

Overview of Current and Proposed Policies in the United States

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International Council on Clean Transportation



ICCT Background

- The goal of the International Council on Clean Transportation (ICCT) is to dramatically reduce conventional pollutant and greenhouse gas emissions from personal, public and goods transportation in order to improve air quality and human health, and mitigate climate change.
- The Council is made up of leading regulators and experts from major motorized countries around the world that participate in ICCT activities since 2001



Participant Locations

ICCT Background(2)

- Recent and upcoming reports:
 - *A Model Regulatory Program for Reducing Exhaust and Evaporative Emissions from Heavy-Duty Vehicles and Engines*
 - Air Pollution and Greenhouse Gas Emissions from Ocean-going Ships
 - Cars and Climate Series
 - Passenger Vehicle Greenhouse Gas and Fuel Economy Standards: A Global Update
 - Sipping Fuel and Saving Lives: Increasing Fuel Economy With Sacrificing Safety
 - Air Emissions Issues Related to Two- and Three-Wheeled Motorcycles
- Recent workshops:
 - Workshop on Air Quality and Climate Change (Bogotá, Colombia)
 - Motorcycle Emission Control: Vietnamese and International Experience (Hanoi, Vietnam)
 - Clean Ships: Advanced Technology for Clean Air (San Diego, California)

Presentation Overview

- Why are the US and California taking action to control emissions from shipping sources
- What specific policies are being implemented
 - Nationally and regionally
 - International initiatives

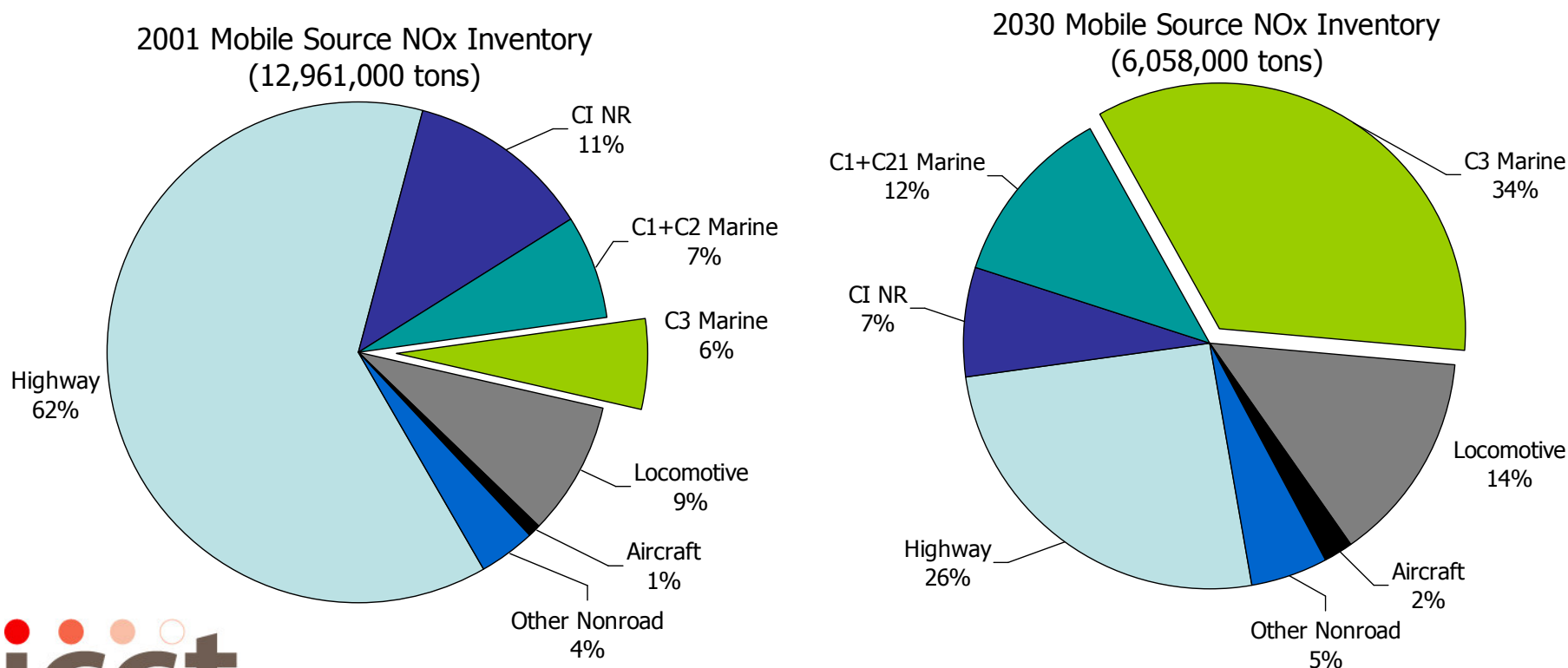
Presentation Overview

- U.S. marine emissions inventory
- US EPA regulations and initiatives
 - International component
 - Federal rules
- California regulations and initiatives
 - State regulations
 - Local programs

U.S. Marine Emissions Inventory

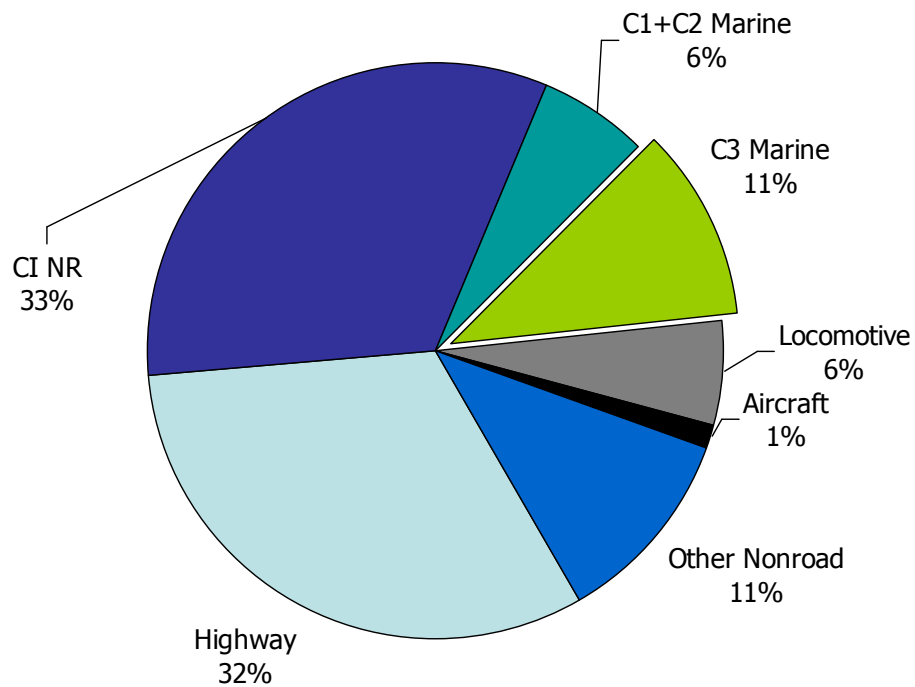
Vessel NOx Emissions in the U.S.

- Marine diesel engines contribute significantly to air pollution in the United States

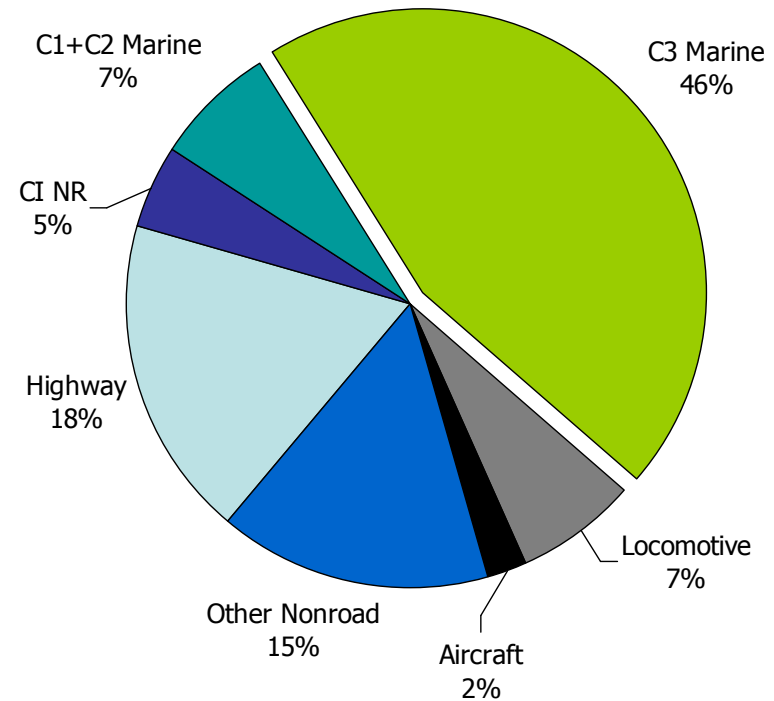


Vessel PM2.5 Emissions in the U.S.

2001 Mobile Source PM2.5 Inventory
(500,400 tons)

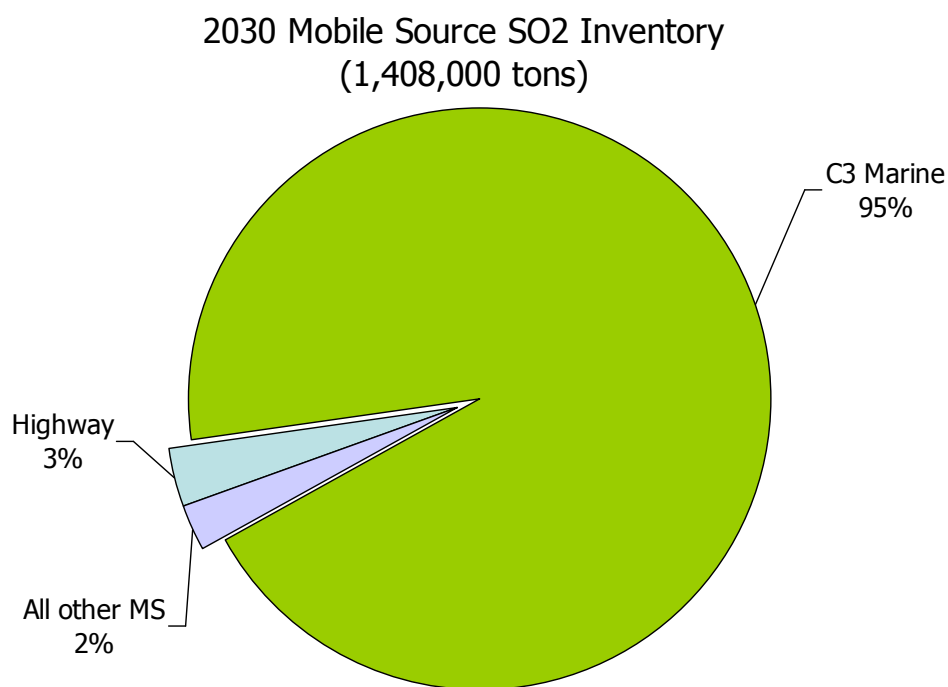
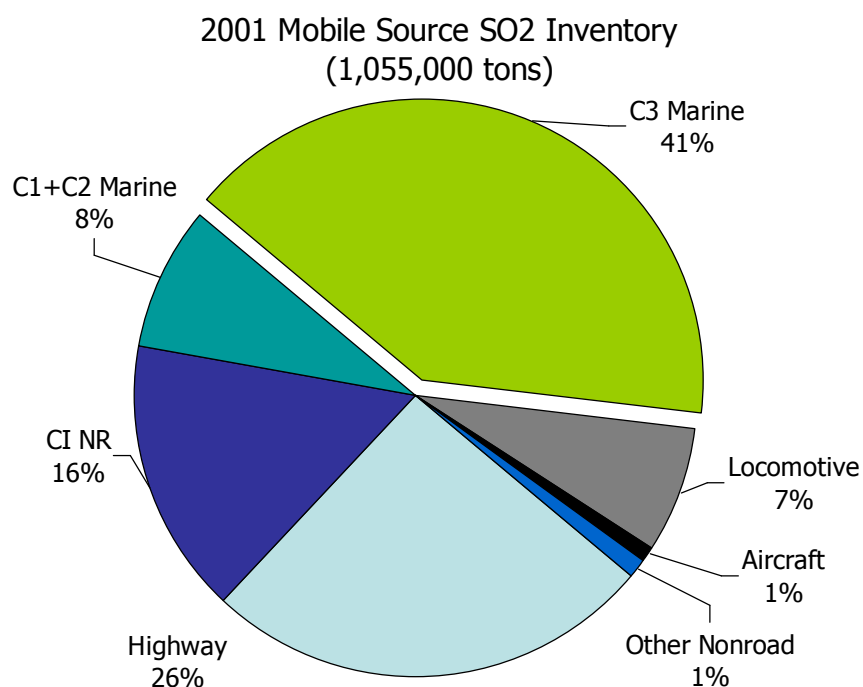


2030 Mobile Source PM2.5 Inventory
(366,900 tons)



Vessel SOx Emissions in the U.S.

- SOx emissions from marine diesel engines are high due to the sulfur content of residual fuel used in C3 engines



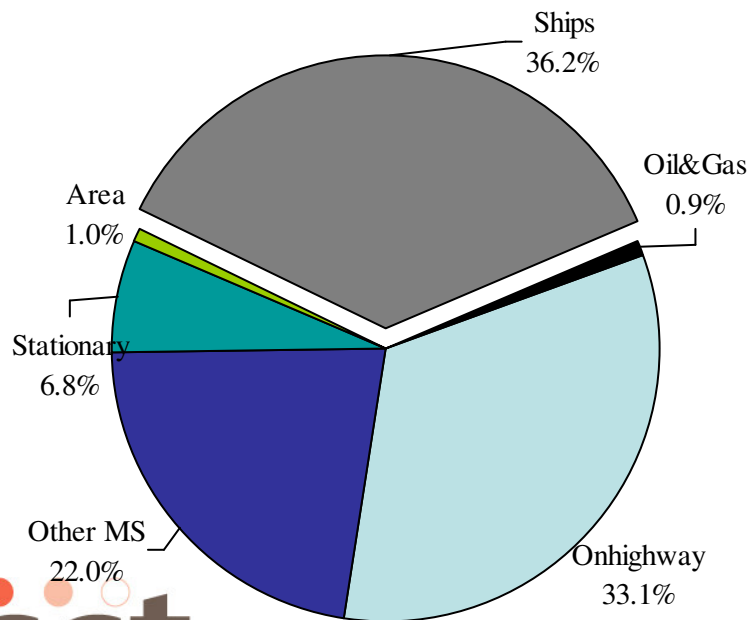
Contribution of OGV Marine Vessels to 2002 Mobile Source Inventories for Selected Ports

Port Area	NOx	PM2.5	SOx
Savannah, GA	24%	39%	80%
Tacoma, WA	20%	38%	74%
Charleston, SC	22%	33%	87%
Baltimore, MD	12%	27%	69%
Miami, FL	13%	25%	66%
New Orleans, LA	14%	24%	59%
Beaumont, TX	6%	20%	55%
Port Everglades, FL	9%	20%	56%
Seattle, WA	10%	20%	56%
Wilmington, NC	7%	16%	73%
Oakland, CA	8%	14%	80%
Galveston, TX	5%	12%	47%
Jacksonville, FL	5%	11%	52%
Valdez, AK	4%	10%	43%
LA/Long Beach, CA	5%	10%	71%
New York/New Jersey	4%	9%	39%
Boston, MA	4%	5%	30%

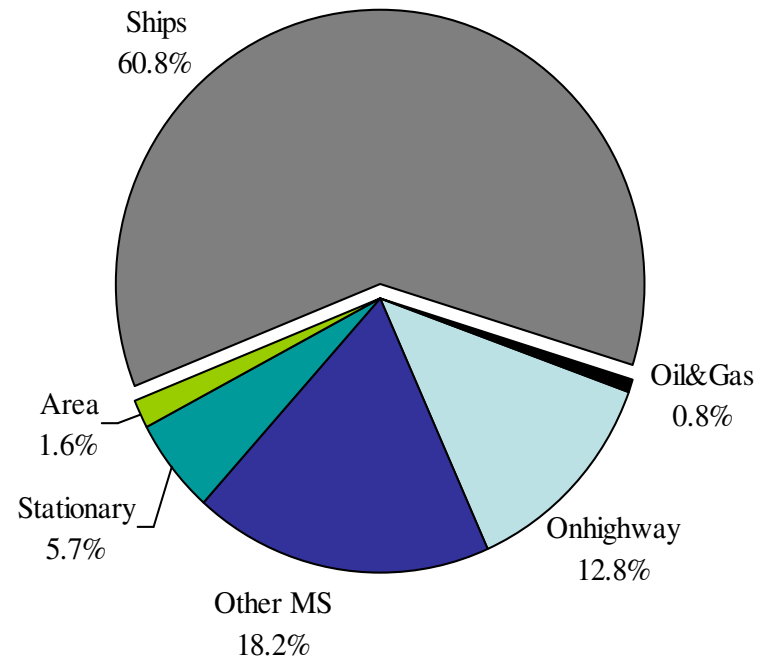
Vessel Emissions Along Coasts

- Emissions in areas without commercial ports can be significant as well

Santa Barbara NOx Inventory 1999

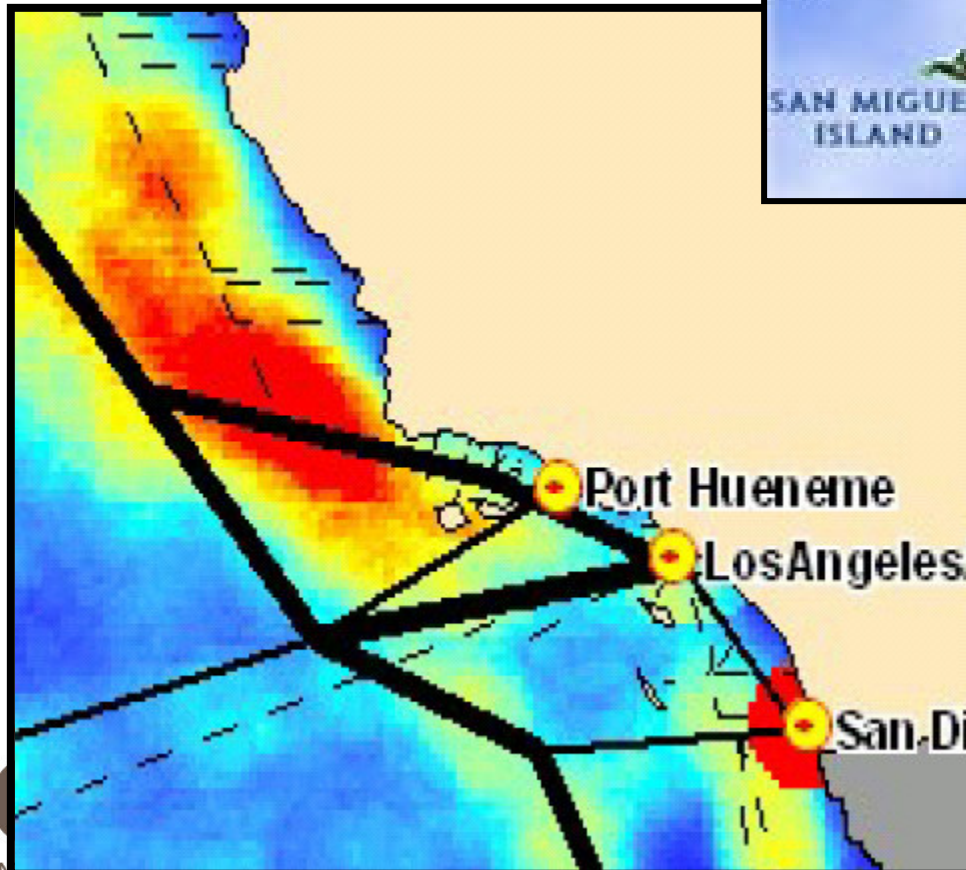


Santa Barbara NOx Inventory 2015



C3 Impacts on Coastal Areas

- Santa Barbara example



- Ships accounted for 36% of all area NOx emissions in 1999
- Expected to increase to 61% by 2015

U.S. Programs to Address Ship Emissions

US Actions to Address OGV Emissions

- International Action
 - U.S. proposal to IMO for amended marine vessel standards
 - SECA designation
- Federal rulemakings
 - Rulemaking for marine engines >30 L/cyl (OGV)

International Action

- U.S. actively engaged in current round of negotiations at IMO for amendments to Annex VI
- Earlier this year, the United States government formally proposed a series of amendments to Annex VI of MARPOL
 - Represents a comprehensive approach to reduce NO_x, SO_x, and PM emissions
 - Combines a geographic approach with long-term aftertreatment-based standards

U.S. Proposal to IMO for OGV

- PM and SOx limits (2011/ 2012)
 - Geographically based: apply to all ships that operate within [200] nautical miles of the coastline as defined under the treaty through SECA-like process
 - Limits could be met through the use of low-sulfur fuels (e.g., 1,000 ppm) or exhaust gas cleaning technology

- NOx limits for New Engines
 - Tier 2 NOx limits beginning in 2011
 - Apply in all areas
 - Standards reflect 15 to 25% NOx reduction, based on in-engine controls
 - Tier 3 NOx limits beginning in 2016
 - Apply when ships are operating in the PM/SOx geographic areas
 - Reflect use of high efficiency catalytic aftertreatment emission control technology capable of achieving NOx reductions of 80% or more

- NOx limits for Existing Engines (subset of engines built before Jan 1, 2000)
 - Phase-in beginning 2010/2012
 - Reflect 20% NOx reduction based on engine modifications/adjustments

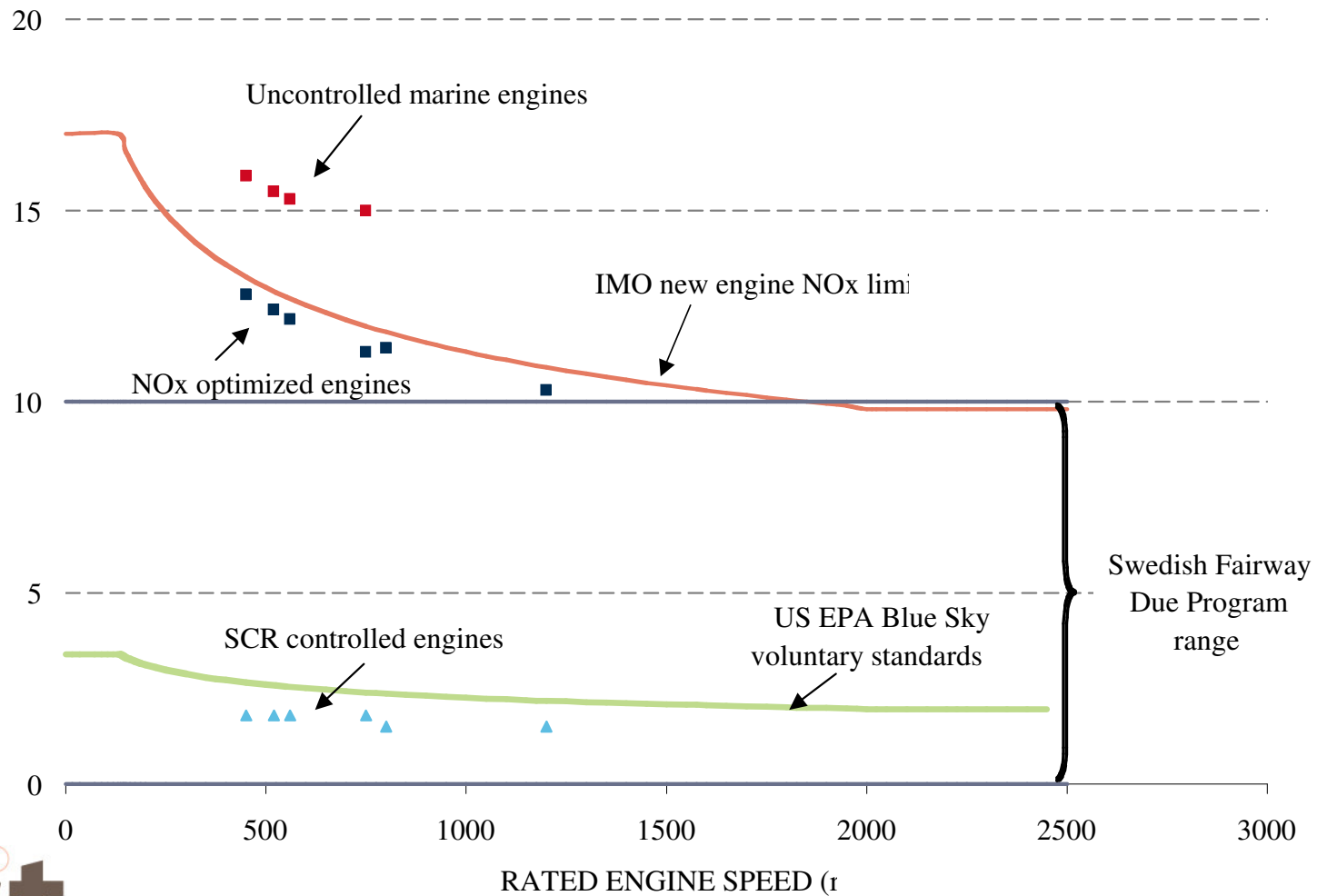
US SECA

- The US is investigating SECA designation
 - Working with Canada and Mexico
- Preparing inventory, air quality modeling
- Examining economic impacts of SECA designation through refinery modeling

Federal Standards - OGV

- Current U.S. OGV standards equivalent to MARPOL NO_x limits.
- Future U.S. OGV standards
 - USEPA developing a new rule for Category 3 marine diesel engines (>30 l/cyl displacement)
 - Advance Notice of Proposed Rulemaking expected to be signed in coming weeks

Marine Emission Standards and Engine Performance



California's Programs to Address Ship Emissions

Policy Drivers in California

- Lead agency is the California Air Resources Board
 - Board appointed by the Governor
 - Federal waiver to set standards, some off-road sources exempted
- Diesel Risk Reduction Plan
 - Diesel as a Toxic Air Contaminant
- California Goods Movement Action Plan
 - Addresses infrastructure need and public health and environment mitigation
- AB 32 California Global Warming Solutions Act
 - Discrete early action measures

Shipping in California

- Largest container ports in the US (Ports of Los Angeles and Long Beach)
- Significant health impacts from goods movement activities
 - 2,400 premature deaths in 2005 (\$19 billion)

Contribution to Good Movement Emissions in California

SOURCE	DIESEL PM		NO _x		SO _x	
	2001	2020	2001	2020	2001	2020
Ships	43%	75%	23%	55%	92%	100%
Harbor craft	24%	14%	21%	20%	1%	-
Cargo handling equipment	5%	1%	5%	2%	-	-
Trucks	15%	6%	31%	12%	2%	-
Transport refrigeration units	3%	-	1%	-	1%	-
Trains	10%	1%	19%	11%	4%	-

Adopted Measure: California Auxiliary Engine Rule

- Requires the use in auxiliary engines within 24 nautical miles of California coast
 - Starting January 1, 2007: marine gas oil (MGO) or marine diesel oil (MDO) with 0.5% or less sulfur
 - Starting January 1, 2010: marine gas oil (MGO) with 0.1% or less sulfur
- Alternative compliance is allowed based on emission levels
 - Shorepower, scrubbers fleet emission averaging,
- Legal challenge from ship-owners association on enforcement
 - Enforcement halted by court ruling
 - Judge took issue with alternative compliance based on emission levels, in-use requirements vs. emission standards
 - Voluntary compliance continues according to ship-owners
 - ARB appealing ruling
 - Redraft rule or seek US EPA approval

Proposed Regulations in California (1)

- Main engine and auxiliary boiler rule within 24 nautical miles
 - Most likely two-step implementation with 2-year delay from auxiliary rule (2009 and 2012) and same fuel sulfur limits
 - No alternative compliance allowed
 - Board hearing in April 2008
- Commercial harbor craft rule
 - Use onroad diesel fuel (CARB spec, 15 ppm)
 - New ferries have Tier IV or Tier II/III with 85% reduction in PM and NOx
 - In-use measures
 - Replace engines, install aftertreatment
 - Accelerated engine retirement

Proposed Regulations in California (2)

- Shore power rule
 - Considering two options
 1. Limit auxiliary engine operation by 50% by 2014 and 80% by 2020
 2. Require emission reduction by 50% by 2014 and 80% by 2020
 - Board hearing December 2007
- Vessel speed reduction
 - 12 knots limit similar to Southern California program

Local Effort:

San Pedro Bay Ports Clean Air Plan (1)

- Joint plan for Ports of Los Angeles and Long Beach
- Ocean-going vessel measures
 - Vessel speed reduction (from 20 nm to 40 nm)
 - 0.2% MGO at berth and within 20 nm in auxiliary and main
 - Shore power for all container and most selected bulk and cruise implemented from 2012 to 2016
 - Alternatives are allowed
 - Emission after-treatment on auxiliary and main engines for all new builds and frequent callers

Local Effort: San Pedro Bay Ports Clean Air Plan (2)

- Implementation mechanisms for OGVs
 - Lease requirements
 - Take advantage of port expansion
 - Require overall emission reduction from operators as well as specific measures
 - Tariff changes
 - Completed for trucks, exploring legal basis for ships
 - Incentives
 - Facilitate technology demonstration
 - Provide grants for technology implementation

Other strategies

- Container Fee
 - Legislative proposal for a \$30/TEU fee (or \$60 per container)
 - Currently postponed, previous version vetoed by Governor
- On the legal front
 - State of California
 - Petition to US EPA to adopt next round of standard

Conclusions

- Pollution from ocean-going vessels has serious impact on local air quality as well as emissions of GHGs
- National and local efforts have and will continue to introduce cleaner fuels and technologies to meet local air quality and global climate change goals
- Partnerships with the private sectors have been useful to demonstrate and implement technologies
- Collaboration between nations seeking further reductions in emissions from shipping is imperative for success at the IMO

For more information:

www.theicct.org

www.epa.gov/otaq/oceanvessels.htm

www.epa.gov/otaq/marine.htm

www.epa.gov/cleandiesel/ports

[www.arb.ca.gov/ports/marinevess/marineve
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