



# Reducing Pollution from School Buses

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U.S. EPA New England Office

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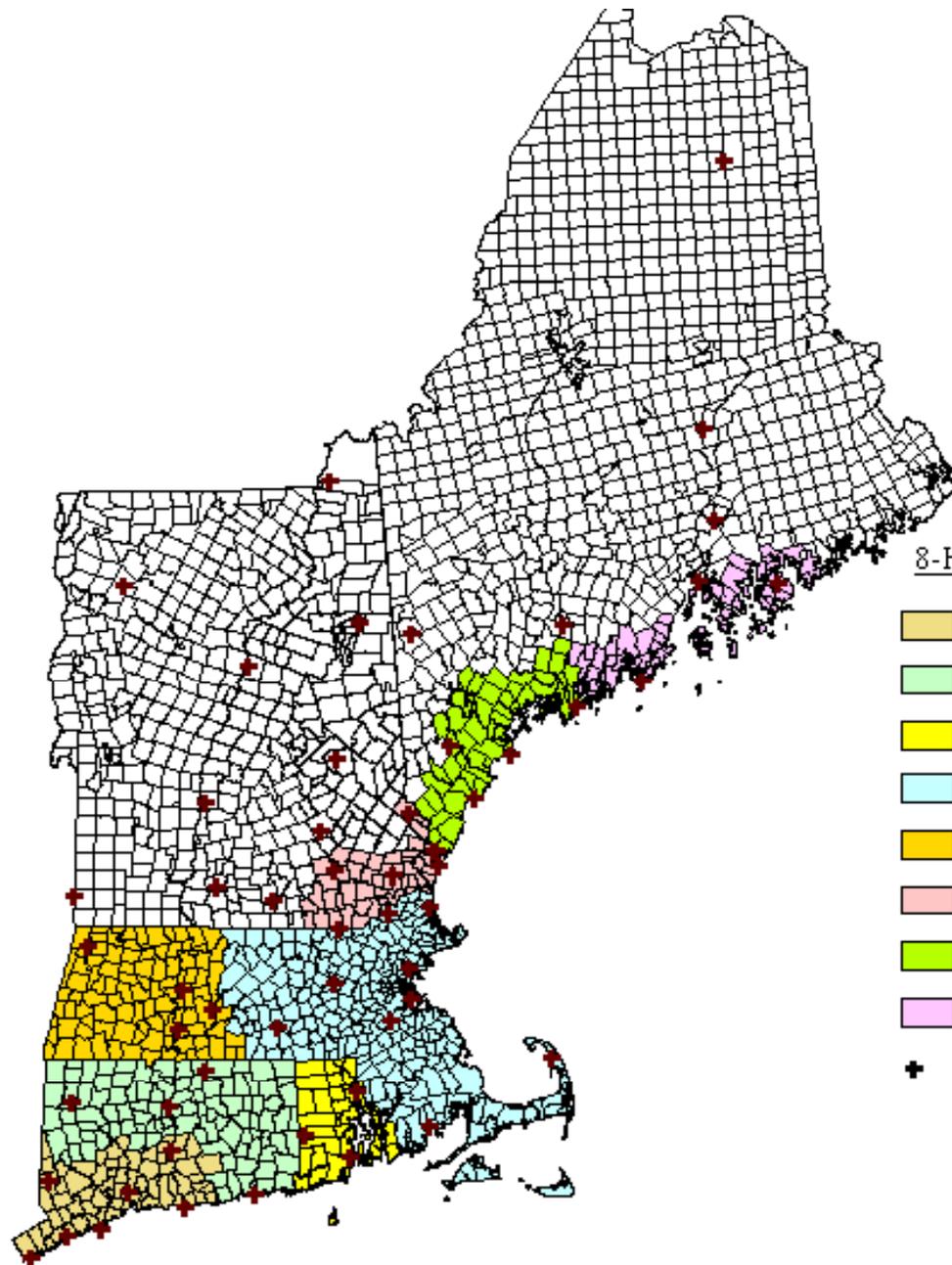


# Why are We Concerned about Diesel Exhaust?



- The Northeast has some of the highest asthma rates in the country
  - All six New England states have childhood asthma rates above 10 percent
  - In Conn., lifetime childhood asthma rates are 13.7 percent
- Diesel exhaust contains fine particles which can aggravate asthma and cause lung damage as well as premature death
- EPA has classified diesel particulate matter as a likely human carcinogen
- Diesel engines are significant contributors to air pollution, especially in urban areas (e.g., ~ 50% of the directly emitted particulate matter emissions in Suffolk county Massachusetts come from diesel engines)
- Many cost effective strategies exist to address this problem

## 8-Hour Nonattainment Areas in New England (effective June 15, 2004)

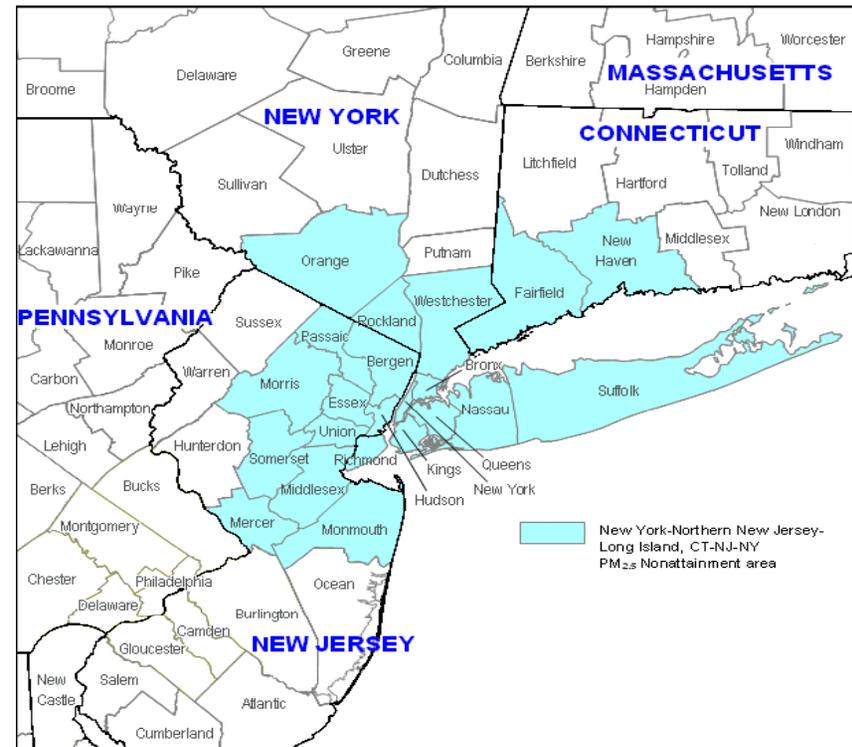


### 8-HOUR OZONE NON-ATTAINMENT AREAS

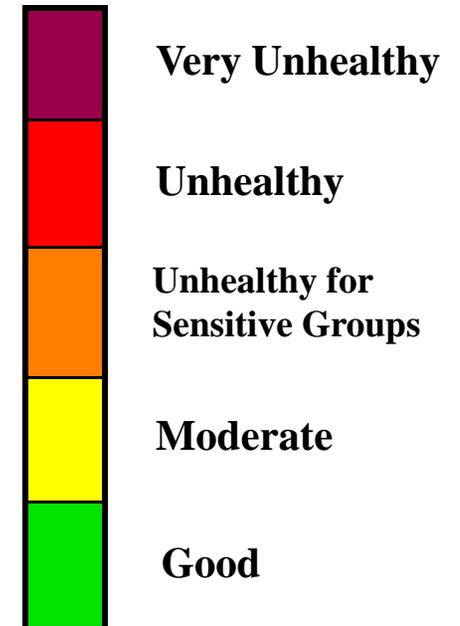
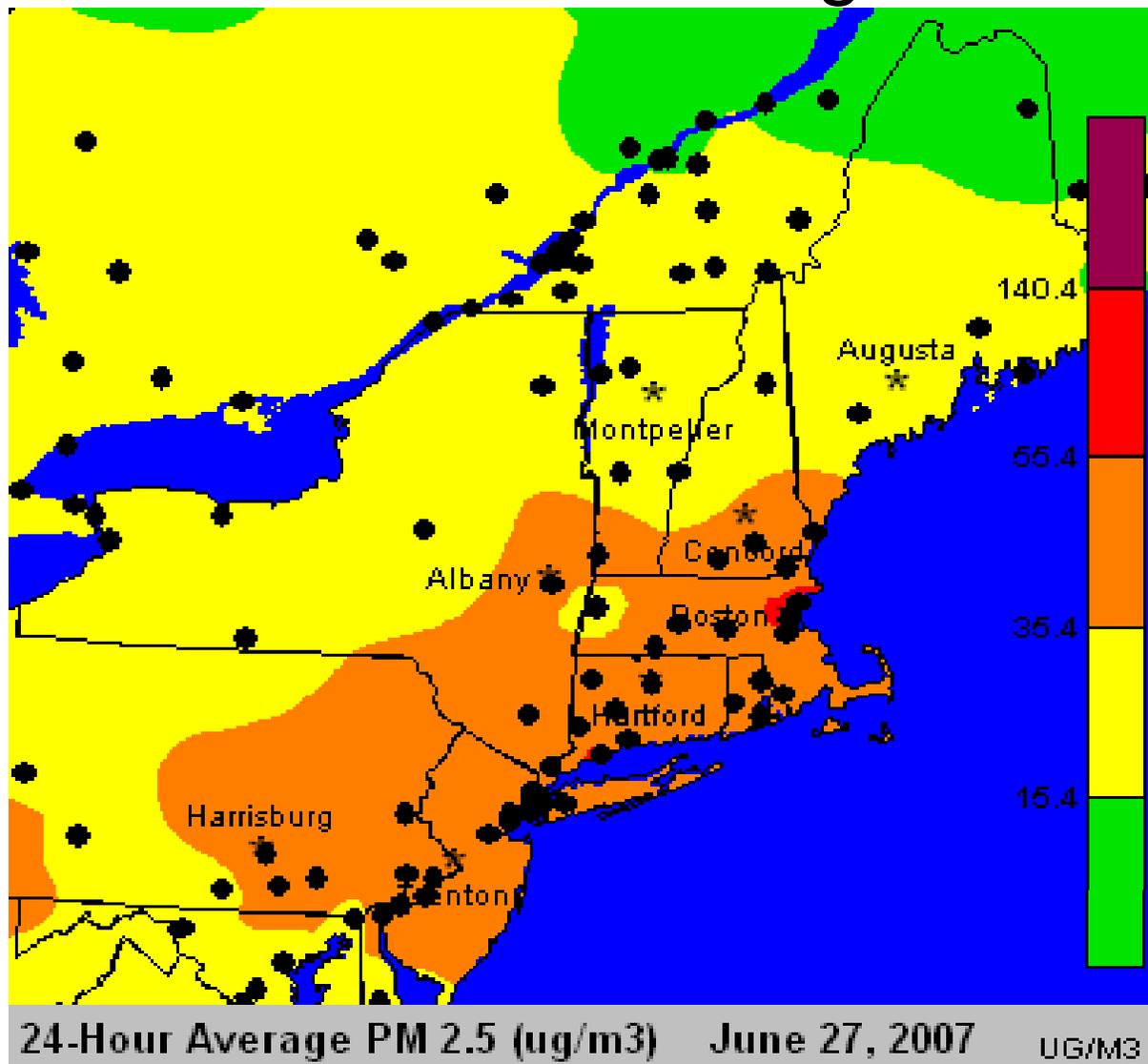
-  NEW YORK-N. NEW JERSEY-LONG ISLAND, NY-NJ-CT
-  GREATER CONNECTICUT, CT
-  PROVIDENCE (ALL RI), RI
-  BOSTON-LAWRENCE-WORCESTER (E. MA), MA
-  SPRINGFIELD (W. MA), MA
-  BOSTON-MANCHESTER-PORTSMOUTH (SE), NH
-  PORTLAND, ME
-  HANCOCK, KNOX, LINCOLN AND WALDO COS, ME
-  2003 OZONE MONITORING STATION

# CT PM<sub>2.5</sub> Nonattainment Area

- The daily air quality standard for fine particles, or PM<sub>2.5</sub>, is 35 micrograms per cubic meter.
- In December 2008, EPA designated areas not meeting this standard as “nonattainment.”

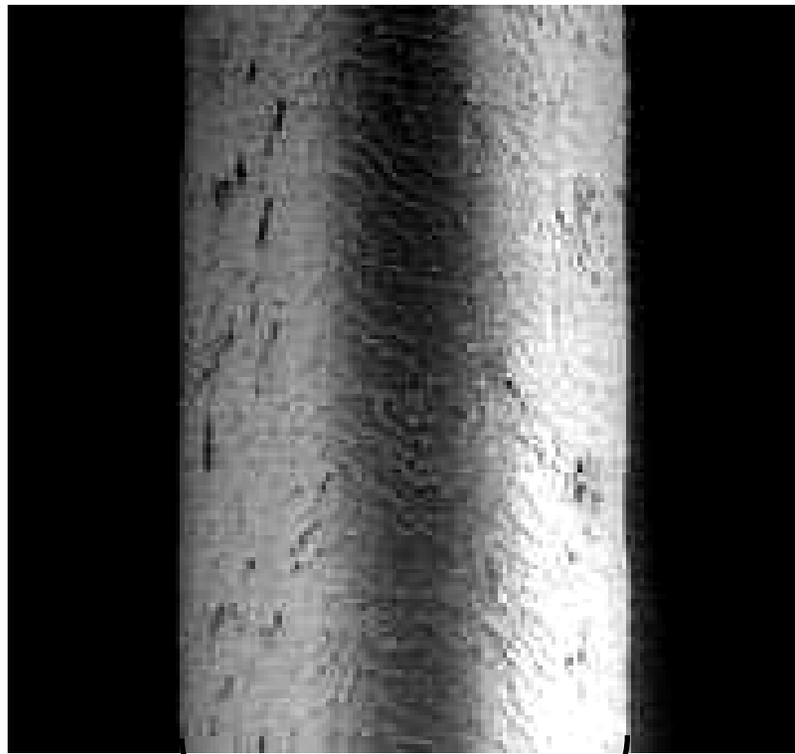


# Unhealthy Levels of Fine Particles Can Occur Across New England



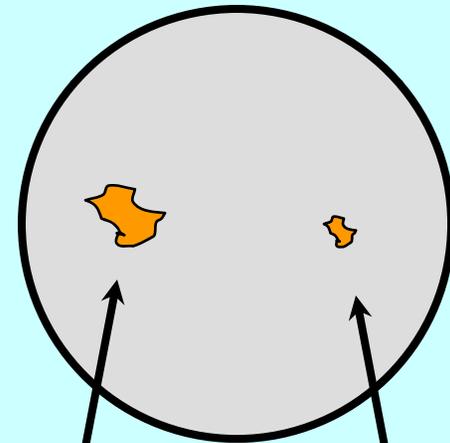
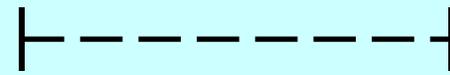
Fine particle concentrations on June 27, 2007

# Fine Particles – How Small are They?



**Human Hair**  
**(60  $\mu\text{m}$  diameter)**

**Hair cross section (60  $\mu\text{m}$ )**



**PM10**  
**(10  $\mu\text{m}$ )**

**PM2.5**  
**(2.5  $\mu\text{m}$ )**

# What is EPA doing to Reduce Diesel Pollution?



- Setting stringent **emission standards for new diesel engines**
- Supporting voluntary efforts to **retrofit existing engines with pollution controls**
- Developing **local and regional initiatives** to reduce diesel pollution
- Encouraging schools, businesses, institutions and communities to **develop anti-idling policies**
- **Enforcing** anti-idling rules

# What is EPA Doing?

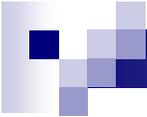


- Setting stringent **emission standards for new diesel engines**

# EPA's Clean Diesel Campaign – Regulations for New Engines



- Nationally, EPA has set standards for **new diesel engines and diesel fuel** that will reduce PM and NOx emissions from new diesel engines by over 90 percent
- Clean Air Highway Diesel Rule (December 2000)
  - Established stringent standards for new heavy-duty trucks and buses that take full effect beginning in 2007
  - Also required a 97 percent reduction in the sulfur content of highway diesel fuel, from 500 ppm to 15 ppm
  - Ultra low sulfur diesel fuel (ULSD) introduced October, 2006
  - Phase-in of NOx standards 2007-2010
- Clean Air Non-Road Engine Rule (May 2004)
  - Established very stringent standards for new nonroad diesel engines which will take effect beginning in 2008
  - Requires use of low sulfur diesel (LSD) fuel in non-road equipment by June 2007, ULSD by 2012



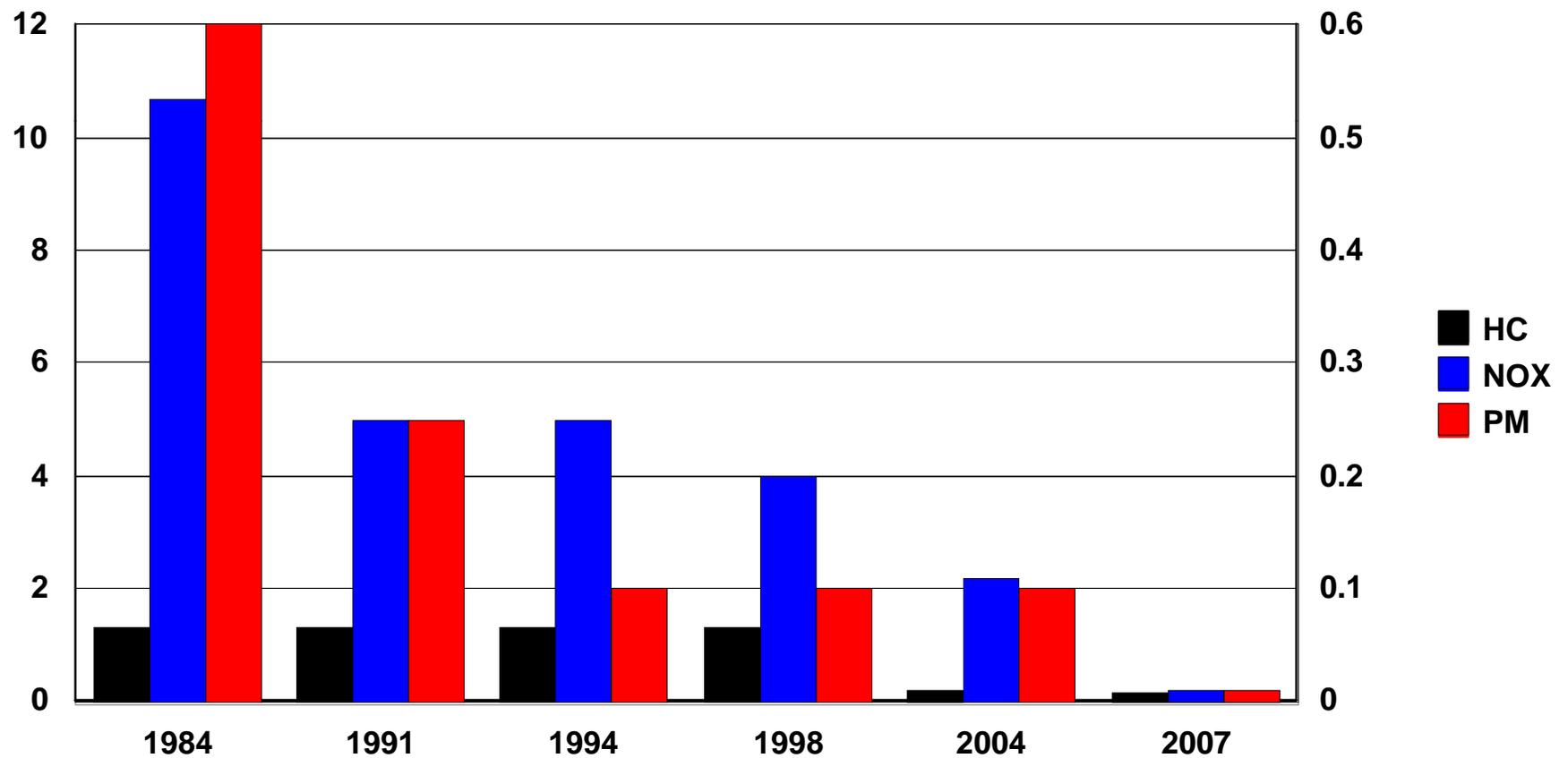
# EPA's Clean Diesel Campaign – Regulations for New Engines

<b>Year</b>	<b>Clean Diesel Action</b>
2006	ULSD for all highway vehicles
2007-2010	New emission standards for heavy-duty trucks and buses
2007	LSD for all non road vehicles
2008-2015	New emission standards for non road engines
2010	ULSD for non-road engines
2012	ULSD for locomotives and marine vessels

# EPA Standards for New Trucks and Buses

**HC, NO<sub>x</sub>**  
(g/bhp-hr\*)

**PM**  
(g/bhp-hr)



# What is EPA Doing?



- Supporting voluntary efforts to **retrofit existing engines with pollution controls**

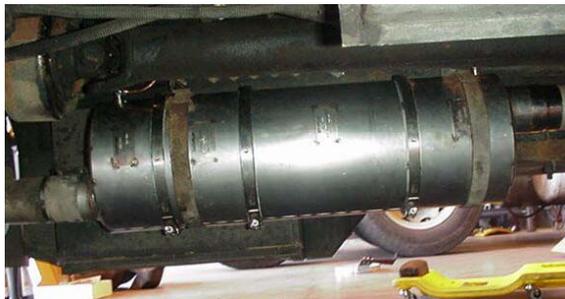


# EPA's Clean Diesel Campaign

- National Voluntary Diesel Retrofit Program
  - Reduces pollution from **existing diesel engines** through the use of pollution controls and cleaner fuels
  - Projects underway or completed to add advanced pollution controls to construction and port equipment, tourist trolleys, and municipal vehicles
- SmartWay Transport
  - Voluntary partnership between EPA and the freight industry to increase energy efficiency and energy security and reduce air pollution and greenhouse gases
  - 44 partners in New England to date
- Clean School Bus USA
  - Has provided \$31.5 million to school districts for school bus retrofit projects nationwide
  - Fifteen projects underway or completed in New England, totaling nearly \$3.7 million

# Retrofits and Cleaner Fuels

- Diesel Oxidation Catalyst
  - 20 - 30% PM reduction
  - \$1,500 - \$2,500
- Diesel Flow through Filter
  - 50% PM Reduction
  - \$3,000-\$5,000
- Diesel PM Filter
  - 90% PM reduction
  - Requires ULSD
  - \$5,000 - \$9,000



- Ultra Low Sulfur Diesel Fuel
  - 15-20% PM reduction (compared to non-road fuel)
- Biodiesel
  - 10% PM reduction (B20)
  - 15 to 30 cents more per gallon (price varies)
- Compressed Natural Gas
  - 70 - 90% PM reduction
  - \$30,000 more than diesel
  - Requires special maintenance facility and fueling infrastructure



# School Bus Retrofit/Replacement Projects in New England



- **Statewide, ME** – 450 buses with catalysts and crankcase filters
- **Boston, MA** – 600 buses with filters or catalysts and ULSD
- **Medford, MA** – 70 buses with combination of filters and catalysts (and ULSD)
- **Manchester/Nashua, NH** – 45 buses with catalysts and crankcase ventilation systems
- **Warwick, RI** – 70 buses with/ULSBD (40 w/filters, 40 w/catalysts)
- **Bellows Falls, VT** – replace 5 buses w/new 2007 MY buses
- **Hollis, NH** – 25 buses with diesel particulate filters and crankcase ventilation systems

# School Bus Retrofit Projects in Connecticut [EPA Funded]



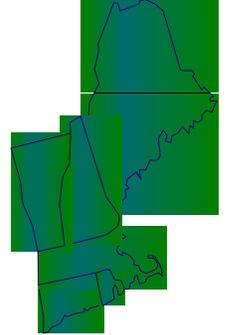
- **Stamford, CT** – 35 buses with catalysts
- **Fairfield, CT** – 55 buses with filters
- **Old Lyme, CT** – 14 buses with filters
- **Mansfield, CT** – 22 buses with filters
- **Newtown, CT** – 60 buses with filters or catalysts



# What is EPA Doing?

- Developing **local and regional initiatives** to reduce diesel pollution

# Reducing Diesel Emissions in New England



- Numerous innovative programs are underway to reduce diesel pollution from transportation and construction
- EPA, the states and our local partners are working to reduce emissions from diesel vehicles through:
  - Anti-idling education and enforcement
  - Diesel retrofits and cleaner fuels
  - Heavy-duty vehicle testing



# Voluntary Collaboration

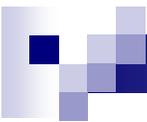
- Northeast Diesel Collaborative (NEDC)

- [www.northeastdiesel.org](http://www.northeastdiesel.org)

- Greater Boston Breathes Better (GB3)

- [www.epa.gov/ne/eco/gb3](http://www.epa.gov/ne/eco/gb3)





# Northeast Diesel Collaborative



Northeast  
Diesel Collaborative  
[www.northeastdiesel.org](http://www.northeastdiesel.org)

- EPA Regions 1 and 2, NESCAUM and the eight Northeast states established the Northeast Diesel Collaborative (NEDC) to:
  - Significantly expand existing, and develop new, regional partnerships to reduce diesel emissions and protect public health
  - Leverage new funding for initiatives to reduce emissions in key sectors, including:
    - Federal and State Grant Programs
    - Funds from enforcement settlements
    - Federal Transportation Funds (e.g., Congestion Mitigation/Air Quality-CMAQ)
    - Private Sources



# Greater Boston Breathes Better

- Greater Boston Breathes Better (GB3)
  - Comprehensive, multi-stakeholder initiative to improve air quality in the Boston area by increasing participation in EPA's voluntary transportation programs
  - Partnership with government, private sector, institutions, and nonprofit organizations including:
    - EPA New England; Commonwealth of Massachusetts; Massport; Cities of Boston, Cambridge and Somerville; the Town of Belmont; Harvard University; Massachusetts Institute of Technology; Suffolk University; Dana Farber Cancer Institute;

# What is EPA Doing?



- Encouraging schools, businesses, institutions and communities to **develop anti-idling policies**
- **Enforcing** anti-idling rules

# Anti-Idling Rules and Policies in New England

- Every New England state has an anti-idling rule
- CT, MA & RI rules are included in the state air quality plan, and enforceable by EPA
- EPA has enforced the MA rule and imposed fines against:
  - Eleven bus operators at Logan Airport
  - Massachusetts Bay Transportation Authority
  - Wal-Mart
  - Paul Revere Transportation Company



# Diesel Related Funding Opportunities

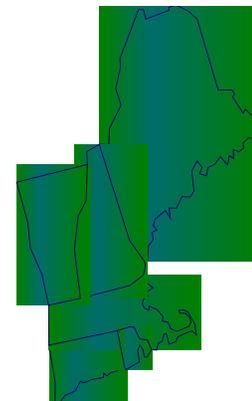
Northeast  
Diesel Collaborative  
[www.northeastdiesel.org](http://www.northeastdiesel.org)

- 2009 Northeast Diesel Collaborative (NEDC) Request for Proposals (RFP)
  - RFP expected in February 2009
  - **~\$5 million** in grants and innovative financing to significantly reduce diesel emissions and improve public health in EPA Regions 1 and 2
  - For more information:  
[www.northeastdiesel.org/funding](http://www.northeastdiesel.org/funding)

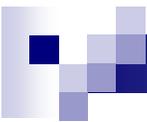


**National Clean Diesel Campaign**

# State Diesel Emissions Reduction Program



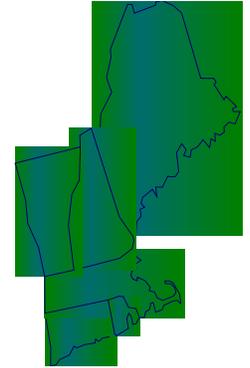
- Allocation program; not a competition
- Formula for allocation is in the legislation
- EPA encourages all States to participate



# State Clean Diesel Grant Program: Funding Allocation

- ~ \$10M for states that apply
  - If all 50 states + D.C. participate, 1.96% for each (\$193K)
  - If fewer than 50 + D.C. states participate, 1.96% plus population formula
  
- ~ \$5M reserved as incentive for state match
  - Match not required
  - If State matches allocation dollar for dollar, State receives an additional 50% of allocation above
  - Any funding not utilized reverts to national program
  
- Award amounts to states could range from \$193,000 to over \$500,000

# 2008 State Clean Diesel Grant Program - Connecticut



- \$492,200 awarded to CT DEP:
  - \$295,320 in EPA Funding + \$196,880 in State Funding
- Funds will be used to reduce emissions from school buses



# For more information:

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- [www.northeastdiesel.org](http://www.northeastdiesel.org)

- [www.epa.gov/ne/eco/diesel](http://www.epa.gov/ne/eco/diesel)

