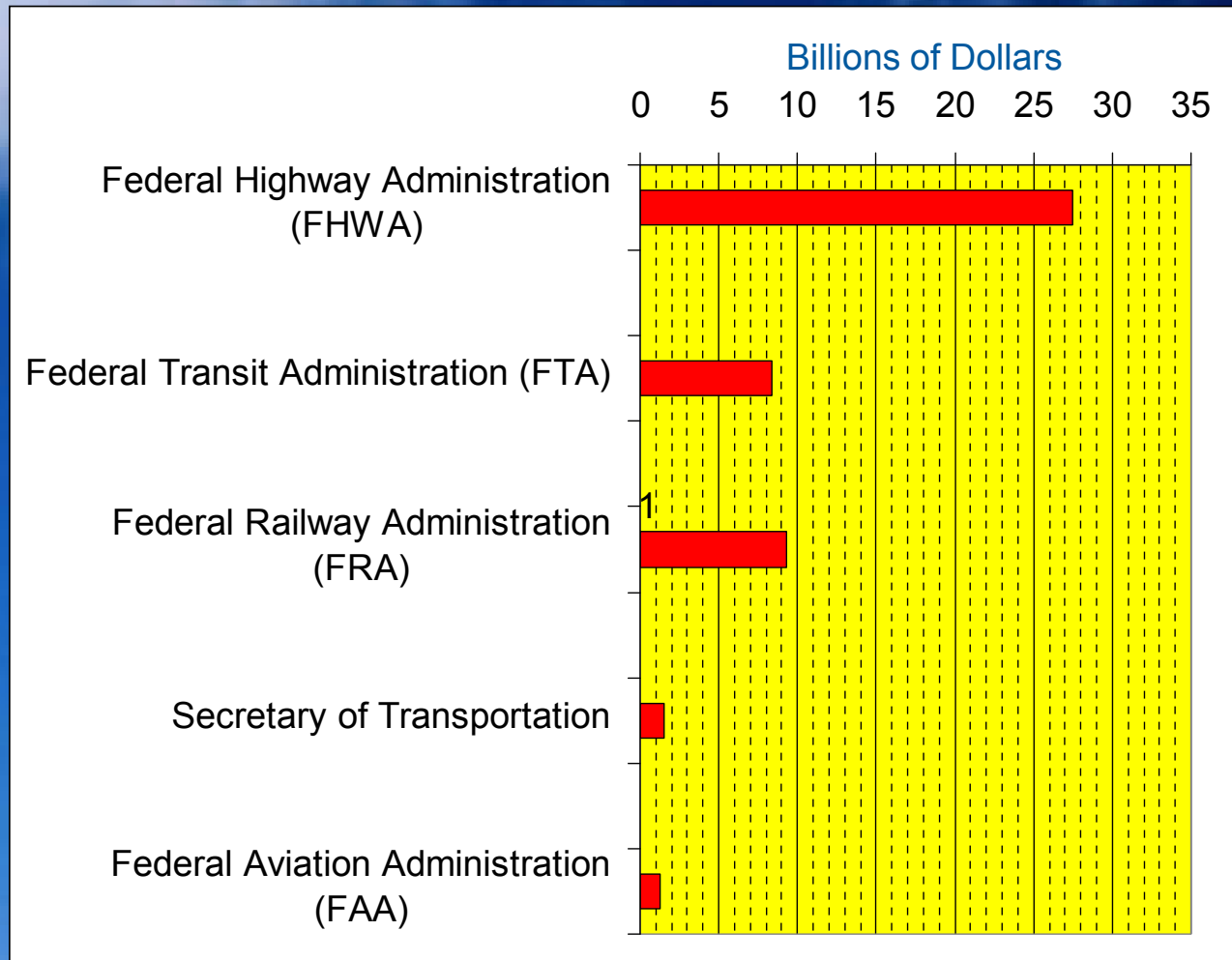
What is next





# DISTRIBUTION OF “CORE INFRASTRUCTURE” FUNDS

Agencies  
within  
the  
Department  
of  
Transportation  
(\$51B)



Objectives of Stimulus

Where & how funds distributed

Funds for highways

Funds for maintenance

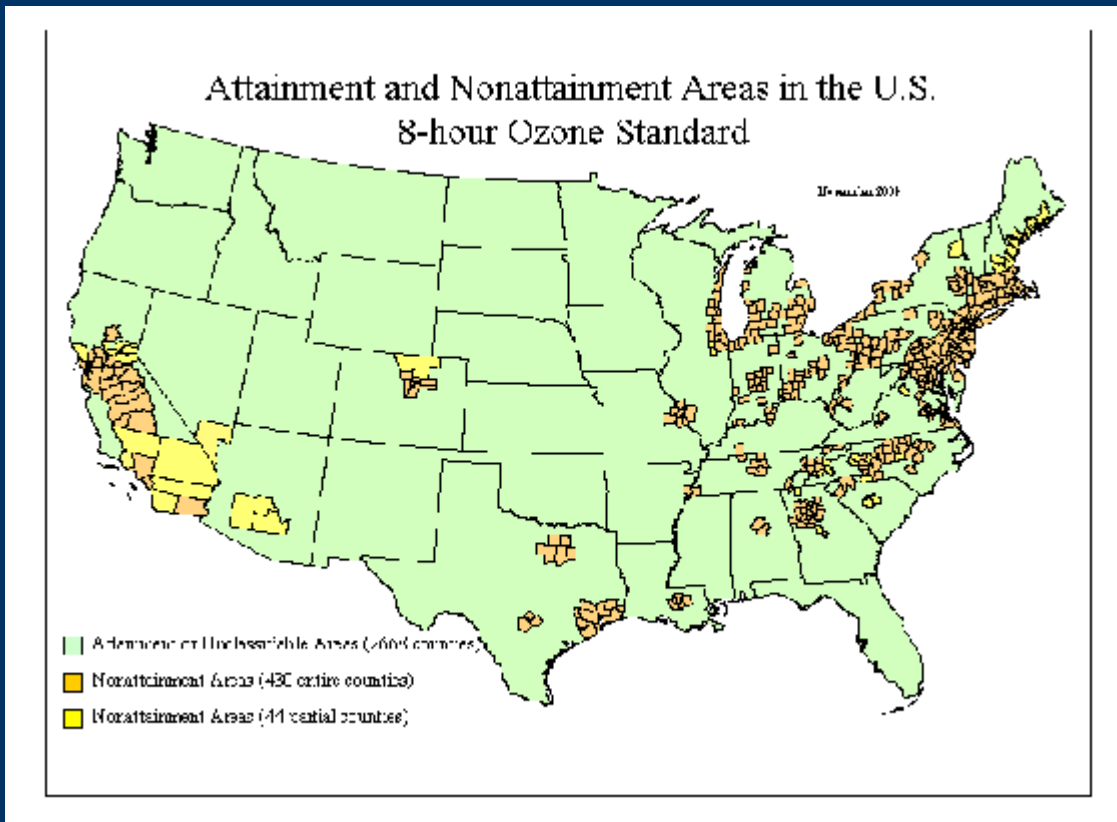
Caltrans example

What is next



# The long fuse of increasing regulatory restrictions

## Non-Attainment Zones in USA est'd by CAA of 1990



Analyses based on Federal standards for 8-h ozone (now, PM 2.5) levels of ozone, lead, CO, SO<sub>2</sub>, and PM-10.





# Air Quality Initiatives Strengthen Annually

## National Association of Clean Air Agencies (NACAA)

Transl

**NACAA**



**Select State:**  
Select one

**Environmental Quality, Air Quality Division**

**Contact Name:**  
Vinson Hellwig

**Contact Title:**  
Chief

**Address:**  
Michigan Department of Environmental Quality  
Air Quality Division  
Constitution Hall  
525 West Allegan Street  
Lansing, MI 48909

**Phone:**  
(517) 373-7069

**Fax:**  
(517) 335-6993





# Air Quality Initiatives Strengthen Annually

## Midwest Regional Planning Organization

Transl

**NACAA**



**Select State:**

Select one

**Environmental Quality, Air Quality Division**

**Contact Name:**  
Vinson Hellwig

**Contact Title:**  
Chief

**Address:**  
Michigan Department of Environmental Quality  
Air Quality Division  
Constitution Hall  
525 West Allegan Street  
Lansing, MI 48909

**Phone:**  
(517) 373-7069

**Fax:**  
(517) 335-6993



# Air Quality Initiatives Strengthen Annually

## Ozone Transport Commission

### U.S. Agency Contacts



Select State:

Select one

### Local Agencies

- [Bridgeport](#)
- [Bristol-Burlington](#)
- [Greenwich](#)
- [Milford](#)
- [New Britain](#)

### Agency Name:

Connecticut Department of Environmental Protection, Bureau of Air Management

### Contact Name:

Anne Gobin

### Contact Title:

Bureau Chief

### Address:

Connecticut Department of Environmental Protection  
Bureau of Air Management  
79 Elm Street  
Hartford, CT 06106

### Phone:

(850) 424-3026

### Fax:

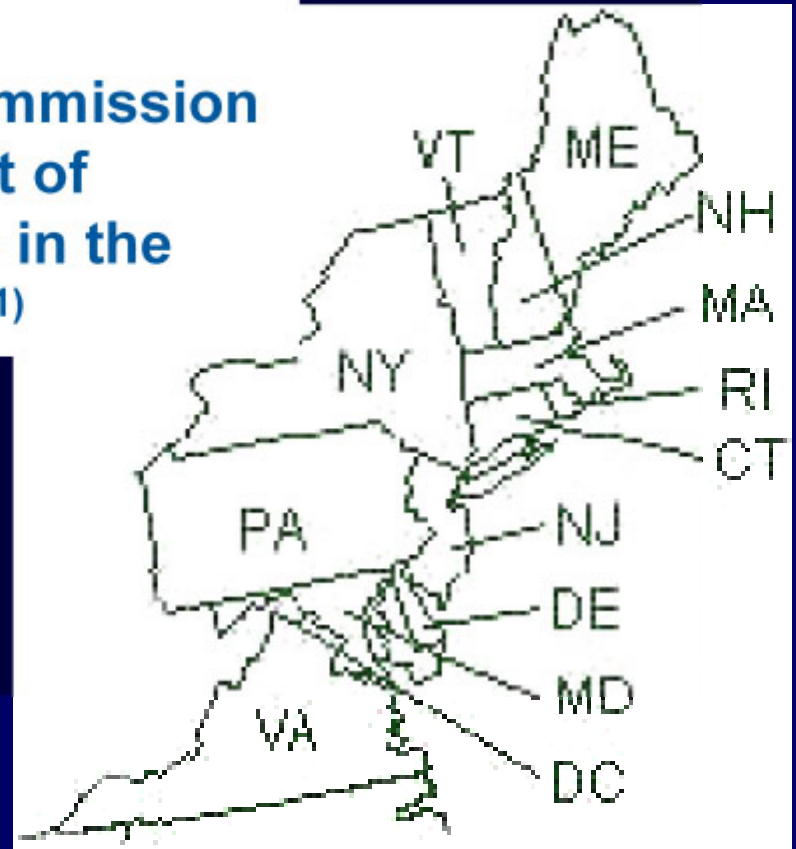
(850) 424-4063



# The Ozone Transport Commission?

## OZONE TRANSPORT COMMISSION (OTC)

The 1990 Clean Air Act Amendments established the Ozone Transport Commission (OTC) to coordinate the development of control plans for ground-level ozone in the Northeast and Mid-Atlantic Region. <sup>(1)</sup>



1. Source: [www.dep.state.pa.us/dep/DEPUTATE/AIRWASTE/AQ/transport/transport.htm](http://www.dep.state.pa.us/dep/DEPUTATE/AIRWASTE/AQ/transport/transport.htm)





## AEMA Interaction with OTC

- Sept. 2006: OTC contacted AEMA about “banning” solvent use in cutbacks & asphalt emulsions
- International Technical Committee contacted OTC: education on emulsions & applications, data sharing
- Nov. 2006: OTC recommended 20% across-the-board reduction in solvents for all emulsions
- OTC Board forwarded the recommendation to the 13 member States
- Lesson: proactive initiatives needed to assist regulators in understanding stakeholder issues



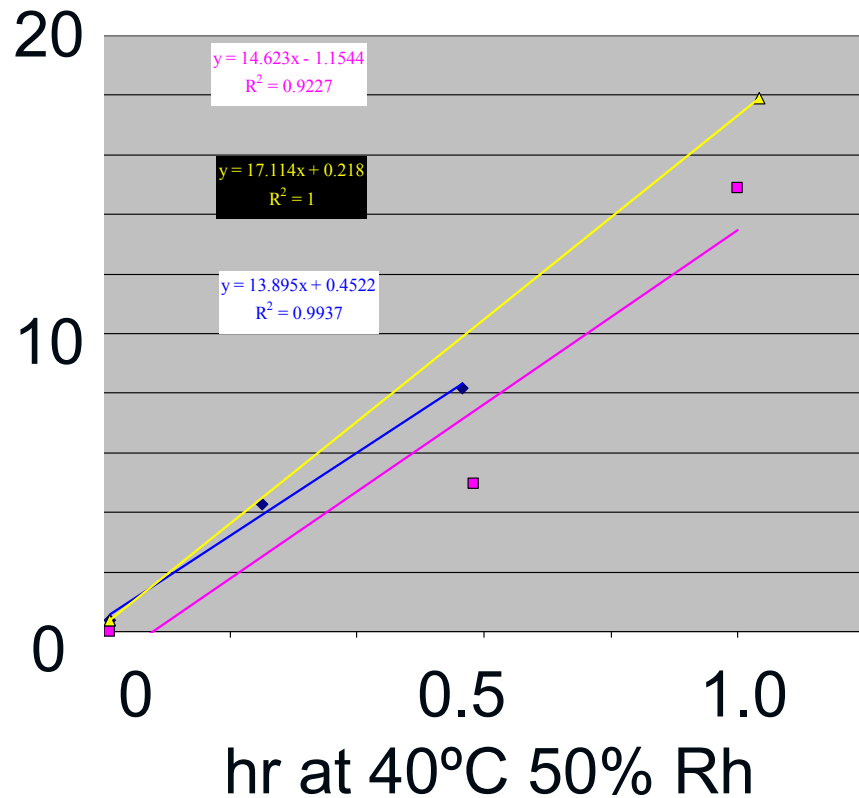
# ITC Reaction to CT DEP Regulation

## Laboratory Data on VOC Emissions: Thin Films

Long Term Weight Loss from Thin Film of United PG 58-28  
Carbon Diluent at 40°C 50% Rh

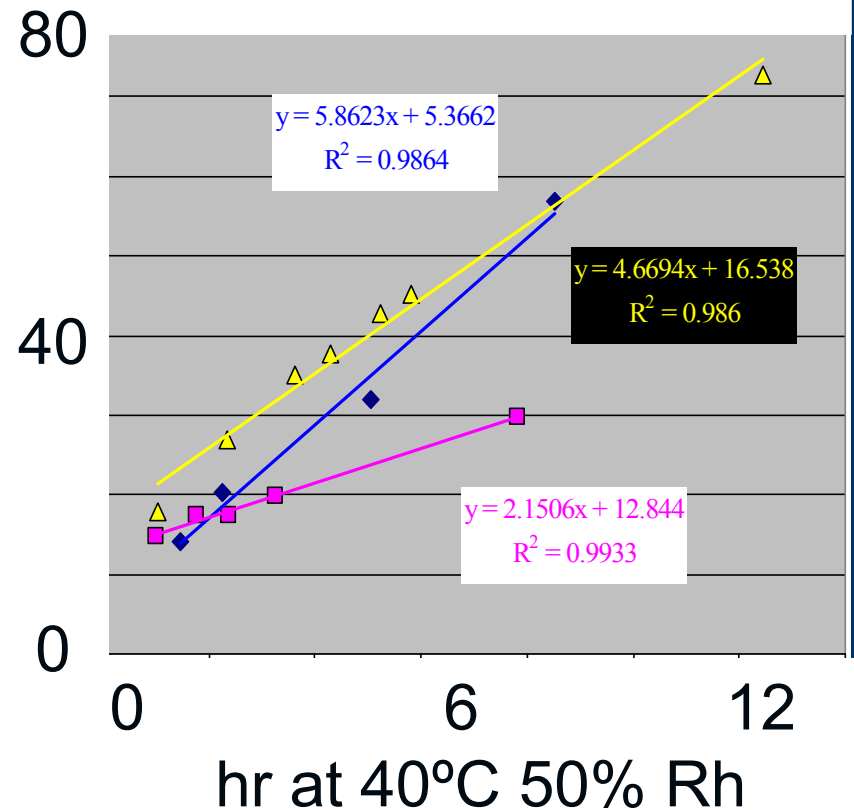
### % Solvent Loss

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Carbon Diluent at 40°C 50% Rh



### % Solvent Loss

Carbon Diluent at 40°C 50% Rh

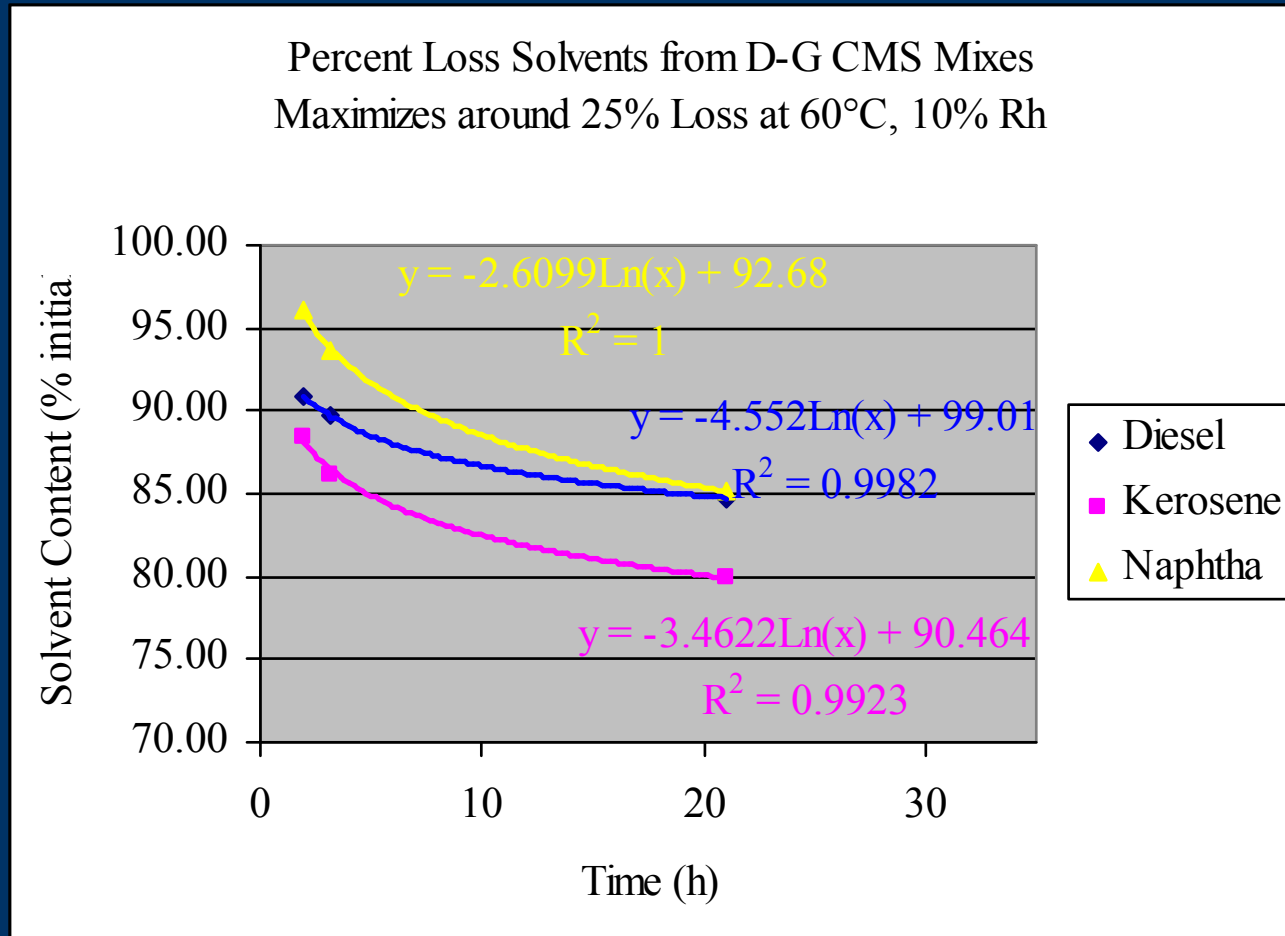


- ◆ Naphtha
- Diesel
- ▲ Kerosene



# ITC Reaction to CT DEP Regulation

## Laboratory Data on VOC Emissions: Dense Mixes





# OTC Technical Support Document: 2007 Rules

State	Cutback Asphalt	Emulsified Asphalt
CT	22a-174-20 (k): VOC content limited to 5% during June, July, August, and September	Nothing specified
DE	Reg. No. 24, Section 34: Ban during ozone season	Reg. No. 24, Section 34: Ban on use of emulsified asphalt that contains any VOC
DC	Chapter 7 Section 8-2:707(k): Ban during the months of April, May, June, July, August, and September	Nothing specified
ME	Chapter 131: Ban during the period May 1 through September 15, with some exceptions	Chapter 131: VOC content limited to 3-12%, depending on the type of use
MD	COMAR 26.11.11.02: Ban during the period April 16 through October 14	COMAR 26.11.11.02: Allowed upon approval of the Department; no VOC content limit specified
MA	310 CMR 7.18(9): Ozone season ban on cutback asphalt with VOC content greater than 5% by weight with exemptions including use as prime coat	Nothing Specified
NH	Env-A 1204.42: Ban during the months of June through September; cutback with up to 5% VOC allowed upon approval of Department	Env-A 1204.42: VOC content limited to 3-12%, depending on the type of use
NJ	7:27-16.19: Ban from April 16 through October 14, with some exemptions	7:27-16.19: VOC content limited to 8% by volume
NY	Part 211: Ban from May 2 through October 15	Part 211: VOC content limited to 2-12%, depending on the type of ASTM grade
PA	25 Pa. Code Section 129.64: Ban from May 1 to October 30	25 Pa. Code Section 129.64: VOC content limited to 0-12%, depending on type
RI	Reg. No. 25: Ban from April 1 to September 30, with some exemptions	Reg No. 25: VOC content limited to 3-12%, depending on application/use
VT	5-253.15: Ban on cutback asphalt with VOC content greater than 5% by weight, with some exemptions	5-253.15: Ban on emulsified asphalt with VOC content greater than 5% by weight
VA	Chapter 40, Article 39: Ban during April through October	Chapter 40, Article 39: VOC content limited to 6% by volume



# OTC Technical Support Document: 2007 Rules

Note calendar periods when compliance is required, are the “ozone season,” which corresponds to the “paving season.”

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# Connecticut Department of Environmental Protection

## CT DEP Objective: ozone = smog reduction

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- CT regulatory legislation targeted cutbacks & asphalt emulsions
- Goal: <0.5 g distillate in 200 mL emulsion (ASTM D 244)
- Kiernan Wholean, DEP rep, allowed 6 mL distillate due to comments made by asphalt industry stakeholders in the region



# Rhode Island DEM Office of Air Resources

## Public hearing on 20 Feb. 2009 to allow comments on VOC reg's

State of Rhode Island  
Department of Environmental Management  
Office of Air Resources

### Notice of Public Hearing and Comment Period

#### **Concerning adoption of proposed amendments to Air Pollution Control Regulations Nos. 25, 31 and 33 and proposed new Air Pollution Control Regulation No. 44.**

Notice is hereby given that a public hearing regarding adoption of proposed amendments to Air Pollution Control Regulations Nos. 25, 31 and 33 and proposed new Air Pollution Control Regulation No. 44 will be held in Room 300 of the Department of Environmental Management, at 235 Promenade Street, Providence, Rhode Island on Friday, February 20, 2009 at 10:00 AM, at which time interested parties will be heard.

The proposed revisions to Regulation No. 31, "Control of Volatile Organic Compounds (VOC) from Consumer Products," and No. 33, "Control of VOC from Architectural Coatings and Industrial Maintenance Coatings," and proposed new Regulation No. 44, "Control of VOC from Adhesives and Sealants," would limit the VOC content of 102 categories of consumer products, 53 categories of architectural and industrial maintenance coatings and ~~40 categories of adhesive and sealant products. VOC is a precursor to the formation of ozone in the ambient air. The proposed revision to Regulation No. 25, "Control of Volatile Organic Compound Emissions from Cutback and Emulsified Asphalt," would prohibit the use of cutback asphalt and limit the VOC content of emulsified asphalt used for road paving, maintenance or repair during the ozone season (April through September).~~

O

CT DEP 2007

ITC Reaction

Summary





# Rhode Island DEM Office of Air Resources

## Proposed level similar to that put forward by Connecticut

~~Medium curing cutback asphalt used for the manufacture of patching mixtures or as a penetrating prime coat shall have less than 5 percent (5%) of the total solvent evaporate at a temperature up to and including 500°F.~~

25.3.2 During the period of April 1<sup>st</sup> through September 30<sup>th</sup> of any calendar year, no person shall use or apply emulsified asphalt unless:

(a) The emulsified asphalt was formulated to contain 0.1% or less VOC by weight, as applied, or

(b) The emulsified asphalt, as applied, produces no greater than 6.0 milliliter of oil distillate by distillation as measured by ASTM Method D 244 or AASHTO Method T 59.

~~25.3.2 No person shall cause, allow or permit the manufacture, mixing, storage use or application of cutback asphalt between 1 October and 31 March except in the following circumstances:~~



## Paving applications affected by VOC reg's

- Prime coats
- Seal coats
- CMS & HFMS cold virgin and recycling mixes
- Stockpile patch mix



## Paving applications affected by VOC reg's

- Prime coats
- Seal coats
- ~~CMS & HFMS-cold virgin and recycling mixes~~
- Stockpile patch mix

Numerous asphalt chemicals manufacturers and emulsion suppliers have developed new, VOC-free emulsions for these applications.



## Things to come in the foreseeable future

- Facts: regulatory restrictions will increase



## The foreseeable future

- Facts: regulatory restrictions will increase
- Facts: some phase out of current technologies / formulations is likely



# Industry Stakeholders **Can** Work with Agencies to Influence Regulations

The Spring 2009 EPA Regulatory Agenda lists regulations & major policy under development or review over the next 12 months.



## Semiannual Regulatory Agenda



SPRING 2009



NAPA developed test methods for the EPA to analyze VOC emissions at mix plants

## Excerpt from EPA Spring 2009 Regulatory Agenda

### 97. ADDITION OF METHOD 208, PROTOCOL FOR THE SOURCE TESTING, ANALYSIS, AND REPORTING OF VOC EMISSIONS FROM HOT MIX ASPHALT PLANT DRYERS

**Legal Authority:** 42 USC 7401 et seq

**CFR Citation:** 40 CFR 51, appendix M

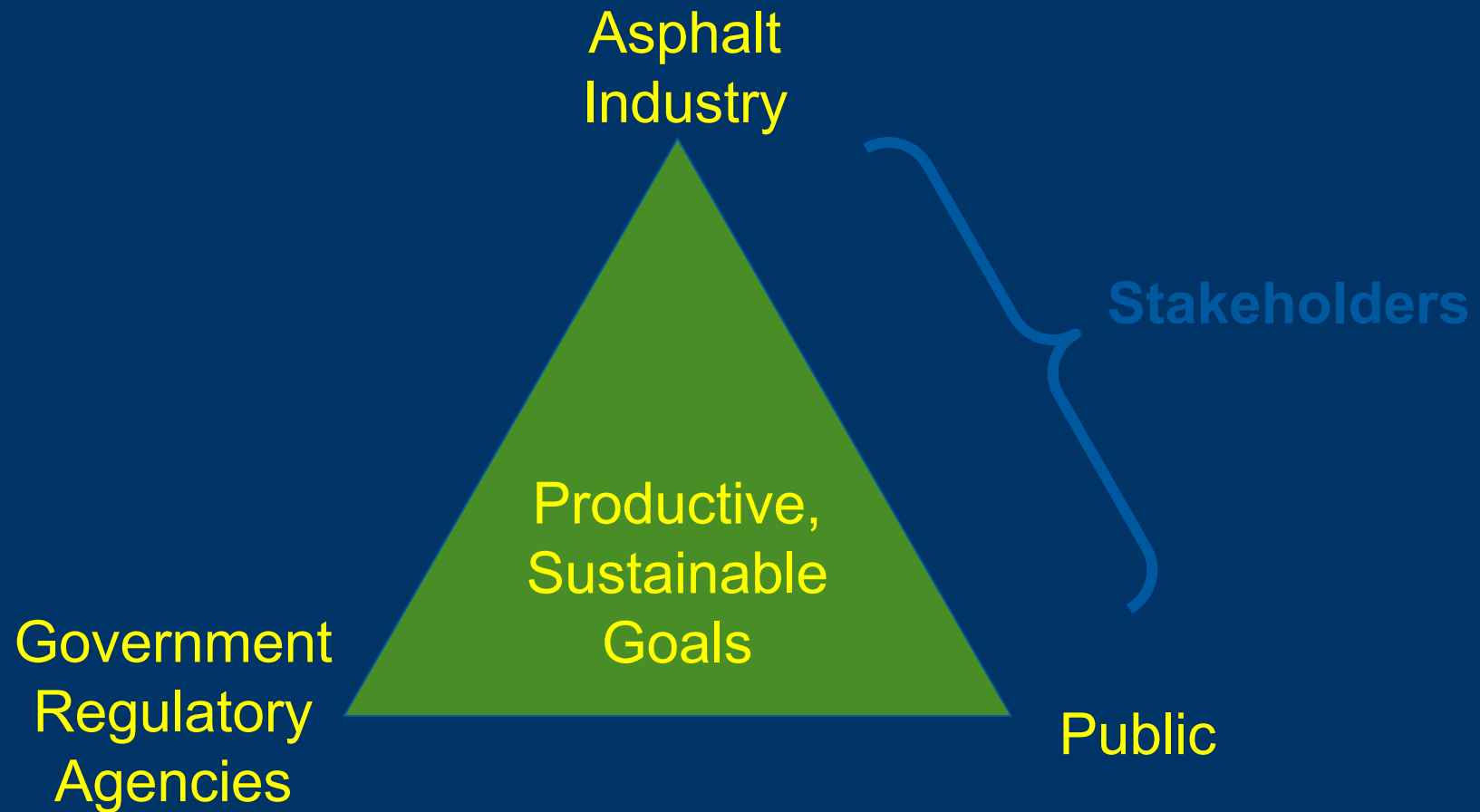
**Legal Deadline:** None

**Abstract:** Method 208 is a protocol for collecting, analyzing, and reporting of volatile organic compounds (VOC) emissions from asphalt paving production operations. It will produce more accurate measurement of the mass of VOC emissions from such operations than any other current method for measuring VOC. The method will allow the EPA to make a more accurate assessment of whether asphalt paving plants are major sources under the Federal programs for New Source Review and Prevention of Significant Deterioration. This method was developed by the National Asphalt Paving Association specifically for asphalt paving plants as an alternative to existing EPA methods for measuring VOC. EPA is promulgating these methods to make them more widely available and acceptable for use by asphalt paving producers in meeting various environmental regulations.





# Government – Industry – Public alliance is possible





## The foreseeable future

### Next Steps for the Asphalt Emulsion Industry

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- Facts: regulatory restrictions will increase
- Facts: some phase out of current technologies is likely
- Facts: regulatory agencies are interested in finding sustainable solutions
- Balancing industry growth & EHS issues



## Things to Come

### Next Steps for the Asphalt Emulsion Industry

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- Facts: regulatory restrictions will increase
- Facts: some phase out of current technologies is likely
- Facts: regulatory agencies are interested in finding sustainable solutions
- Balancing industry growth & EHS issues
  - prepare for more research that shows asphalt adversely impacts air quality



## The foreseeable future

### Next Steps for the Asphalt Emulsion Industry

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- Facts: regulatory restrictions will increase
- Facts: some phase out of current technologies is likely
- Facts: regulatory agencies are interested in finding sustainable solutions
- Balancing industry growth & EHS issues
- View regulatory mandates as business opportunities rather than business burdens



FY 2010  
EPA Budget in Brief



\$ 10.5 Billion, up 34% from 2009.



THANK YOU.

