



# Heavy-Duty Fleet Updates

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**Georgia Association of Pupil Transportation**

**June 2008**



# Topics

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- 1) Air Quality Overview**
- 2) EPA Heavy-Duty Engine Standards**
- 3) ULSD Review**
- 4) EPD's HDDE Requirements Rule**
- 5) Idling Reduction**
- 6) Biodiesel**
- 7) Georgia Retrofit Program**
- 8) Clean Fueled Fleet Program Status**
- 9) Stage I Vapor Recovery**
- 10) Southeast Diesel Collaborative**
- 11) Clean Cities**





# Air Quality Overview

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- Georgia has areas of the state that do not attain the NAAQS for two criteria pollutants
  - Particulate Matter for 2.5 microns or larger
  - Ozone
- EPD is responsible for demonstrating attainment of the standards and for programs to attain the standard - State Implementation Plan

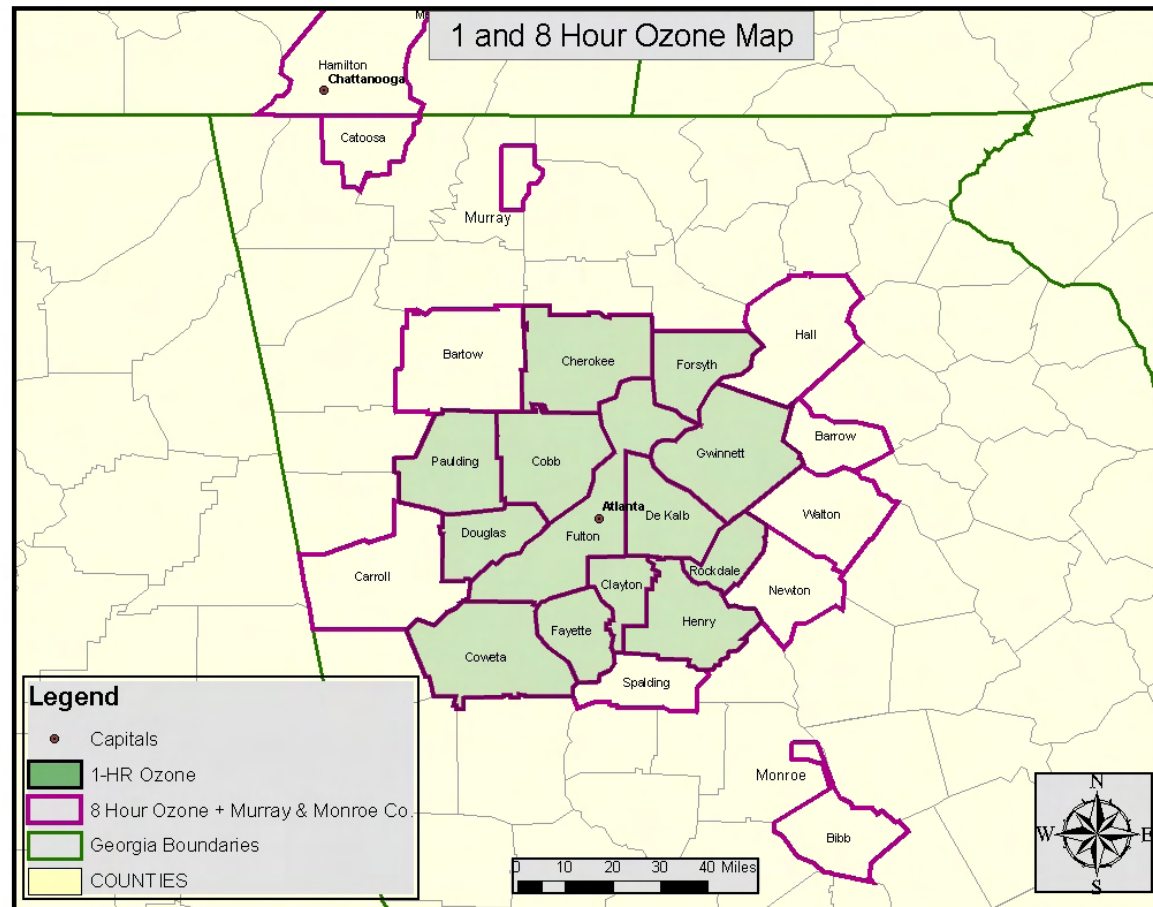




# Air Quality Overview (Ozone)

- Previous Ozone Standard is 0.08 ppm or 84 ppb

Bibb and Murray counties were redesignated to maintenance areas

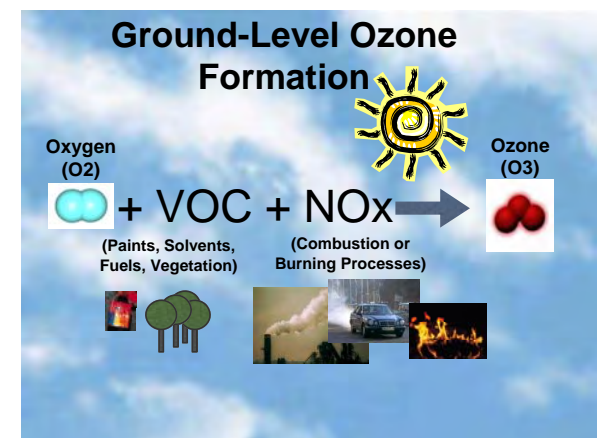




# Air Quality Overview (Ozone)

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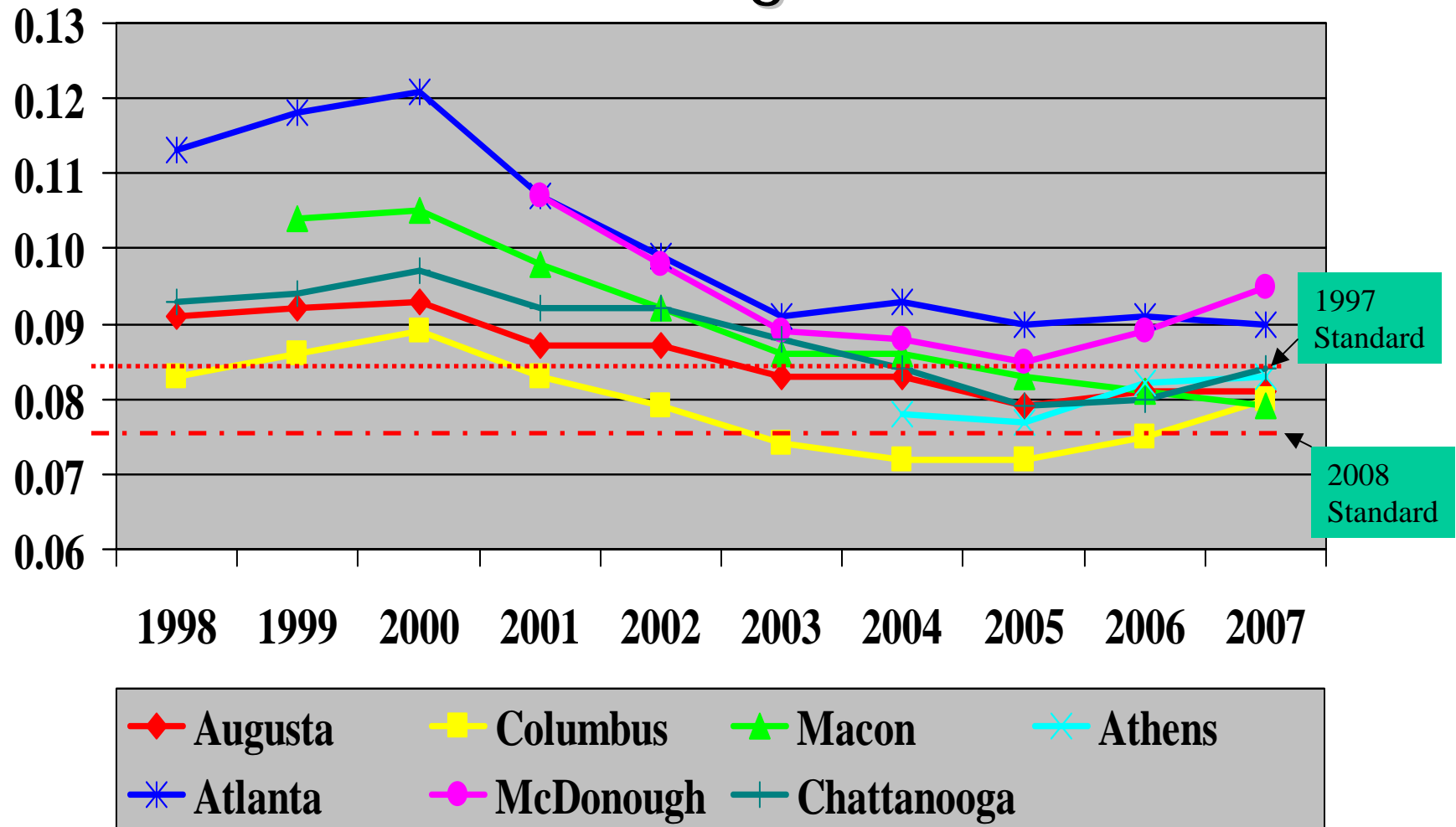
- New Ozone Standard
  - Announced by EPA on March 12, 2008
  - .075 ppm or 75 ppb (3 digits instead of two)
  - States must send list of counties not attaining by March 2009
  - EPA must officially designate counties by March 2010





# Air Quality Overview (Ozone)

## • Ozone – 3-Year Design Value





# Air Quality Overview (Ozone)

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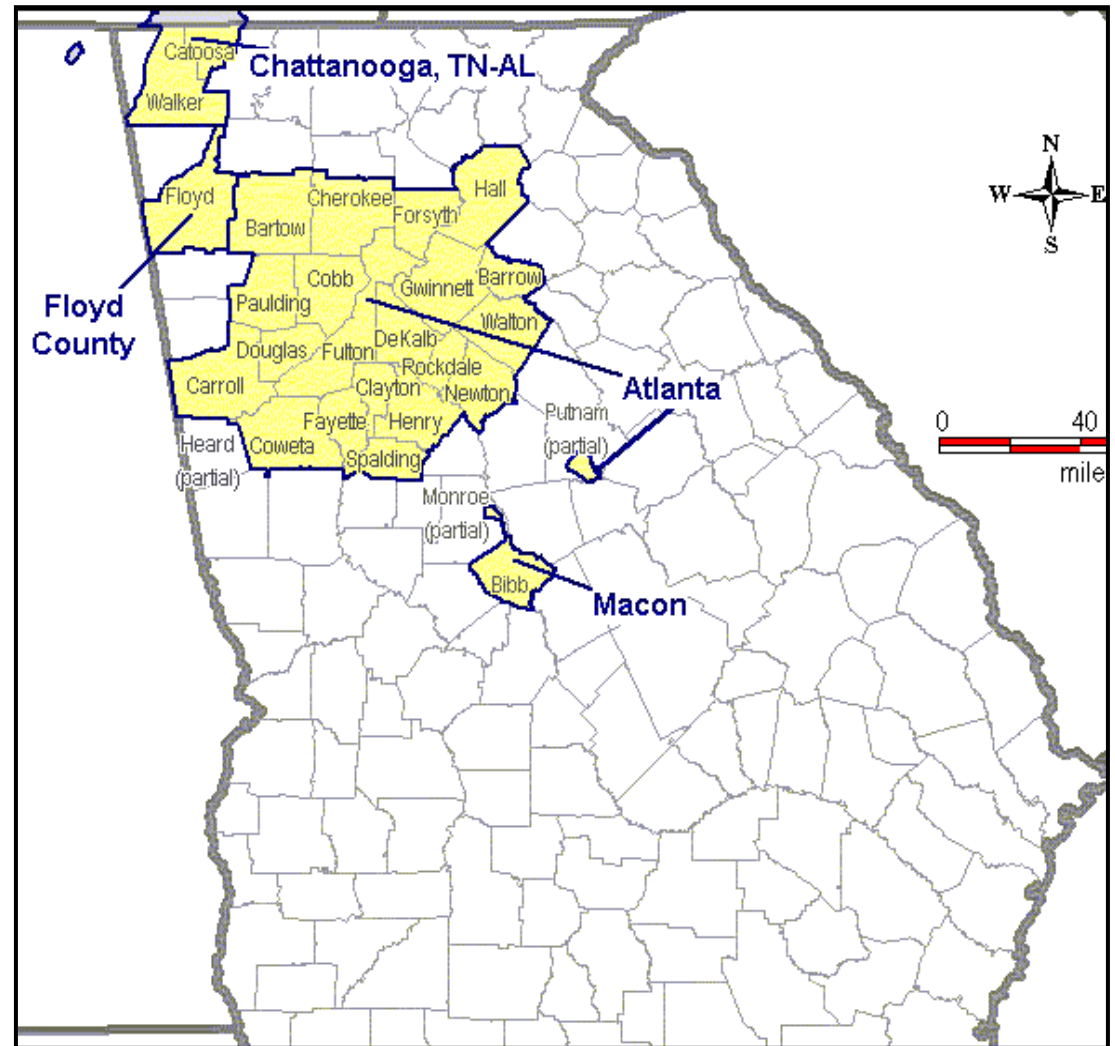
- **EFFECTS OF OZONE**
  - Scars lungs & impairs lung function
  - Causes respiratory diseases
  - Aggravates heart disease & asthma
  - Damages crops, trees & other vegetation
  - Damages man-made structures



# Air Quality Overview (PM<sub>2.5</sub>)

Annual PM<sub>2.5</sub> standard (15  $\mu\text{g}/\text{m}^3$ ):

- Metro-Atlanta (20 counties)
- Bibb County
- Floyd County
- Chattanooga



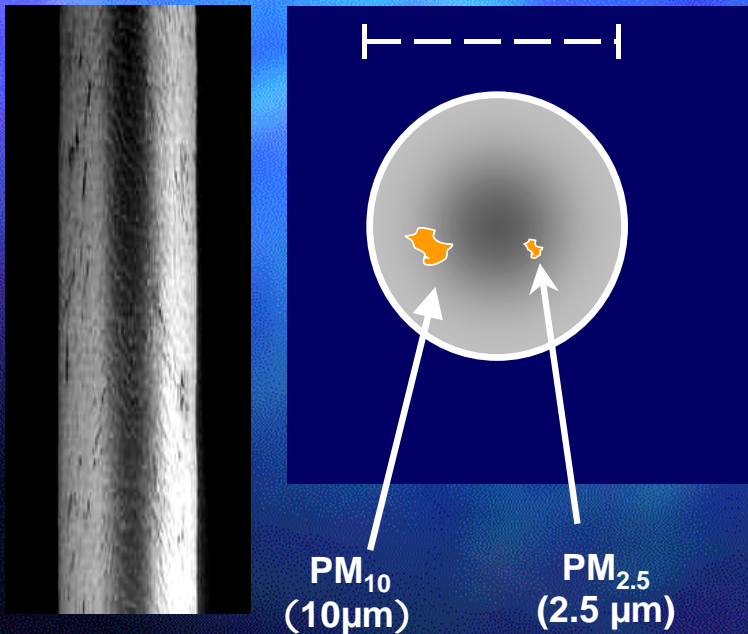


# WHAT IS PM<sub>2.5</sub>?

(also called Particulate Matter 2.5 or PM Fine)

*The particles in particle pollution are so small, you can't see just one of them ...*

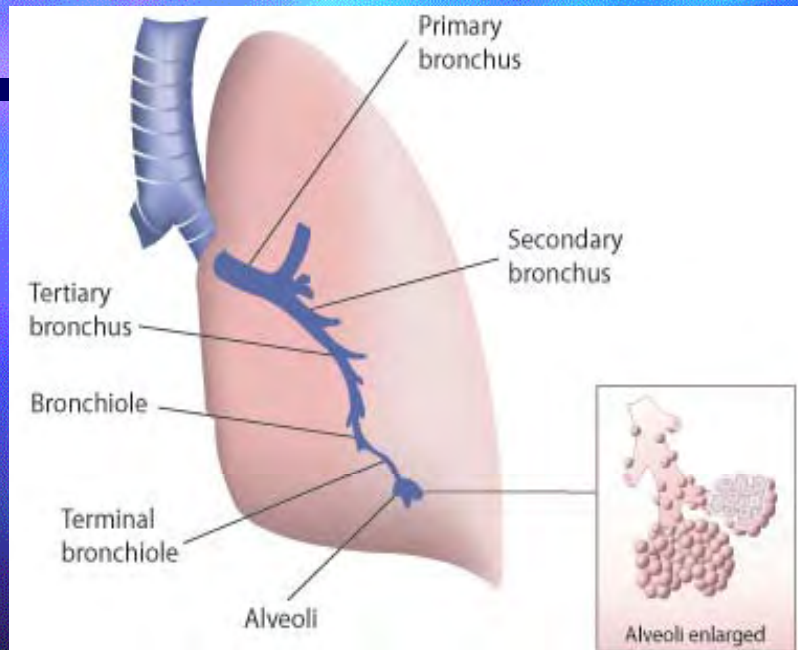
Hair cross section (70  $\mu\text{m}$ )



- Particle pollution is a complex mixture of extremely small particles and liquid droplets.
- Some of these particles – called fine particles – are just 2.5 micrometers in diameter. 30 can fit in the diameter of a human hair.
- The size of particles is directly linked to their potential for causing health problems.
- Particle pollution also contributes to reduced visibility, or haze.



## Particle pollution affects your lungs



*Particle pollution can penetrate into the part of your lungs known as the alveoli, which deliver oxygen to the bloodstream.*

**You are exposed to particle pollution simply by breathing polluted air.**

**Exposure increases when you exercise**, because you breathe more vigorously and deeply than usual.

People exposed to particles may experience a number of respiratory symptoms, including:

- **airway irritation;**
- **cough;**
- **phlegm;**
- **decreased lung function;**
- **airway inflammation;**
- **asthma attacks; and**
- **chronic bronchitis**

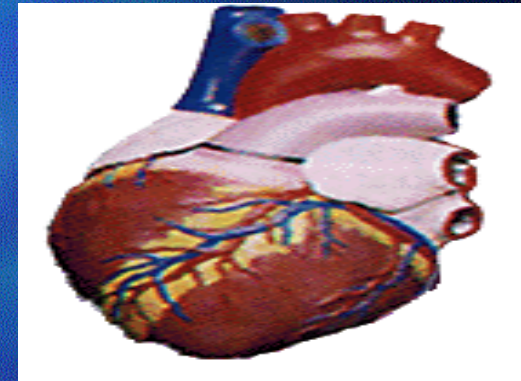


## And particle pollution affects your heart

Particle pollution has been linked to changes that indicate your heart isn't as healthy as it should be. Those include:

- Arrhythmias and changes in heart rate.
- Changes in the variability of your heart rate. Your heart rate should increase, for example, when you run and return to normal when you sit quietly. Decreased variability is a risk factor for heart attacks.
- **Blood component changes** that signal inflammation, and increased likelihood of potential blood clots, which can lead to heart attacks.

Some studies have shown that particle exposure causes **heart attacks**. And particles are linked with **death from heart disease**.



*Particle exposure  
has been linked  
to heart attacks.*



# Air Quality Overview (PM<sub>2.5</sub>)

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## PM Emission Sectors of Concern

- Coal/Oil fired Stationary Sources
  - Electric Generating Units (EGU) – Subject to CAIR
  - Non-EGUs – Subject to RACT
- Diesel Burning Mobile Sources
  - On-road – trucks, buses
  - Off-road – construction, agriculture, airports, rail
- Open Burning
- Commercial Cooking



# Air Quality Overview

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## Ozone and PM Controls

- Georgia Gas
- I&M/ Enhanced I&M
- Stage I & II Vapor Recovery
- Burn Ban
- NOx & VOC RACT/Expanded RACT
- Stationary Source NOx & VOC rules (also controls PM)
- Stationary Source NOx & VOC SIP permit conditions
- Partnership for a Smog Free Georgia
- NSR/Expanded NSR
- Power Plant Controls (also controls PM)
- New Equipment Rules
- Various Consumer Products and Surface Coatings
- New Heavy-Duty Diesel Engine and Fuel Standards





# EPA Heavy Duty Engine Standards

## Beginning with 2007 Model Year

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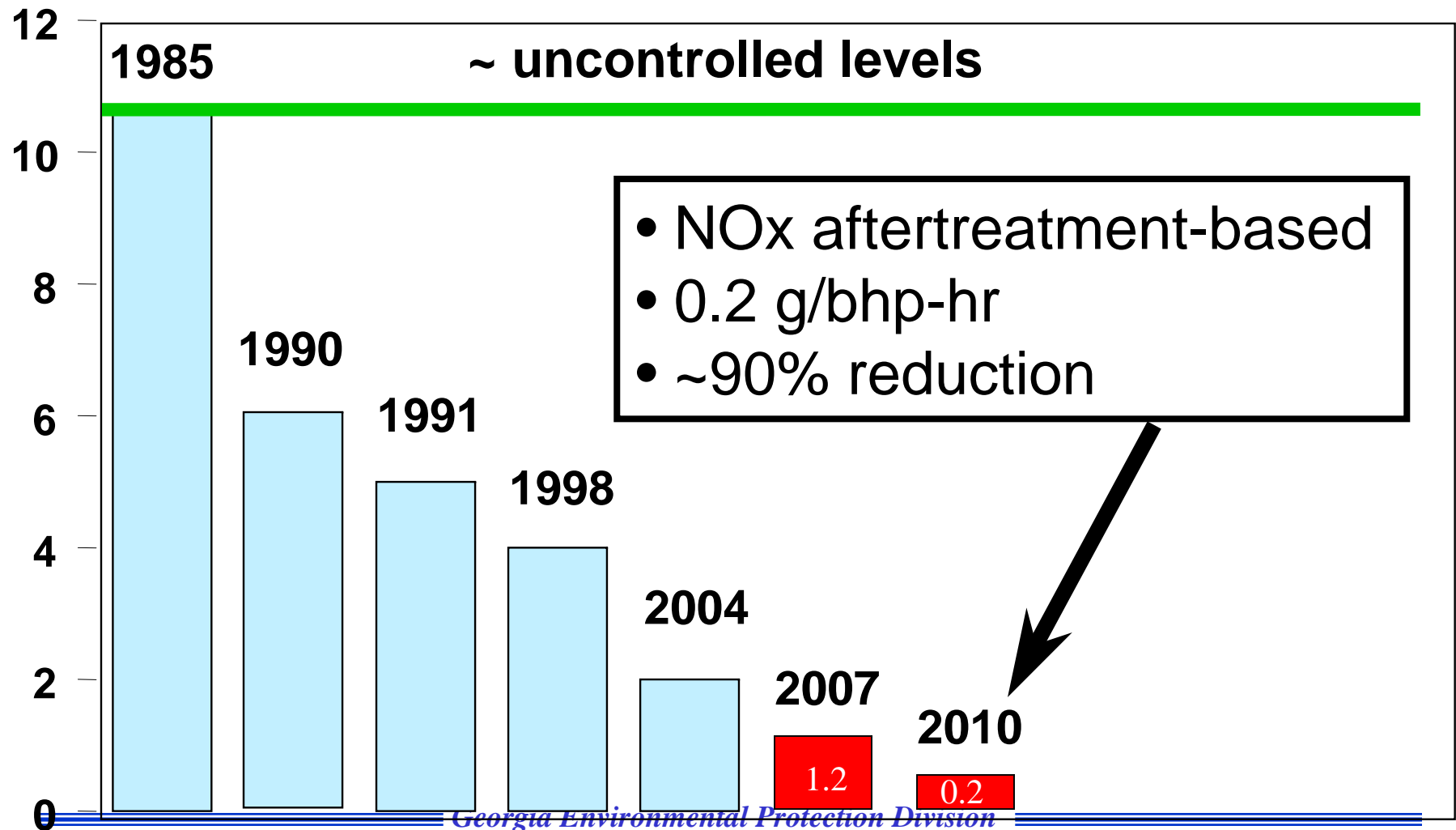
	2006	2007	2008	2009	2010	2011	2012
PM		100% at 0.01 g/hp-hr					
NOx		50% at 0.20 g/hp-hr			100% at 0.20 g/hp-hr		
Fuel		80% at 15 ppm maximum sulfur (under temporary compliance option)			100% at 15 ppm		

- Manufacturers must comply with standards in order to sell engines in the U.S.
- Fleets are not required to retrofit older engines



# Highway Diesel NO<sub>x</sub> Standards

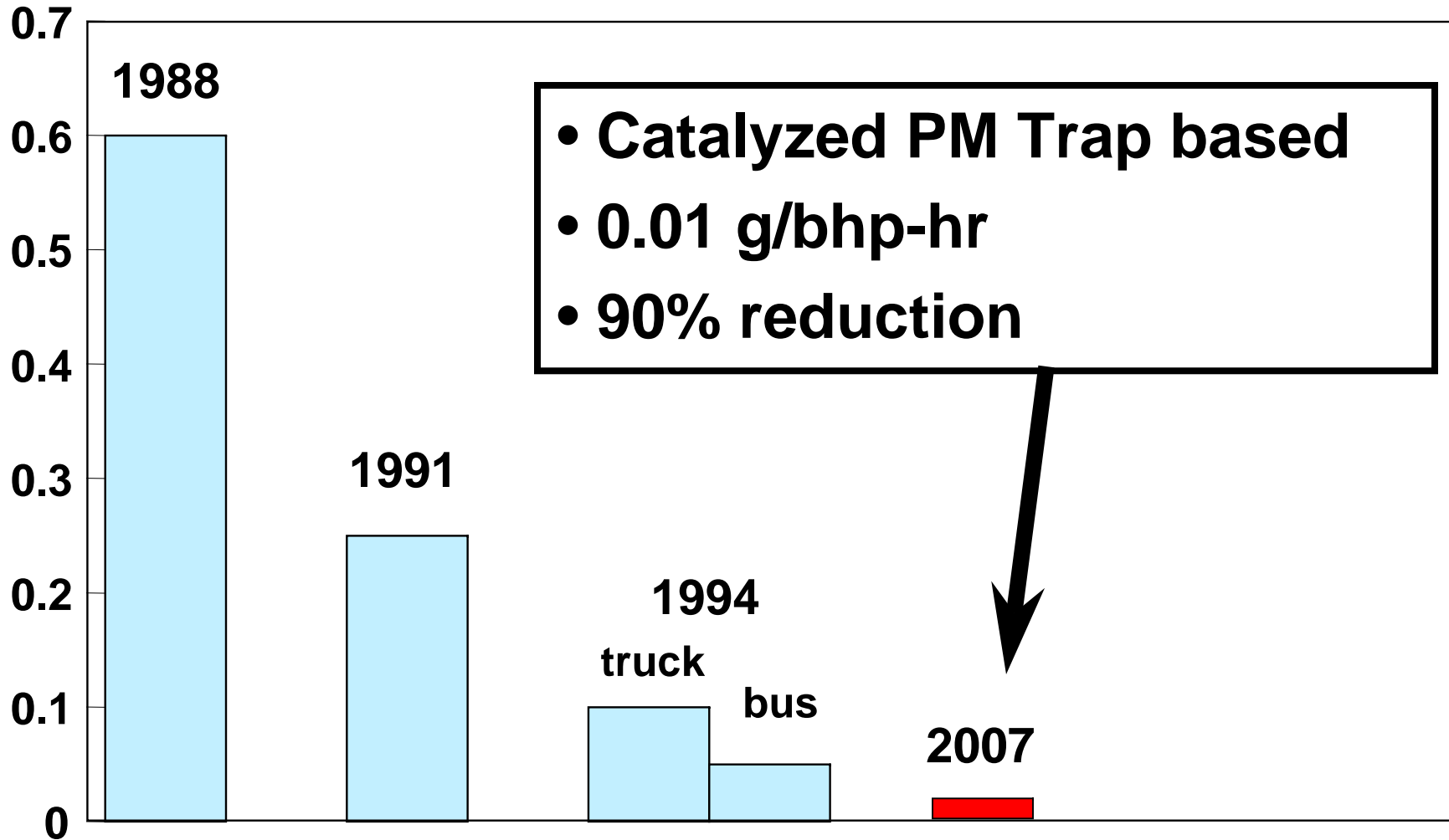
g/hp-hr





# Highway Diesel PM Standards

g/hp-hr

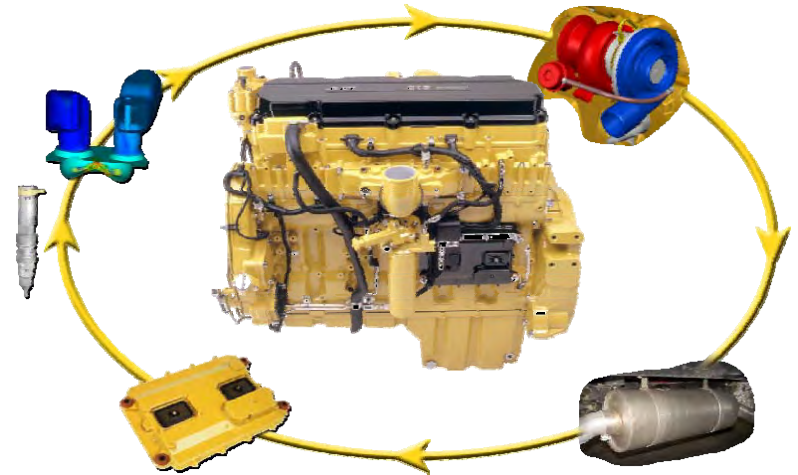




# EPA HDDE Standards

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- 2007 – 2009 Technologies
  - Particulate Matter
    - Actively regenerated diesel particulate filters
    - Closed crankcase systems
  - NO<sub>x</sub>
    - Exhaust Gas Recirculation
    - Engine Timing
    - Injector Timing





# EPA HDDE Standards

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- 2010 NO<sub>x</sub> Technologies
  - Higher EGR levels
  - Higher injector pressures and injector timing (multiple injections)
  - Lean NO<sub>x</sub> Catalysts
  - NO<sub>x</sub> Adsorbers
  - Selective Catalytic Reduction – Not expected to be needed on school bus engines
- Manufacturers are working out the last details on their NO<sub>x</sub> strategies for 2010
- On-Board diagnostics and In-Use Testing



# ULSD Regulatory Update

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- Standard: 15 ppm or lower sulfur in on-road diesel fuel
- 80% of on-road fuel must meet 15 ppm standard in each PADD
- 100% of on-road fuel must meet 15 ppm standard starting June 1, 2010
- Non-road Diesel Fuel - Large Refiners and Importers
  - 500 ppm by June 1, 2007
  - 15 ppm by June 1, 2010
  - 15 ppm by June 1, 2014 for all refiners
- Available supply nationwide





# ULSD – System Approach

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- Part of system control strategy
- Reduces PM emissions by 5% to 9% in older buses
- Prerequisite for emission control technology in 2007 and newer engines
  - Sulfur poisons precious metal loaded catalysts
  - ULSD improves efficiency of diesel particulate filters and NOx technologies
- Enables certain retrofit technologies



# Transition to ULSD

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- Most terminals in Georgia provide ULSD
- Minor problems resulting from transition
  - Replacement of seals and o-rings
  - Some replacement of fuel pumps
- Most school systems are using ULSD in all of their school buses





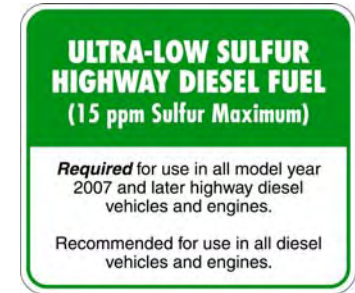
# ULSD – How Does It Affect You?

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- Purchasing fuel offsite
  - Regulatory burden on station owner
  - Know what type of fuel you are buying
- On-site refueling: Wholesale Purchaser / Consumer
  - 2007 and newer vehicles will need to operate on ULSD
  - Allowed to continue receiving and dispensing 500 ppm fuel after Oct. 15, 2006: **Storage will be limiting factor**
  - No commingling between 500 ppm and 15 ppm
  - May downgrade up to 20% of 15 ppm fuel to 500 ppm annually



# How Does It Affect You? (continued)



- Labeling
  - Applies to retailers and wholesale purchasers/consumers
  - *Wholesale purchaser-consumer* means any person that is an ultimate consumer of gasoline, diesel fuel, ... and which purchases or obtains gasoline, diesel fuel, ... from a supplier for use in motor vehicles or nonroad engines, ... and, in the case of gasoline, diesel fuel, methanol or liquified petroleum gas, receives delivery of that product into a storage tank of at least 550-gallon capacity substantially under the control of that person.
  - Must place labels on dispensers
    - Ultra Low Sulfur Diesel Fuel
    - Low Sulfur Diesel Fuel
    - Non-road Diesel Fuel
  - Placed on dispensers by June 1, 2006 and kept on them through May 31, 2010 except for non-road, which must be kept on the dispenser through May 31, 2007
  - **If you have not placed labels on your dispensers, you are out of compliance**



# Sample Labels

**ULTRA-LOW SULFUR  
HIGHWAY DIESEL FUEL  
(15 ppm Sulfur Maximum)**

**Required** for use in all model year 2007 and later highway diesel vehicles and engines.

Recommended for use in all diesel vehicles and engines.

**LOW SULFUR  
HIGHWAY DIESEL FUEL  
(500 ppm Sulfur Maximum)**

**WARNING**  
Federal law **prohibits** use in model year 2007 and later highway vehicles and engines.  
Its use may damage these vehicles and engines.

May obtain from  
local distributor

Labels are  
designed by  
API

**NON-HIGHWAY  
DIESEL FUEL  
(May Exceed 500 ppm Sulfur)**

**WARNING**  
Federal law **prohibits** use in highway vehicles or engines.  
Its use may damage these vehicles and engines.

You may design  
your own label as  
long as it meets  
EPA requirements



# Heavy-Duty Diesel Engine Requirements

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- Rules for Air Quality Control, Chapter 391-3-1-.02(2)(000) – Heavy-Duty Diesel Engine Requirements
- Effective beginning with the 2005 model year.
- Adopts CARB heavy-duty emission standards
- Requires that only new heavy duty engines receiving an executive order from CARB be sold in Georgia.
- Heavy-duty vehicle is defined as vehicles with a GVWR of 14,001 lbs or greater
- Program is state-wide
- Does not affect
  - Used vehicle purchases for 2004 model year engines and older
  - Replacement of engines with rebuilt or used engines
  - Vehicles already in your fleet



# HDDE Requirements

## continued

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- Emission control devices may not be rendered inoperative or removed
- No component may be sold or installed that will bypass, defeat, or render inoperative the emission control devices or design
- Manufacturer must provide emission information upon request by authorized official of the state
- Annual reports are still required to be submitted to EPD 60 days after the end of the calendar year



# HDDE Requirements Cont.

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- CARB amended HDDE rules in November 2006
  - Require automatic shut-off of engine after 5 minutes of unnecessary idling – **school buses are exempt**
  - Effective with 2008 model year engines
- EPD amended the Georgia rule to adopt the most recent CARB rule
  - Board adopted in January
  - EPA Certified Engines for 2008
- Check with your bus manufacturer to ensure that you receive a compliant engine



# HDDE Requirements Cont.

- Emission Labels
  - Emission label must be posted on the driver's door of the vehicle (Above door on school buses)
  - Engine manufacture must install emission label in visible location on the engine
    - Alternate Method: Use VIN to identify model year of vehicle as long as the vehicle model year correlates to the engine model year – 2007 and 2008 models only
    - Required for all new HDDVs in 2009



# Idling Reduction

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- EPD Idling Reduction Program
  - Developed Idling Reduction Document
    - Estimated Benefits of Idling Reduction Program
    - Idling Reduction Technologies
    - Summary of Other State Rules
  - Developed draft Unnecessary Idling Rule
- Stakeholder Process to Develop Rule
  - First Stakeholder Meeting held on May 2<sup>nd</sup>
  - Second Stakeholder Meeting held on June 11<sup>th</sup>
  - Next Stakeholder Meeting will be scheduled in July
  - Stakeholder process complete when all issues with the proposed rule have been addressed



# Idling Reduction – Proposed Rule

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- Limit idling to 5 minutes
  - On-road engines with a GVWR of 10,000 lbs or higher
  - Non-road engines with a horsepower of 75 or greater
  - Excludes time spent in traffic
  - Proposed rule is planned to cover the state
- Landowners, HDV operators, and fleet owner can be found in violation for exceeding the 5 minute idle limit
- Exemptions
  - Emergency, Law Enforcement, and Tactical Vehicles
  - Idling necessary for vehicle repair or maintenance
  - Idling necessary to provide power take off (PTO)
- This rule will apply to school buses as well as most other on-road vehicles and nonroad equipment
- Will not apply to locomotives, marine vessels, and aircraft



# Idling Reduction – Proposed Rule

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- Issues brought up by stakeholders
  - Liability of landowners
  - Length of time allowed for queuing
  - Include exemptions for engine diagnostics and inspections
  - Allow longer idle times for special needs buses and other buses where passengers health is at risk
- Involvement is Stakeholder Process
  - May contact Rich McDonald or Vicky Giles to be placed on the Stakeholder's List
    - 404-363-7028
    - Richard\_McDonald@dnr.state.ga.us
    - Vicky\_Giles@dnr.state.ga.us
    - <http://www.georgiaair.org/airpermit/>
  - May choose to attend meetings, submit comments, and/or receive information



# Biodiesel

- Biodiesel can be blended with ULSD
  - Improves lubricity
  - Further reduce PM
- Most common blend is B20: 20% biodiesel
- Most manufacturers have stated that their engines will work with B5 (5% biodiesel) and some with B20
- Emissions



<b>Pollutant</b>	<b>B20 vs. #2 Diesel</b>
Nitrogen Oxides	neutral
Particulate Matter	-15%
Hydrocarbons	-21%
Sulfates	-40%
Carbon Monoxide	-10%



# Biodiesel

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- 14 Biodiesel Distributors in Georgia
- 5 Biodiesel Producers in the state
- Fuel quality is improving
  - In Georgia, Biodiesel must meet ASTM 6751
  - IRS requires that Biodiesel meet ASTM 6751 to be eligible for tax credits
- Eight School Systems in Georgia has used or is using Biodiesel
  - Floyd, Bibb, Burke, Carrollton City, Gordon, Murray, Putnam, and Wilkerson
  - 5% to 20% blends
  - 6 school systems have suspended use based on price



# EPD Biodiesel Position

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- Compatible with emission control devices
- Production facilities are expected to have a minimal impact on local and regional air quality
- Significant emission reductions can be achieved from using biodiesel
- Encourage use of biodiesel blends
  - Lowers emissions
  - Renewable resource
  - Less toxic
  - Improves energy supply



# Georgia Retrofit Program

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- Primary focus has been on the voluntary retrofit of school buses
- Program is designed to help school systems in Georgia reduce diesel emissions
  - Use of emission control devices
  - Use of cleaner fuels
  - Reduction in idling
  - Purchase of cleaner buses
- EPD has to date has developed partnerships with 17 school systems to retrofit a portion or all of their eligible buses

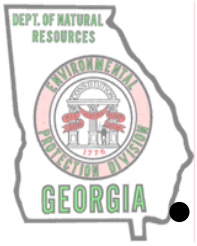


# Georgia Retrofit Program

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- As of today, 942 buses have been retrofitted
- Over 100 more buses are planned to be retrofitted this year
- Funding
  - Past sources have included EPA's Clean School Bus USA Program and Supplemental Environmental Projects
  - EPD still has CMAQ funds for school systems in 20 counties
  - Future funds are expected to include CMAQ for 24 counties and DERA for attainment counties
  - EPD will continue to seek additional funds, particularly for attainment counties



# Georgia Retrofit Program

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- EPD is continuing to promote the retrofit program as voluntary
  - We need you to make it successful
  - School Systems must be willing to enter into agreements to retrofit their buses
    - Retrofits are safe and effective
    - Technologies can be installed that will minimize maintenance costs
    - Grants pay for most, if not all, of the purchase and installation costs
  - We will be calling you to request meetings to discuss retrofitting buses in your school system
- Potential to make program mandatory
  - Other states such as New Jersey and California are mandating retrofits
  - If Georgia does not continue to get volunteers, program could become mandatory



# Georgia Retrofit Program

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- EPD has begun looking at advanced technologies for bus replacements
- Hybrid Electric Buses
  - DeKalb County School System is expected to be selected to receive funds to pay for the incremental cost of 4 parallel system hybrids
  - EPD expects to partner with 2 school systems to purchase 8 series hybrids
- For more details on the Georgia Retrofit Program and hybrid buses
  - Presentation on Wednesday at 12:00 in room 9
  - Presentation on Wednesday at 4:30 in room 9



# Clean Fueled Fleet Rule Status

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- The CFF Rule covers 13 counties in metro-Atlanta
- Requires the purchase of low emission vehicles and the submittal of an annual report
- All vehicles made today meet the LEV standard
- EPD is currently working with EPA to sunset the rule
  - EPD has submitted initial documentation (110L Demonstration) to EPA
  - EPA is requiring additional information
- Please continue to submit your annual reports until you receive notice from EPD



# Stage I Vapor Recovery

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- Effects only gasoline storage tanks
- Requires the use of vapor recovery systems on gasoline storage tanks at facilities with throughputs greater than 10,000 gallons per month
- Covered Area
  - 13 metro-Atlanta counties and Catoosa, Richmond, and Walker
  - Phasing in for 2008 and 2009: Barrow, Bartow, Carroll, Hall, Newton, Spalding, and Walton
- Enhanced Vapor Recovery is required in the above 7 counties and for all new installations and major modifications



# Stage I Vapor Recovery

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- EPA Program
  - Affects facilities that dispense more than 10,000 gallons per month in the rest of the state
  - Facilities with throughput between 10k and 100k must install drop tubes and report to EPA
  - Facilities with throughput over 100K must install Stage I Vapor Recovery Systems
- State may take delegated authority and expand Stage I rule statewide



# Southeast Diesel Collaborative

- Collaborative made up of 8 southeastern states corresponding to the U.S. EPA Region IV
- SEDC is a public-private partnership working to reduce diesel emissions
  - Local, state, and federal entities
  - Private companies
  - Nonprofits
- School systems are welcome to join
  - Option of signing MOU
  - Sign up for committees on [www.southeastdiesel.org](http://www.southeastdiesel.org)
  - Learn about funding and educational opportunities
- 3<sup>rd</sup> Annual Partners Meeting
  - June 23<sup>rd</sup> – 25<sup>th</sup>
  - Retrofit and Idling Reduction Workshop on 25<sup>th</sup>



# Clean Cities Program

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- Voluntary program through the U.S. Department of Energy
- Focused on reducing the nation's dependence on foreign petroleum through the following strategies:
  - Alternative Fuels
  - Fuel Blends
  - Idle Reduction
  - Hybrids
  - Fuel Economy
- 90 Coalitions across the U.S. with 2 located in Georgia
  - Clean Cities – Atlanta
  - Middle Georgia Clean Cities Coalition



# Clean Cities Program

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- **Clean Cities – Atlanta**
  - Covers 20+ counties around Metro-Atlanta and North Georgia
  - First designated Clean Cities Coalition in the nation
  - Membership includes state gov't., public and private fleets, fuel providers, and auto manufacturers
  - Membership Info: Call William Cook and visit <http://www.cte.tv/cca/cleancitiesatl.html>
- **Middle Georgia Clean Cities Coalition**
  - Covers 7+ counties around Macon-Warner Robins and South Georgia
  - Contact Charise Stephens at 478-803-2506



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# Additional Information

- William Cook, GA EPD: 404-363-7031
- Stacy Allman, GA EPD: 404-363-7033
- Rich McDonald, GA EPD: 404-362-2602
- Websites
  - [www.epa.gov/otaq](http://www.epa.gov/otaq)
  - [www.eere.energy.gov](http://www.eere.energy.gov)
  - [www.nbb.org](http://www.nbb.org)
  - [www.gaepd.org](http://www.gaepd.org)
  - [www.clean-diesel.org/](http://www.clean-diesel.org/)
  - [www.southeastdiesel.org](http://www.southeastdiesel.org)

