

# Puerto Rico's Air Quality in 2010 and New EPA Initiatives



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**Air pollution affects our Health, our Environment and the Economy.**



The 1970 Clean Air Act and its Amendments of 1990 protect and enhance the quality of the nation's air by regulating stationary and mobile sources of air emissions.



The CAA required EPA to set national Ambient Air Quality Standards (NAAQS) for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment.

EPA has set NAAQS for six principal pollutants which are called “criteria pollutants”.



# National Ambient Air Quality Standards (NAAQS)

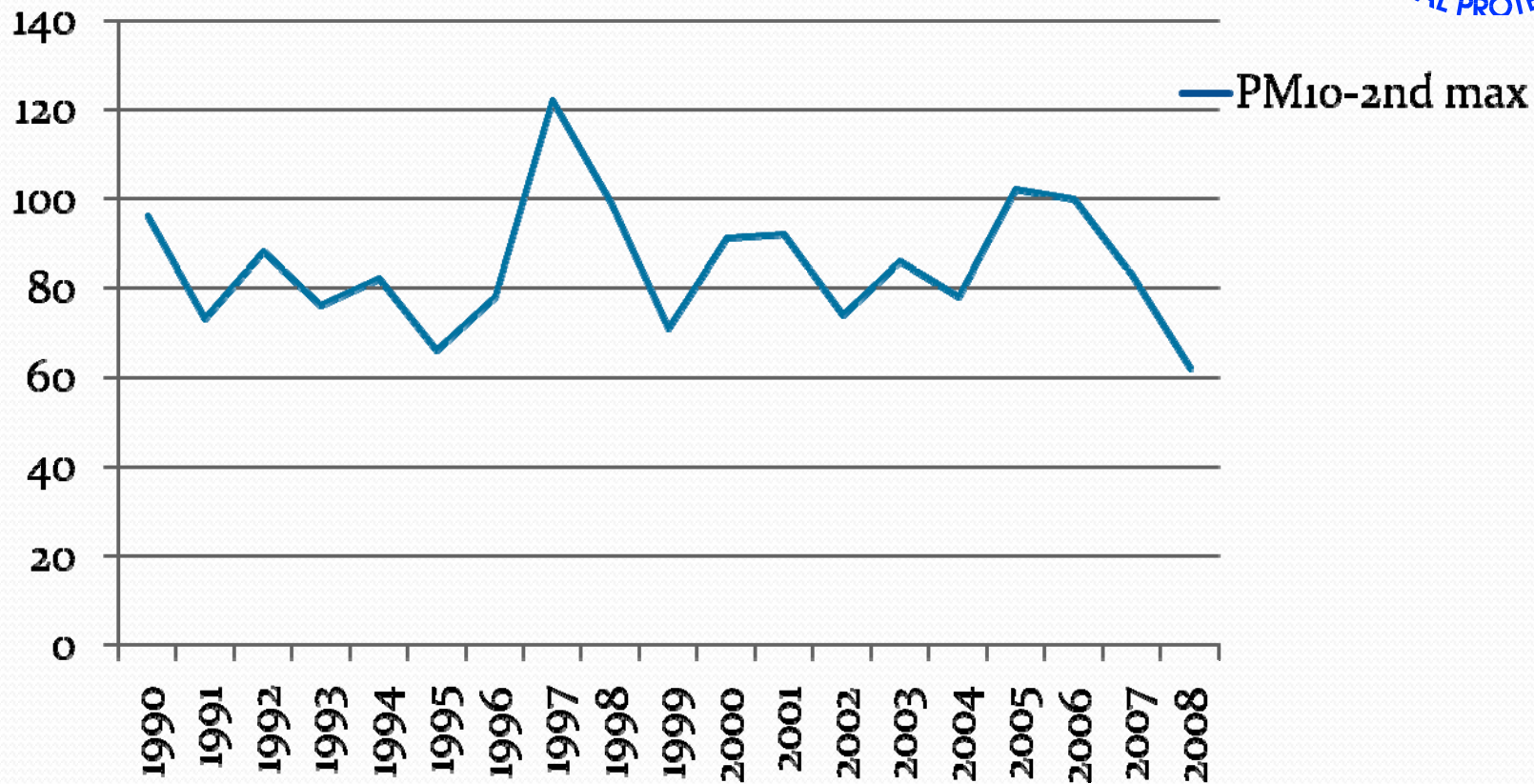
Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
<u>Carbon Monoxide</u>	9 ppm (10 mg/m <sup>3</sup> )	8-hour <sup>(1)</sup>		None
	35 ppm (40 mg/m <sup>3</sup> )	1-hour <sup>(1)</sup>		
<u>Lead</u>	0.15 µg/m <sup>3</sup> <sup>(2)</sup>	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m <sup>3</sup>	Quarterly Average	Same as Primary	
<u>Nitrogen Dioxide</u>	53 ppb <sup>(3)</sup>	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour <sup>(4)</sup>	None	
<u>Particulate Matter (PM<sub>10</sub>)</u>	150 µg/m <sup>3</sup>	24-hour <sup>(5)</sup>	Same as Primary	
	15.0 µg/m <sup>3</sup>	Annual <sup>(6)</sup> (Arithmetic Average)	Same as Primary	
<u>Particulate Matter (PM<sub>2.5</sub>)</u>	35 µg/m <sup>3</sup>	24-hour <sup>(7)</sup>	Same as Primary	
	0.075 ppm (2008 std)	8-hour <sup>(8)</sup>	Same as Primary	
<u>Ozone</u>	0.08 ppm (1997 std)	8-hour <sup>(9)</sup>	Same as Primary	
	0.12 ppm	1-hour <sup>(10)</sup>	Same as Primary	
<u>Sulfur Dioxide</u>	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour <sup>(11)</sup>
	0.14 ppm	24-hour <sup>(12)</sup>		



Once the regulations and standards were promulgated, EPA and PREQB conducted extensive studies to identify the areas of concern.



# PM10 in Puerto Rico



PM10 std (primary and secondary are the same)  
Annual - 50 ug/m<sup>3</sup>  
24 hr- 150 ug/m<sup>3</sup>



## Area of concern:

- **Guayanilla/Tallaboa & Peñuelas**
  - Power plants, refineries and chemical process plants used dirty fuel (2.5%S) between
  - PREQB and EPA developed strategies to reduce sulfur dioxide by limiting the sulfur content %S in fuel.





## Area of Concern:

### Cataño basin

- dense industrial activity (including in the surrounding municipalities of Bayamon, San Juan, Toa Baja and Guaynabo). The area was declared "***of concern***" for TSP (Total Suspended Particles).
- construction activities, grain processing plants, heavy traffic, a refinery, iron smelters, glass production, cement production, and power plant were evaluated by EPA and PREQB.

# EPA designated Guaynabo as Non-Attainment for PM10



- EPA found that Guaynabo (within Cataño basin) exceeded the primary 24-hr std of 150 ug/m<sup>3</sup>- The value measured in Guaynabo Air Monitor #24 was 287 ug/m<sup>3</sup> and had a 60% probability of a second exceedance over 150 ug/m<sup>3</sup>.
- PREQB developed a State Implementation Plan that was submitted in 1993. New PM10 strategies were developed to
  - reduce sulfur in fuel used at PREPA San Juan and Palo Seco from 2.5% to 1.5%,
  - to reduce production at a grain processing plant (Molinos de PR) to 90%,
  - to add additional controls at two other grain processing plants (Pan American Grain in Guaynabo and Cataño).



## Re-designation of Guaynabo to Attainment for PM<sub>10</sub>

- In 2009, PREQB submitted to EPA the Limited Maintenance Plan (LMP) for Guaynabo.
- EPA re-designated Guaynabo as attainment while it complies with the commitments of the LMP.
- It establishes the strategy to keep the ambient air monitoring network, to continue the enforcement of the present regulations and to keep the ambient air within compliance.



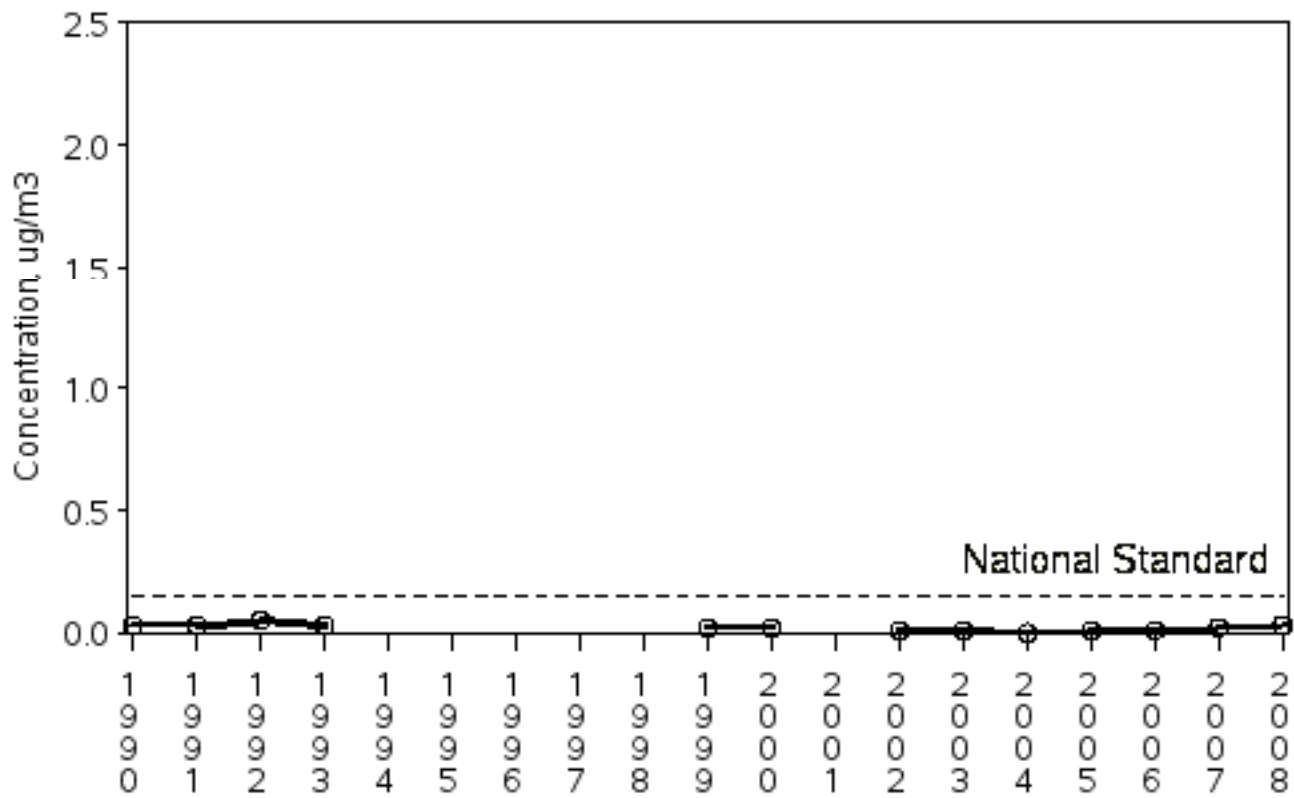
## Lead

- The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources.
- As a result of EPA's regulatory efforts to remove lead from gasoline:
  - emissions of lead from the transportation sector dramatically declined by 95 percent between 1980 and 1999, and
  - levels of lead in the air decreased by 94 percent between 1980 and 1999.



# Lead reductions in PR

Lead Air Quality, 1990 - 2008  
(Based on Annual Maximum 3-Month Average)  
SanJuan-Bayamon,PR  
SITE=721270003





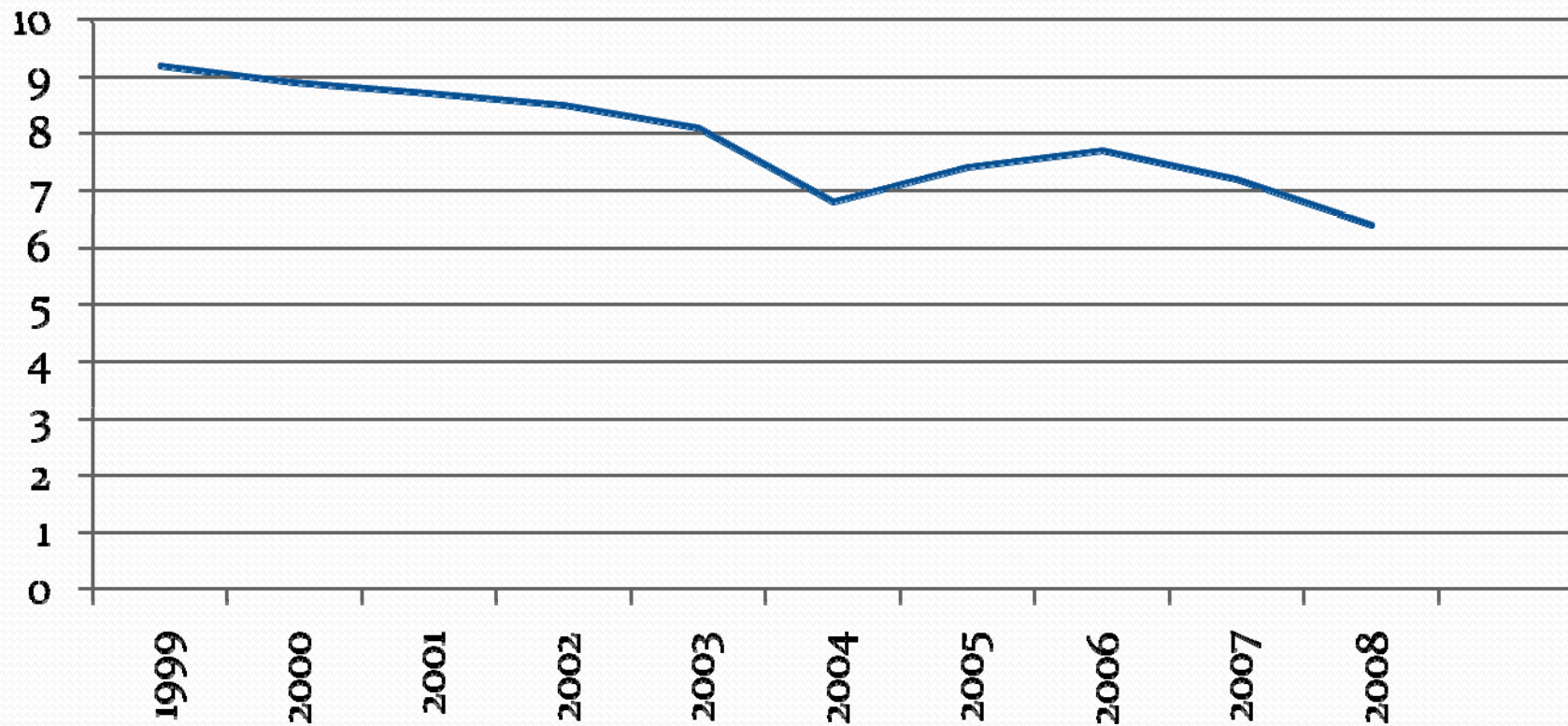
## New PM<sub>2.5</sub> standards

- In 1996, EPA developed the new PM<sub>2.5</sub> standards recognizing that the smallest particles were significantly impacting the human health.
  - Requested states to establish new PM<sub>2.5</sub> air monitors and, within 5 years, determine the air quality.
  - PREQB was able to prove to EPA that no significant values were obtained and EPA approved the attainment of the standards.



# PM2.5 Trends in Puerto Rico

## PM2.5 - Weight Annual Mean



PM2.5 - (primary and secondary are the same)

Annual- 15 ug/m<sup>3</sup>

24 hr- 35 ug/m<sup>3</sup>

# New Air Toxic Program-MACTs



- New pollutants begin to be regulated through the Maximum Available Control Technology (MACTs).
- EPA regulated starts regulating facilities that emit or have the potential to emit the most significant toxics such as methylene chloride, trichloroethylene, benzene, toluene, xylene, ethylene oxides, mercury, dioxins and furans, etc., including pharmaceutical plants, refineries, wastewater treatment plants, dry cleaners, etc.
- EPA also identifies others that were regulated by other programs and the air pollutants that constitute a risk. Among those are the Municipal Solid Waste Landfills (Non Methane Organic Compounds), Municipal Wastewater Treatment Plants (mercury), Municipal Waste Combustors (D/F)



## 1990 CAA amendments....



### Risk Management Plan

- In 1990, EPA also targets those facilities that store, handle or use 77 toxics pollutants and mandates that all prepare a Risk Management Plan (RMP) under Section 112r.
  - to prepare the affected facility to respond adequately to a release or an accident,
  - to share their plans with the surrounding community and to provide the regulators with copies of their emergency plan.

## 1990 CAA amendments....



- In Puerto Rico, there are 105 RMP facilities of which
  - 95 are PRASA facilities that handle more than one ton (2000 lbs) cylinders of chlorine (the RMP threshold is 2500 lbs).
  - Other facilities include refrigeration industries which use anhydrous ammonia.
  - EPA and PREQB also inspect and oversee non-RMP facilities to ensure compliance with their responsibility under the General Duty Clause.

## 1990 CAA amendments....



### Title V Operating Permit Program

- EPA develops a new permit concept called Title V. The permit is intended to be
  - Comprehensive but easy to read and understand
  - Must address all state and federal regulatory requirements including monitoring, recordkeeping and reporting
  - Must allow the public to review it and to comment in public hearings
  - EPA could veto it if it does not meet those requirements

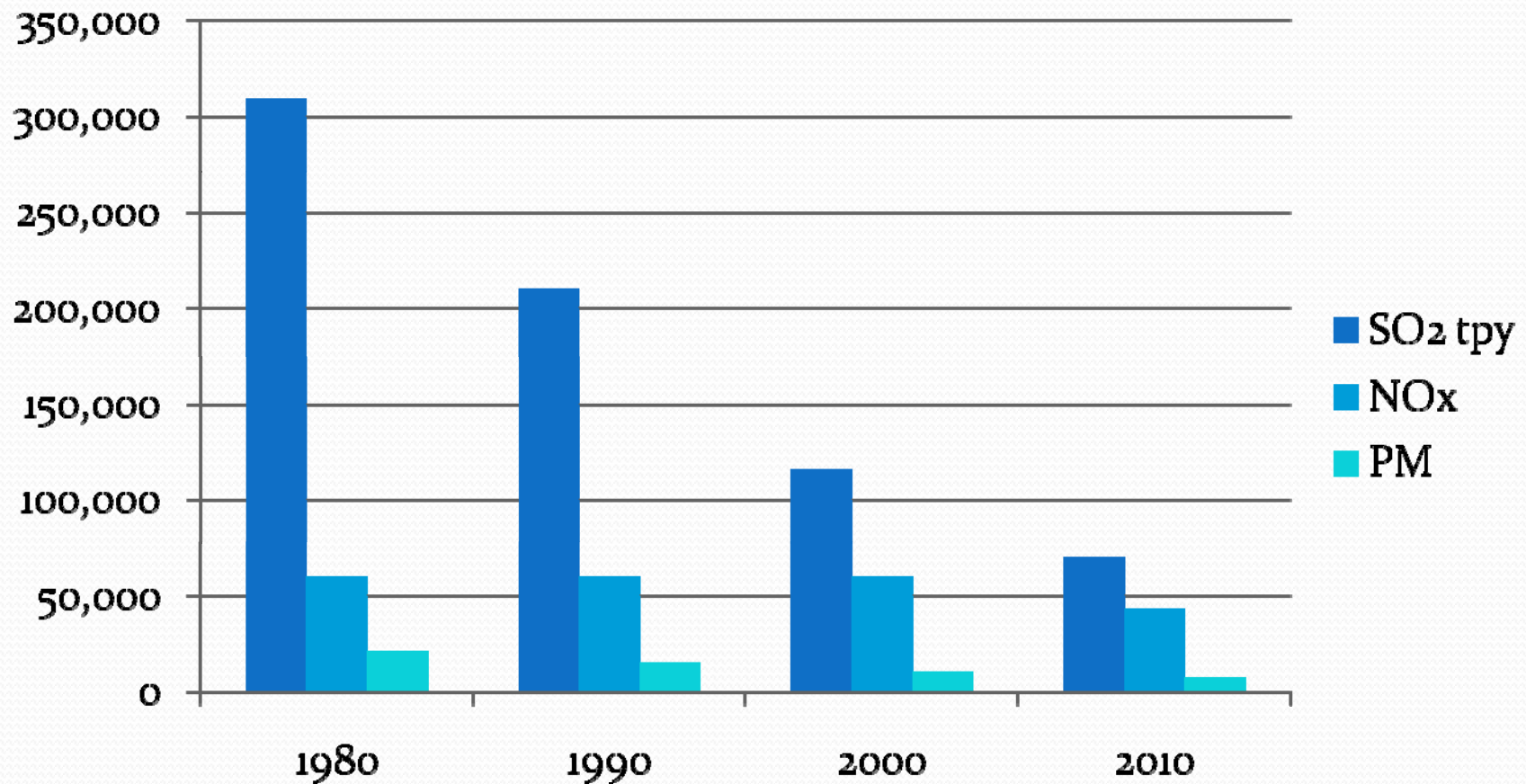
PR has 65 Title V facilities covered and has issued 43 permits.



## **Achievements in 40 years,**

- the six commonly found air pollutants have decreased by more than 50 percent for the past 40 years
- air toxics from large industrial sources, such as chemical plants, petroleum refineries, and paper mills have been reduced by nearly 70 percent
- new cars are more than 90 percent cleaner and will be even cleaner in the future, and
- production of most ozone-depleting chemicals has ceased.
- At the same time,
- the U.S. gross domestic product, or GDP, has tripled
- energy consumption has increased by 50 percent, and
- vehicle use has increased by almost 200 percent.

# PREPA reductions



PM and SO<sub>2</sub> due to PM<sub>10</sub> SIP and EPA Consent Decree %S reductions

## New developments



- **Clean Air Mercury Rule**

- On December 24, 2009, EPA approved an Information Collection Request requiring power plants to submit emissions information for use in developing air toxics emissions standards.
- EPA is developing air toxics emissions standards for power plants under the Clean Air Act (Section 112), consistent with the D.C. Circuit's opinion regarding the Clean Air Mercury Rule (CAMR). EPA intends to propose air toxics standards for coal- and oil-fired electric generating units by March 10, 2011 and finalize a rule by November 16, 2011.

# New developments



- Existing Stationary Diesel Engines/Emissions reductions
  - EPA is setting standards to reduce emissions of formaldehyde, benzene, acrolein and other toxic air pollutants from certain stationary diesel engines. These pollutants are known or suspected to cause cancer or other serious health problems and environmental damage.
    - will need to install emissions controls, such as catalysts, to engine exhaust systems. Emergency engines need to comply with operating requirements that will limit emissions.



## New developments

- EPA will issue final emissions standards for similar existing stationary engines that burn gasoline, natural gas and landfill gas, known as spark ignition engines, by August 10, 2010.
- More information: <http://www.epa.gov/ttn/oarpg/new.html>



## EPA Strengthens Air Quality Standard for Nitrogen Dioxide (NO<sub>2</sub>)



- The new one-hour standard will protect millions of Americans from peak short-term exposures, which primarily occur near major roads. Short-term exposures to NO<sub>2</sub> have been linked to impaired lung function and increased respiratory infections, especially in people with asthma.
- The agency set the new one-hour standard for NO<sub>2</sub> at a level of 100 parts per billion (ppb). EPA also is retaining the existing annual average standard of 53 ppb.
- EPA is establishing new monitoring requirements in urban areas that will measure NO<sub>2</sub> levels around major roads and across the community. Monitors must be located near roadways in cities with at least 500,000 residents. Larger cities and areas with major roadways will have additional monitors. Community-wide monitoring will continue in cities with at least 1 million residents.



## EPA Strengthens Air Quality Standard for Nitrogen Dioxide (NO<sub>2</sub>)

- The new standard will help protect Americans from NO<sub>2</sub> exposures linked to respiratory illnesses that lead to emergency room visits and hospital admissions, particularly in at-risk populations such as children, the elderly, and asthmatics.
- EPA expects to identify or designate areas not meeting the new standard, based on the existing community-wide monitoring network, by **January 2012**. **New monitors must begin operating no later than January 1, 2013**. When three years of air quality data are available from the new monitoring network, EPA intends to re-designate areas as appropriate.
- More information: <http://www.epa.gov/air/nitrogenoxides>

# EPA Strengthens Smog Standard



- EPA is proposing strictest health standards for smog.
  - **Smog, also known as ground-level ozone**, is linked to a number of serious health problems, ranging from aggravation of asthma to increased risk of premature death in people with heart or lung disease. Ozone can even harm healthy people who work and play outdoors.
  - The agency is proposing to set the “**primary**” **standard**, which protects public health, at a level **between 0.060 and 0.070 parts per million (ppm)** measured over eight hours.
- More information: <http://www.epa.gov/groundlevelozone>



## EPA Signs Two Rules to Further Protect Ozone Layer

- EPA signed two final rules that will further cut ozone-depleting pollutants, protecting the Earth's ozone layer and reducing harmful greenhouse gases.
- The rules reduce the availability and use of hydrochlorofluorocarbons (HCFCs), which are primarily used as refrigerants.



- The first rule prohibits the use of specific HCFCs to manufacture new air-conditioning and refrigeration equipment beginning in 2010, while allowing limited HCFC use to service existing equipment.
- The second rule prohibits the sale, distribution, and import of air-conditioning and refrigeration appliances and their components containing certain HCFCs that are manufactured or imported after January 1, 2010. The rulemakings protect the ozone layer by decreasing the availability of these compounds as well as the demand for newly-produced equipment containing HCFCs.



- These rules advance U.S. compliance under the Clean Air Act and the Montreal Protocol on Substances that Deplete the Ozone Layer.
- A diminished ozone layer allows more radiation to reach the Earth's surface, leading to serious health effects, such as skin cancer, cataracts, and weakened immune systems.
- More information on the two rules:  
<http://www.epa.gov/ozone/title6/phaseout/rulesoverview.html>



## EPA Proposes to Revoke New Source Review Final Rule

- New Source Review is a pre-construction permitting program to ensure air quality is maintained when factories, industrial boilers and power plants are built or modified. The program ensures that state-of-the-art emission control technology is installed at new plants or existing plants that are undergoing a major modification.
  - The Agency is proposing to revoke a January 2009 rule that changed the way existing industrial facilities combine upcoming construction projects to determine if Clean Air Act permits are needed.
  - EPA is proposing to go back to its original policy, which required combining projects based on a broader range of factors. This would ensure that potential emissions increases that could harm air quality do not avoid review and the installation of state-of-the-art pollution controls.



## Emission Control Area Designation for Geographic

### Control of Emissions from Ships

- In August 2012, stringent international standards will require that lower sulfur fuels be used by ships operating within up to 200 nautical miles of the majority of the U.S. and Canadian Atlantic and Pacific coastal waters, as well as the U.S. Gulf Coast.
- EPA expects these international standards to bring important benefits for human health through combustion of significantly lower sulfur fuels. Atmospheric reactions convert sulfur dioxide emissions, a byproduct of burning fossil fuels, to sulfate particles, which are a significant threat to public health and marine and terrestrial ecosystems.
- For information: [www.epa.gov/otaq/oceanvessels.htm](http://www.epa.gov/otaq/oceanvessels.htm) and [www.epa.gov/cleandiesel/ports.htm](http://www.epa.gov/cleandiesel/ports.htm)



# New initiatives



- **National Clean Diesel Campaign**

- In January 2001 and in June 2004, EPA finalized the Highway Diesel and Nonroad Diesel Rules.

- Use of lower sulfur fuels (15 ppm) in diesel engines since 2006 for highway diesel fuel, and 2007 for nonroad diesel fuel which can reduce harmful emissions by 90 percent or more.
- EPA established innovative programs to accelerate emission reductions from older diesel engines by promoting a variety of cost-effective emission reduction strategies, including: switching to cleaner fuels; retrofitting, repairing, repowering, and replacing equipment; and reducing idling.



# New initiatives

- The **2007 Heavy-Duty Highway Engine Rule** is cutting harmful pollutants from new highway engines by more than 90 percent, resulting in annual reductions of 2.6 million tons of NO<sub>x</sub> and 110,000 tons of PM when fully implemented.
- The **Clean Air Nonroad Diesel Rule** will cut emissions from new construction and agricultural and industrial engines by more than 90 percent, resulting in annual reductions of 738,000 tons of NO<sub>x</sub> and 120,000 tons of PM annually when fully implemented.
- More information:  
<http://www.epa.gov/otaq/diesel/index.htm>



# New Initiatives....

- **Greenhouse Gas Reporting Requirements**
  - EPA promulgated the Mandatory Reporting of Greenhouse Gases Rule
    - Intended to collect accurate and timely emissions data from suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions.
    - No stationary sources will be required to get Clean Air Act permits that cover greenhouse gases (GHGs) before January 2011.



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