

National Clean Diesel Campaign

Clean Ports USA

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“Talking Freight Webinar” May 18, 2011



National Clean Diesel Campaign

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Comprehensive EPA program to address diesel emissions across industry sectors

- Regulatory and innovative programs
- EPA Regulations under Clean Air Act
 - On-highway Trucks
 - Nonroad Equipment
 - Locomotive and Marine Vessels
 - Ocean-Going Vessels (and international MARPOL treaty)
- Diesel Emission Reduction Program
 - Cost-effective, Verified Technologies
 - Funding, Recognition, Incentives



National Clean Diesel Campaign

EPA's National Clean Diesel Campaign Regulatory Roadmap

Tier 2 Light-Duty

final rule 1999

fully phased in 2009

Diesels held to same stringent standards as gasoline vehicles



These standard-setting rulemakings are key enablers for collaborative partnerships with industry and state & local governments



Heavy-Duty Highway

sales 800,000 / yr

40B gallons / yr

final rule 2000

fully phased in 2010



Nonroad Diesel

sales over 650,000 / yr

12B gallons / yr

final rule 2004

fully phased in 2015



Locomotive/Marine

sales 40,000 marine engines,

1,000 locomotives / yr

6B gallons / yr

final rule 2008

fully phased in 2017



Ocean Going Vessels

CAA Rule Dec 2009

IMO MARPOL Annex VI

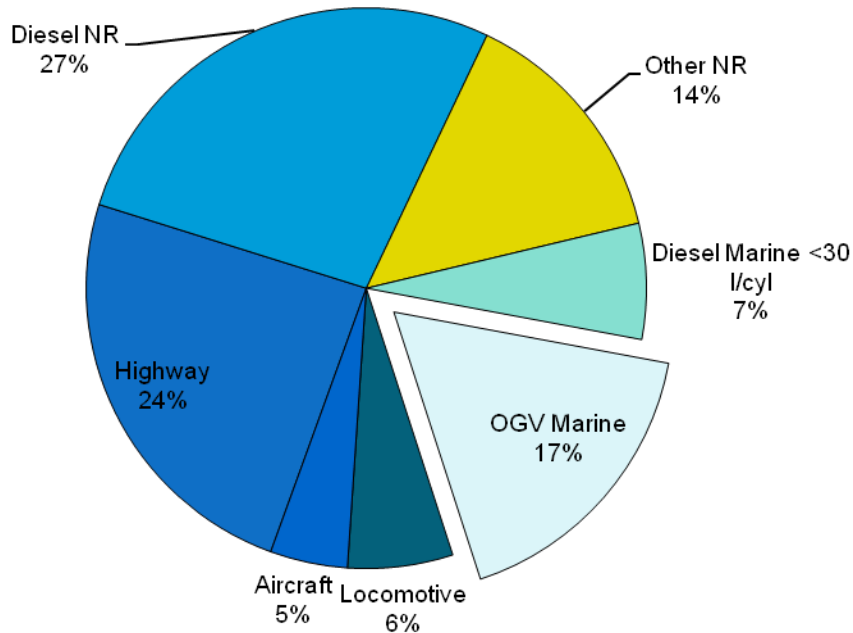
ECA Controls

- Fuel Based 2015
- SCR Catalyst Based 2016

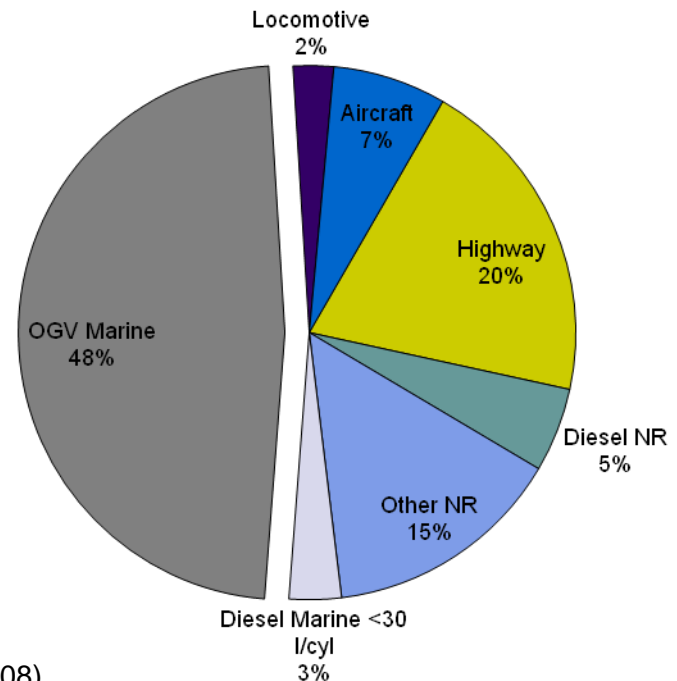
Note: sales and diesel fuel usage vary year-to-year; these figures are for comparison purposes only

Contributions to U.S. PM Inventory

2009 Mobile Source PM2.5 Inventory



2030 Mobile Source PM2.5 Inventory



Source of inventory estimates: C3 Marine NPRM (July, 2009)
Does not reflect IMO MARPOL Annex VI Amendments (October 2008)

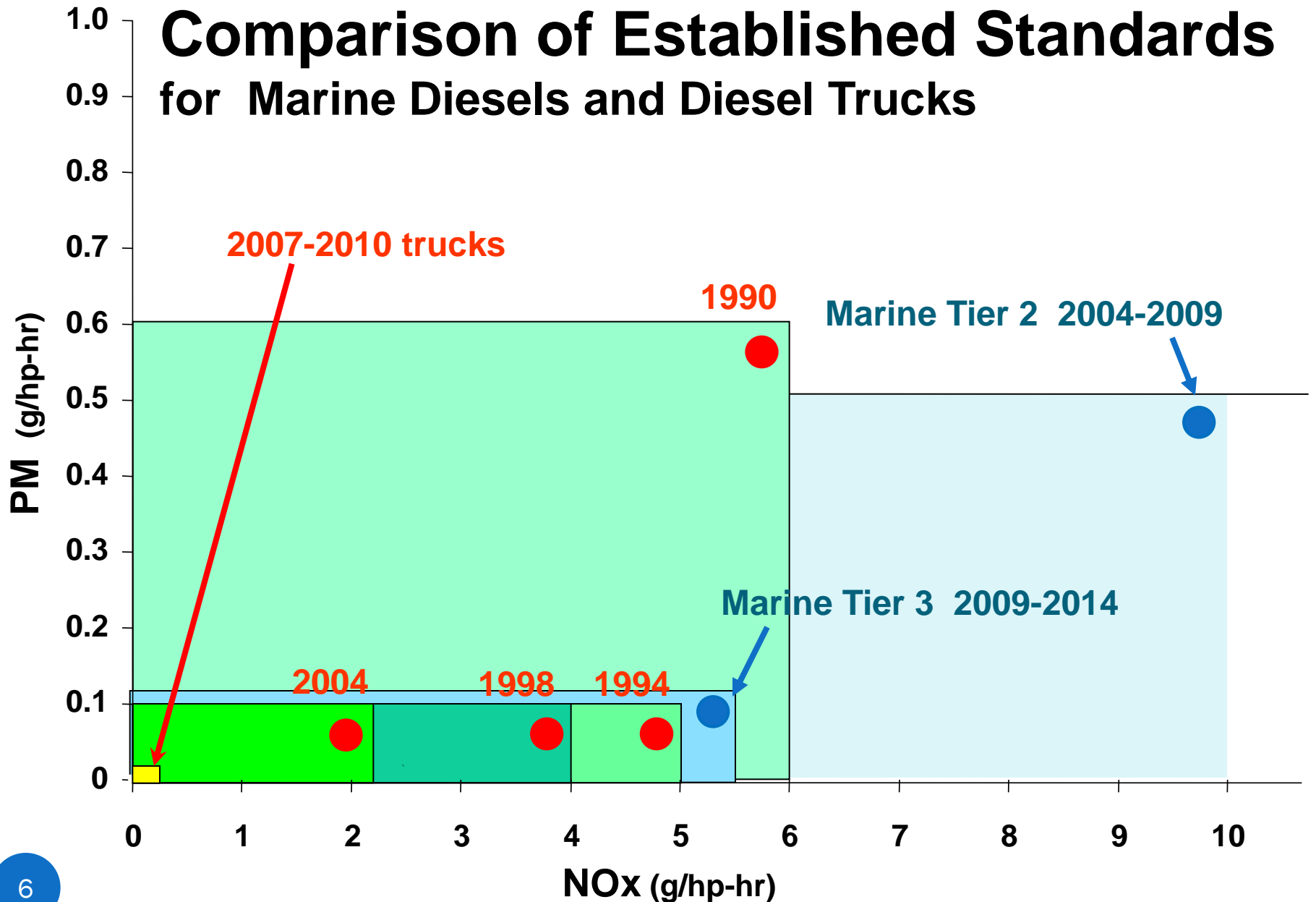
Marine and Locomotive Engines

- **Locomotive and Marine C1 and C2**

- March 2008 EPA adopted more stringent PM and NO_x exhaust emission standards for locomotives and marine diesel engines.
- EPA's three-part program:
 - (1) Tightening emission standards for existing marine engines when they are remanufactured;
 - (2) Setting near-term engine-out emission standards (Tier 3), for newly-built locomotives and marine diesel engines; and
 - (3) Setting longer-term standards (Tier 4), for newly-built locomotives and marine diesel engines that reflect the application of high-efficiency aftertreatment technology.



Comparison of Established Standards for Marine Diesels and Diesel Trucks

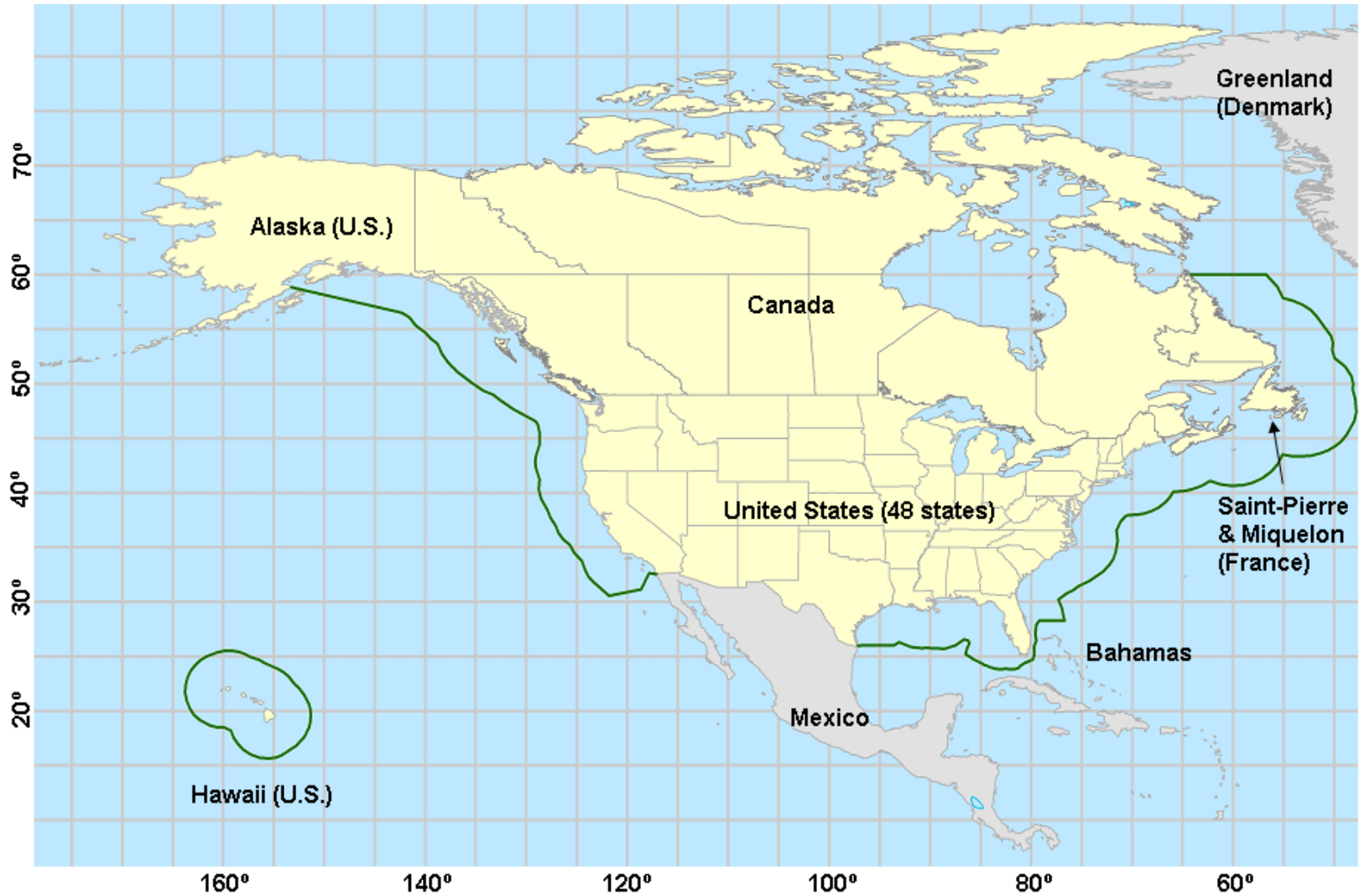


International Maritime Organization (IMO)

Annex VI Amendments for Ships

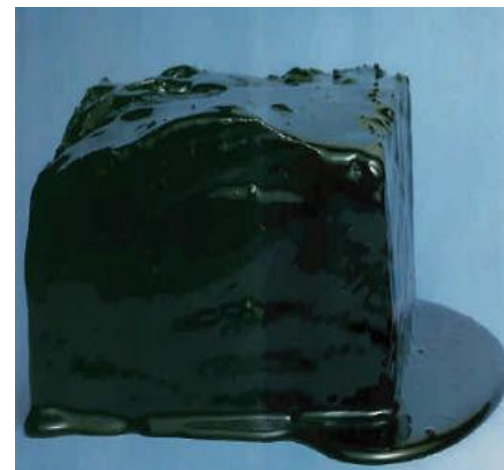
- October 2008 Annex VI amendments approved
- December 2009 EPA adopted IMO Annex VI for US ships
- Global NO_x Controls
 - Tier 2: 20% reduction from new vessels (2011)
 - Existing engine standards
- Global PM and SO_x controls
 - 2012: 3.5% fuel sulfur
 - 2020: 0.5% fuel sulfur
 - Could be delayed to 2025; subject to 2018 fuel availability review
- A country (or countries) can propose to designate an Emission Control Area (ECA), where more stringent standards apply

North American ECA



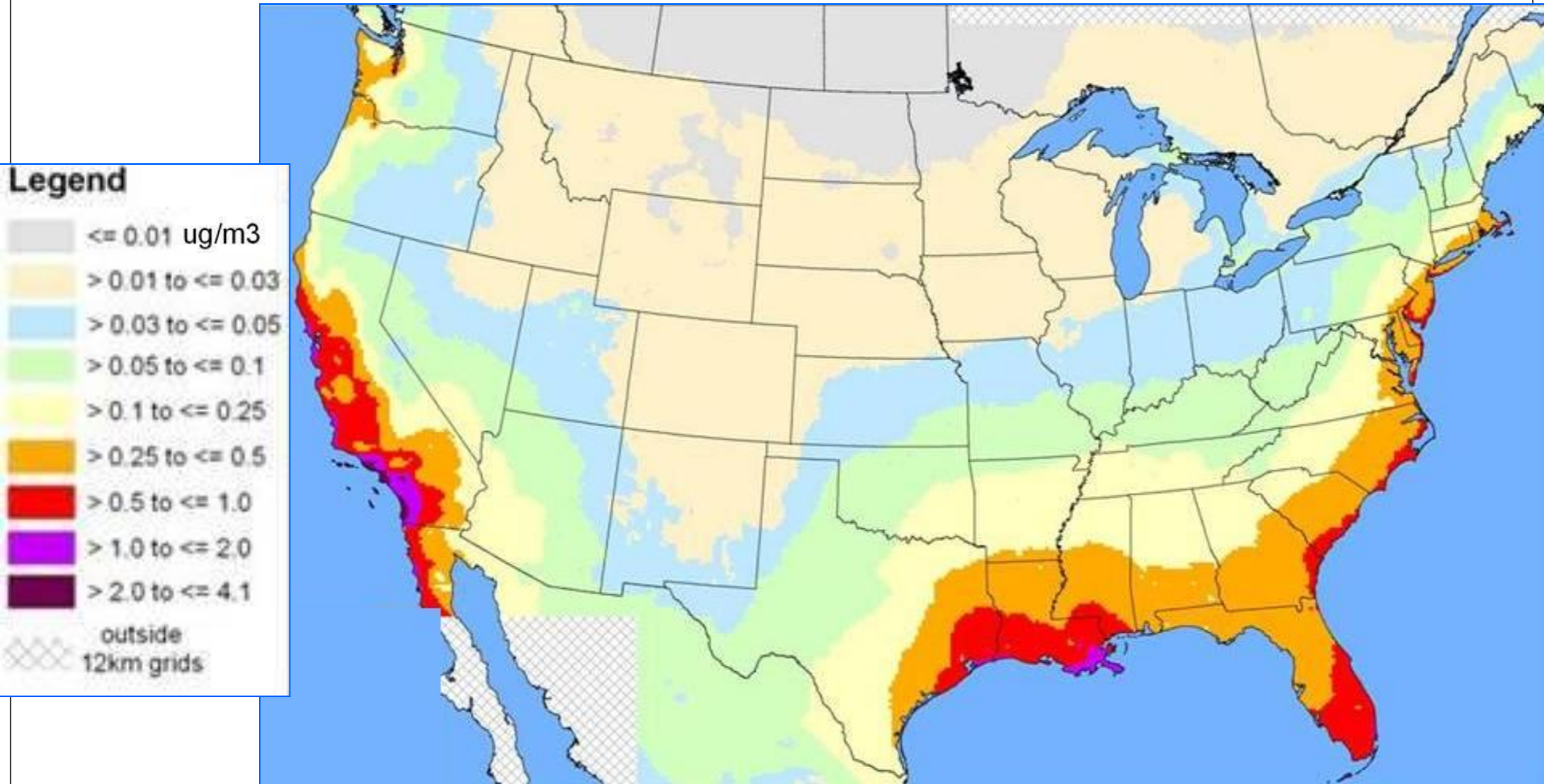
Emission Control Area

- ECA NO_x Controls
 - Tier 3 NO_x 80% reduction new vessels (2016)
- ECA PM and SO_x Controls
 - 1.00% Fuel Sulfur effective August 2012
 - 0.10% Fuel Sulfur 2015+
 - Up to 96% reduction in SO_x
 - ~85% reduction in PM

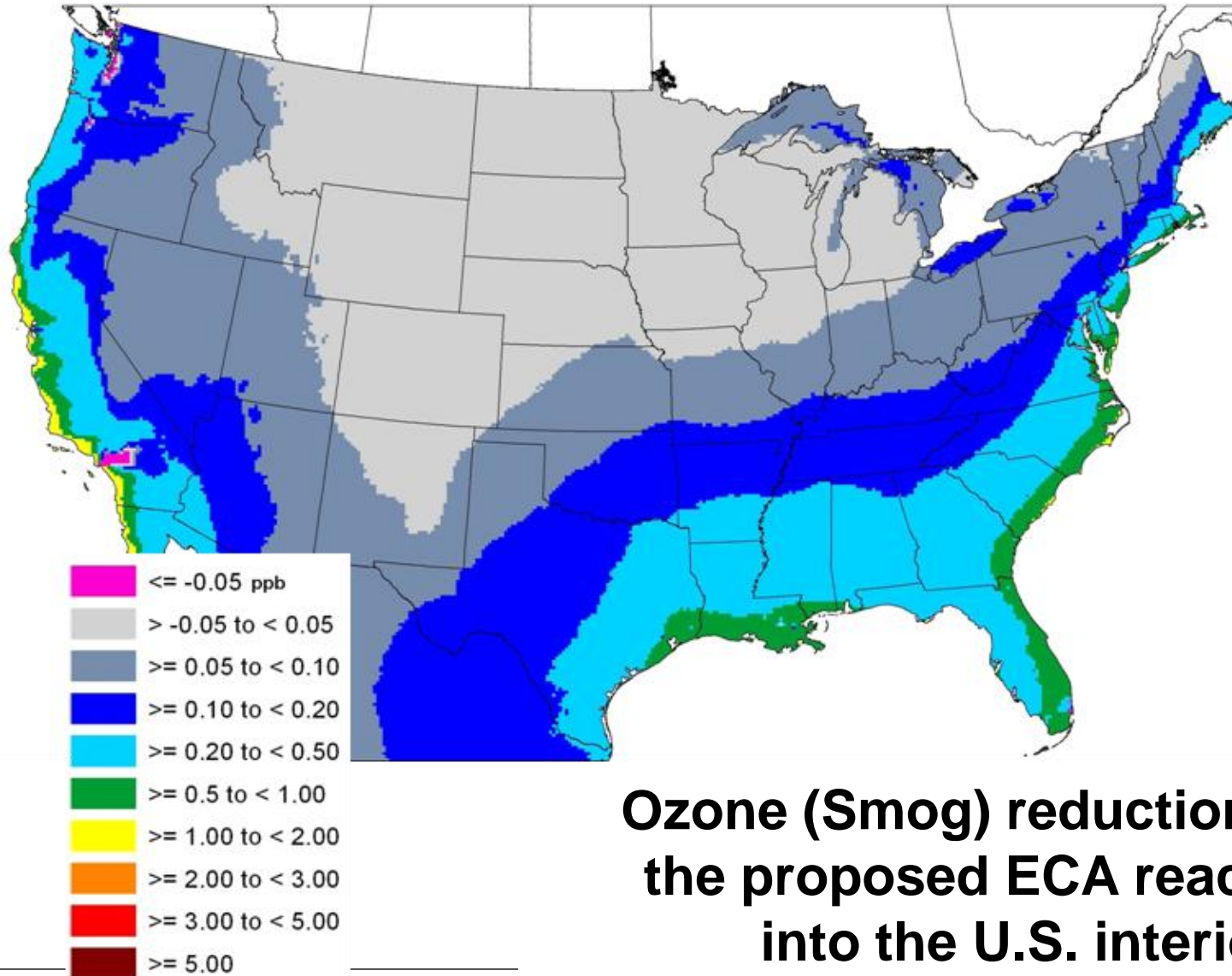


An Emission Control Area should be considered for adoption by the Organization if supported by a demonstrated need to prevent, reduce, and control emissions of NO_x or SO_x and particulate matter or all three types of emissions ... from ships. (Appendix III, para 1.3)

2020 Potential ECA PM_{2.5} Reductions

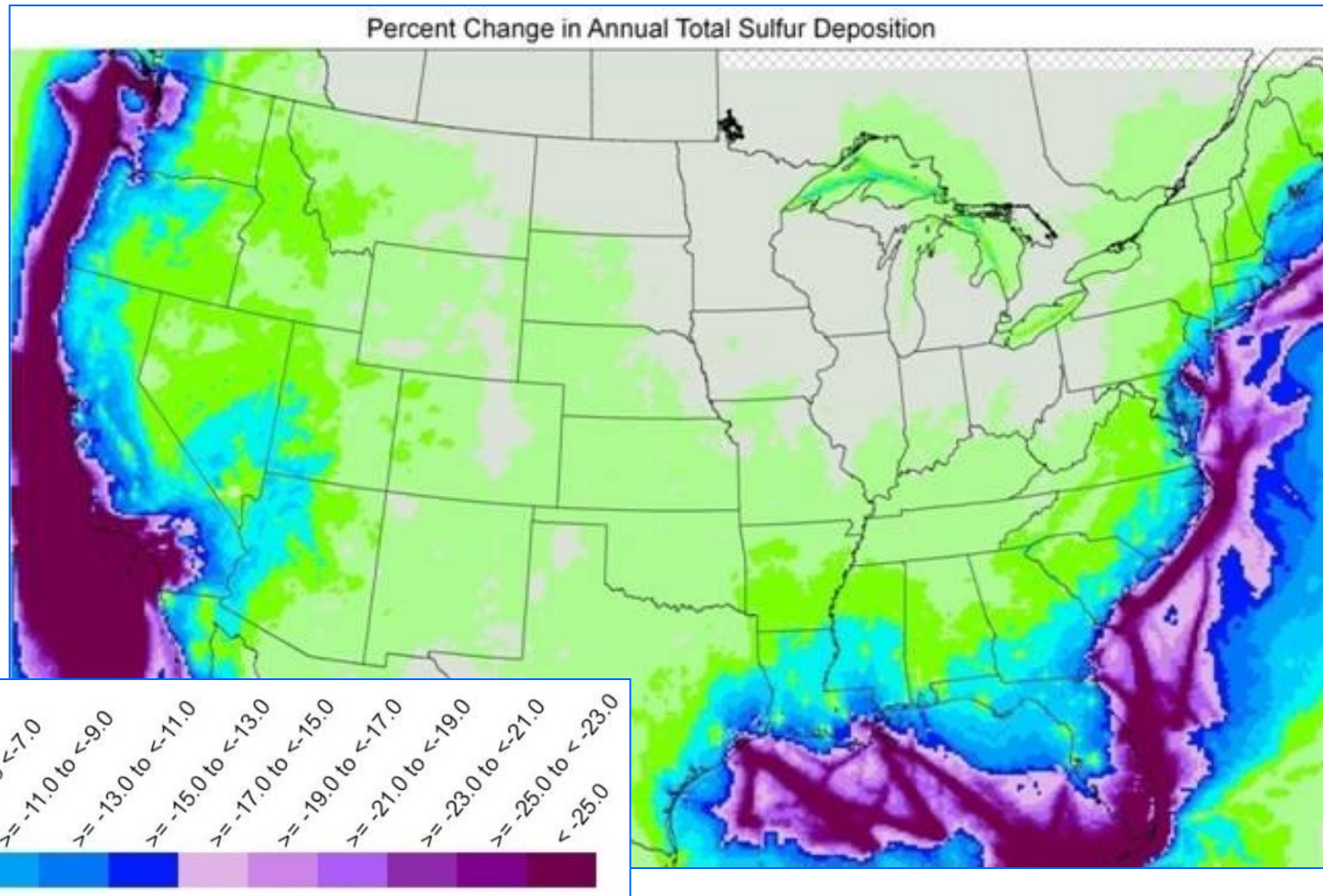


2020 Potential ECA Ozone Reductions



Ozone (Smog) reductions from the proposed ECA reach well into the U.S. interior

2020 Potential Sulfur Deposition Reductions

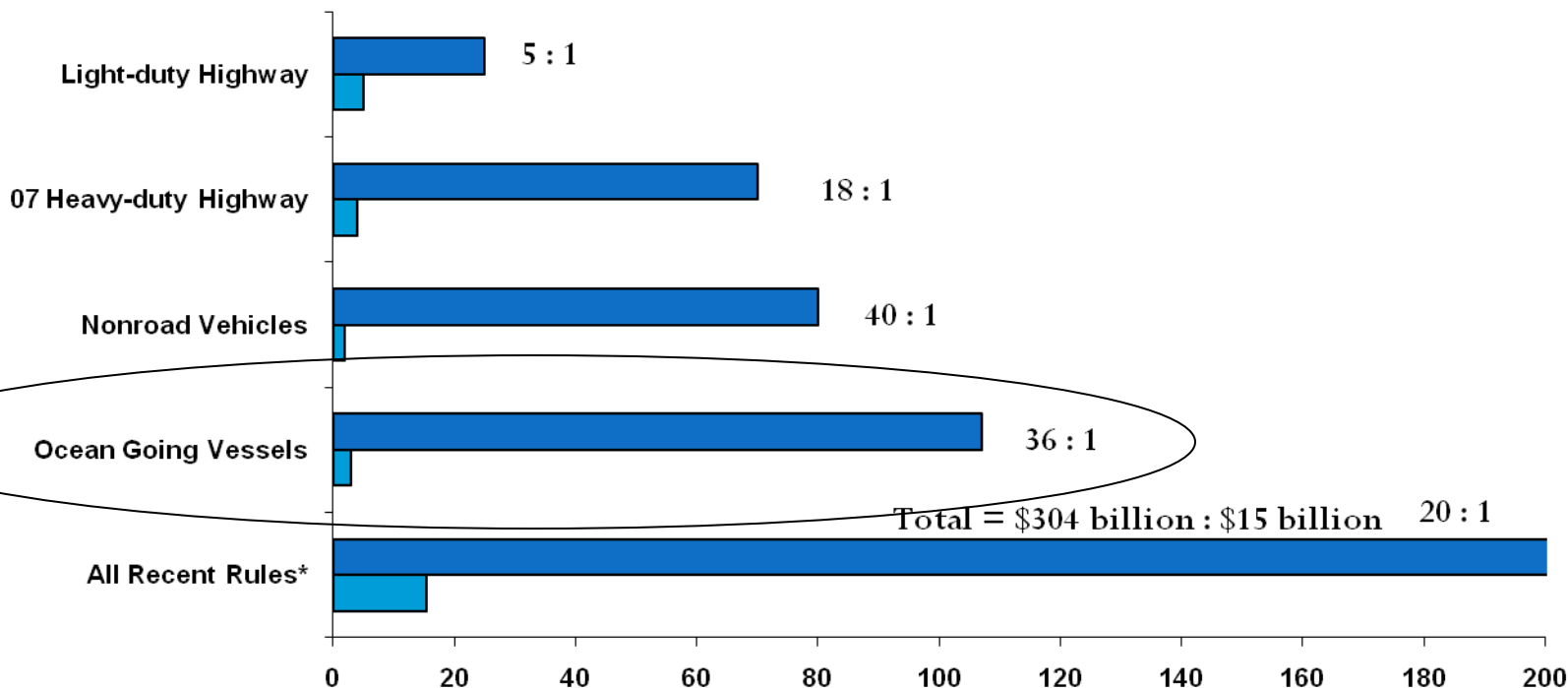


**Improvements
in deposition
for marine and
terrestrial
ecosystems**

Benefits and Costs of the Coordinated Strategy

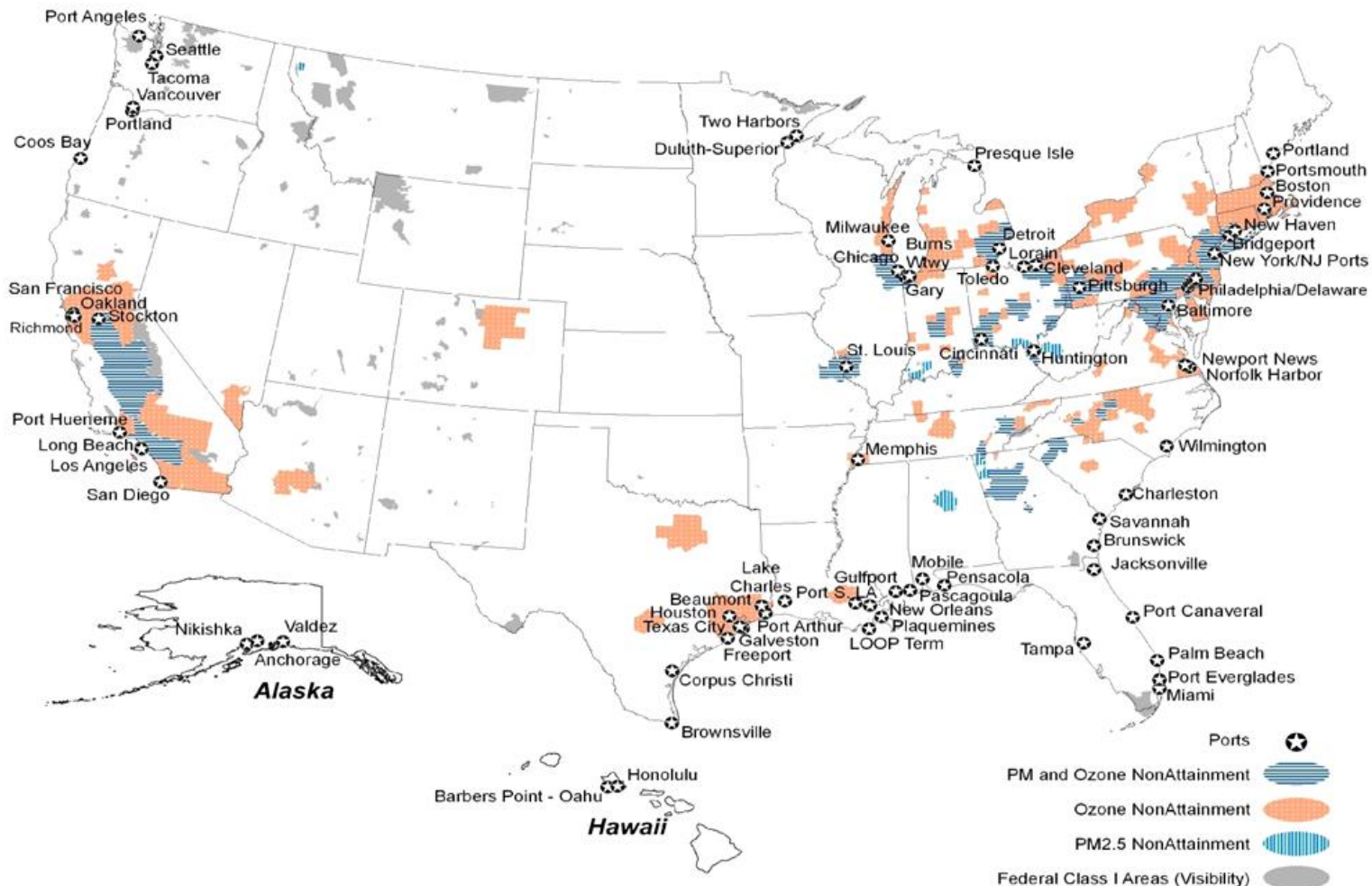
By 2030, the emission reductions associated with the coordinated strategy for OGV will annually prevent:

- Between 12,000 and 30,000 PM-related premature deaths
- Between 210 and 920 ozone-related premature deaths
- About 1,400,000 work days lost
- About 9,600,000 minor restricted-activity days



U.S. Ports and Nonattainment Areas

- More than 40 major ports are located in PM_{2.5} or ozone nonattainment areas
- About 88 million people live in 39 areas that do not meet the PM_{2.5} NAAQS or that contribute to violations in other counties



Targeting Clean Diesel at Ports



- Clean Ports USA tailors DERA to port's needs
- Working with port authorities, terminal operators, shipping, truck and rail companies
- Promote cleaner diesel technologies and strategies through education, incentives, and financial assistance for diesel emissions reductions at ports
- Grants and recognition to foster superior environmental performance
- Voluntary Diesel Retrofit Technology Verification
- Recognizing superior environmental performance
- SmartWay Transport Partnership program
 - Tools , information, and recognition to reduce carbon footprint



Air Emissions Reduction Strategies

Technology Strategies

- Refuel
- Retrofit
- Repair/Rebuild
- Repower
- Replace

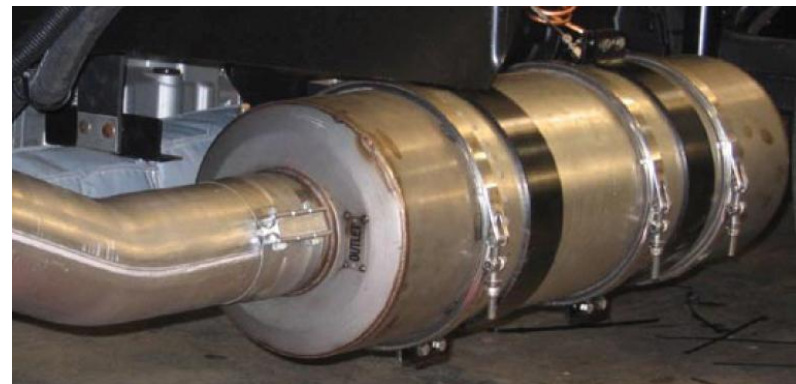


Operational Strategies

- Improved Port Efficiency
- Using On-shore Power
- Considering Air Quality Impacts of Security Changes

Technology Verification

- Cost-effective verified and certified clean diesel strategies
 - Maximize public health benefits
 - Provide immediate, quantifiable emissions reductions
 - Key technologies include:
 - Exhaust controls (DOCs, DPFs, CCVs, and SCRs)
 - Engine upgrade kits, engine repowers
 - Cleaner & alt. fuels
 - Vehicle replacements
 - Idle reduction technologies
 - Hybrid vehicle technologies



Diesel Emissions Reduction Program Funding

- National Clean Diesel Funding Assistance Program
 - Applying verified technologies to reduce most damaging emissions
- Emerging Technologies
 - Moving Innovations from concept to marketplace
- SmartWay Finance
 - Supporting low-cost loans for high-value technologies
- Foundation of State Clean Diesel Programs

DERA Funding at a Glance in Millions			
	FY08	ARRA	FY09/10
National Clean Diesel Funding Assistance	\$29	\$156	\$64
Emerging Technology	\$ 3.7	\$20	\$ 8
SmartWay Clean Diesel Finance	\$ 3.4	\$30	\$12
State Clean Diesel	\$13	\$88	\$36
Total	\$49.2	\$300	\$120

ARRA Funding for Clean Diesel at Marine Ports

- Over \$60 million in awards to marine port-related projects, putting Americans back to work to clean the air

Georgia Ports Authority
Port of Houston Authority
Port of Long Beach
Port of Los Angeles
Maryland Port Administration
Port of New York and New Jersey
Port of Oakland
South Carolina State Ports Authority
Tacoma Port Authority

CLEANPORTSUSA
SVC



Port of Virginia
Mississippi River Corridor
Great Lakes Commission

Cost-effective Marine Repowers

- **Northeast States for Coordinated Air Use Management (NESCAUM)**
- EPA awarded \$4.45 M to NESCAUM for upgrades of 13 harbor craft vessels with some built as early as 1929, 1946, 1970, etc.
- Estimated Annual Reductions
 - 113.4 NO_x tons per year
 - 9 PM tons per year
 - 603.4 CO tons per year
 - Fuel savings: 53,000 gals per year
- Representative Tug Cost-effectiveness of EPA funds
 - \$2,200 per lifetime ton NO_x
 - \$38,500 per lifetime ton PM



Great Lakes: Repowering gen sets

- EPA awarded \$1.21M ARRA grant to Great Lakes Commission
 - \$403K match from American Steamship Company
- Repowering 1976 and 1979 service generator sets on 2 bulk carriers during winter off-season
- Improves air quality for 8 states
 - Estimated Annual Reductions
 - 36.4 NO_x tons per year (40% reduction)
 - 0.4 PM tons per year (49% reduction)
 - Fuel savings: 8,500 gals per year



The H. Lee White is one of two repowered bulk carriers on the Great Lakes.

Emerging Technologies: Marine

- Repowering the *Champion Coal*, a Pittsburgh- based towboat

EPA awarded \$1.5M to Pennsylvania Dept. of Environmental Protection for a marine engine overhaul known as Caterpillar's Emission Upgrade kit. The towboat's two Caterpillar 3500 series Tier 1 engines were rebuilt/ upgraded to Tier 2 standards.

- Estimated Emissions Reductions
 - NO_x by 25%
 - PM by 33%
 - HC by 4%



Port of Baltimore

EPA awarded \$3.5 million grant and is leveraging \$3.2 million in matching funds to repower, replace and retrofit:

- 83 units of cargo handling equipment,
- **50 drayage trucks,**
- 7 locomotives and
- 2 tugboats
- Estimated Lifetime

Emission Reductions:

- 1,152.1 tons NO_x
- 76.2 tons PM



Port Authority of NY & NJ Truck Replacement Program

- EPA supporting \$28 million program with \$7-million grant.
- Part of the Clean Air Strategy to implement a truck replacement program to replace pre-1994 vehicles
- Provide truck owners funding incentives (grants and financing) to replace their older **drayage** trucks with newer models
- Replace 1993 or older with 2004 to 2008



Port of Los Angeles – ARRA Project

\$2M to replace, repower, and retrofit a total of 24 pieces of equipment (27 engines), including harbor craft



Additional Information



- More information about Clean Ports Program:
www.epa.gov/diesel/ports
- Clean Ports contacts:
 - Arman Tanman
 - Email: Tanman.Arman@epa.gov, Tel: (202) 343-9326
 - Bill Jones
 - Email: Jones.Bill@epa.gov, Tel: (215) 814-2023
- North American ECA and supporting information are available at:
www.epa.gov/otaq/oceanvessels.htm
 - Contact: Michael Samulski
 - Email: Samulski.Michael@epa.gov
 - Tel: (734) 214-4532