

Commercial Marine Vessels and Ports



2004 SIP Summit

**Ships, Harbor Craft,
& Land-side Operations**

January 13-14, 2004

Maritime Activities

- California's ports and waterways are an integral part of California's economic engine
- Key uses include
 - transport of containerized, bulk, and other cargo
 - tourism
 - fishing
 - passenger ferry service
 - military

Shipping Lanes and Major Ports in California



Maritime Operations Encompass Broad Range of Emissions Sources

- Diesel heavy duty on-road trucks
- Locomotives
- Diesel cargo handling equipment
- Stationary sources
- Commercial marine vessels



Maritime Activities are Projected to Increase

- Dramatic increase in trade forecasted at California ports
- Increased emissions from entire goods movement system
- Emissions concentrated near population centers

Focus on Commercial Marine Vessels



Commercial Marine Vessels Include Harbor Craft and Ships

- Harbor Craft

- “Captive Fleet”

- Tugboats, work boats, ferries, commercial fishing vessels



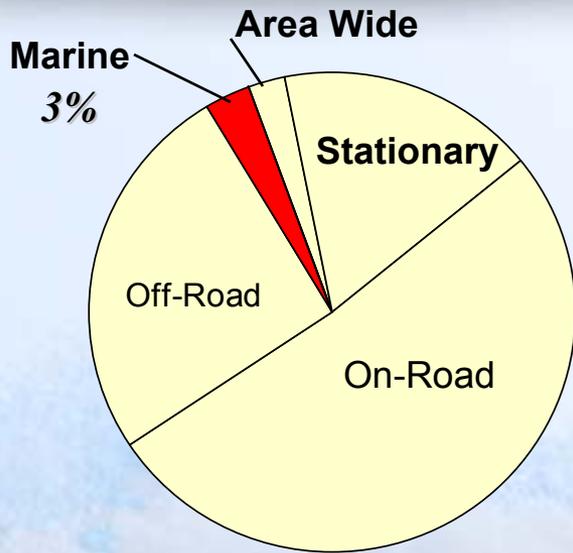
- Oceangoing Ships

- Travel internationally

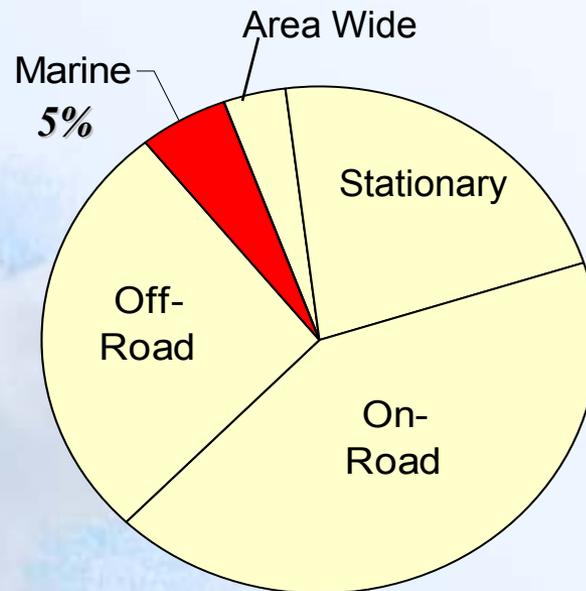
- Cargo ships, passenger cruise ships



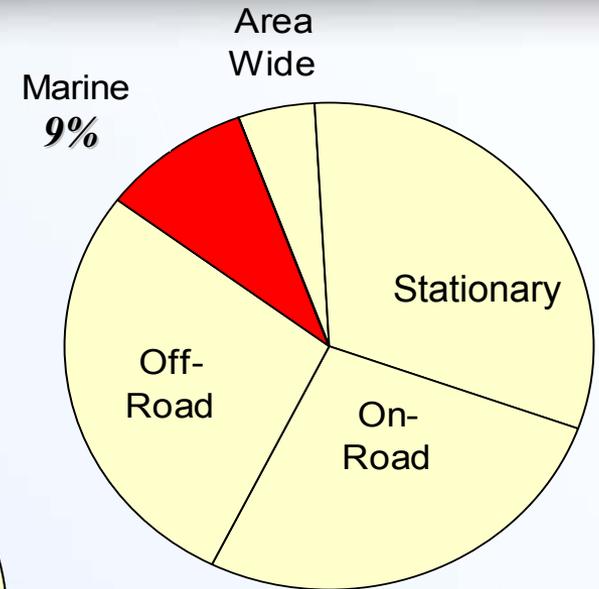
Commercial Marine Vessel Contribution to Statewide NOx Emissions



2000

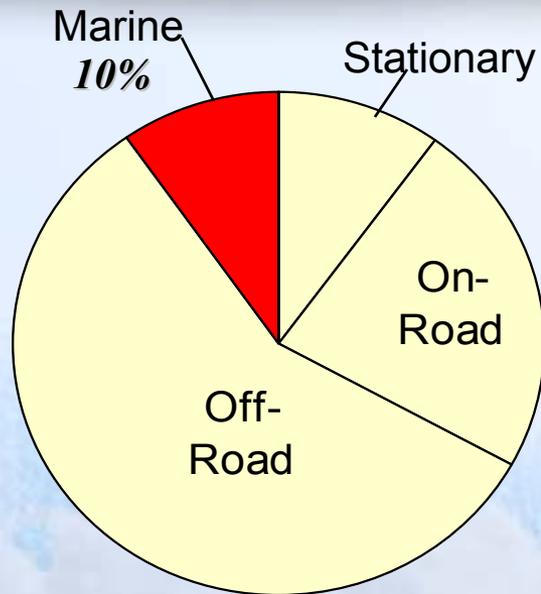


2010

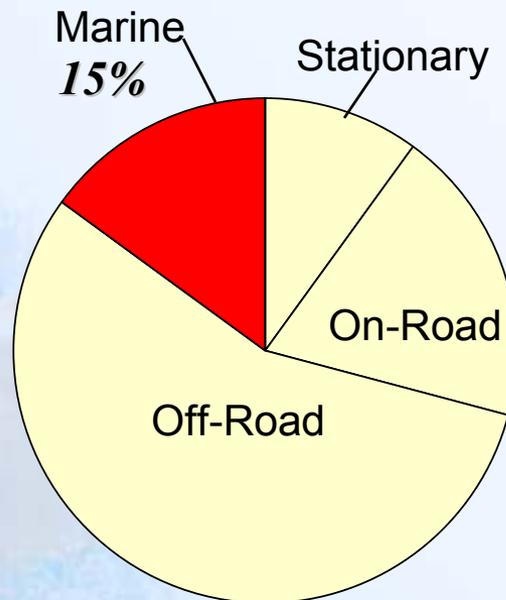


2020

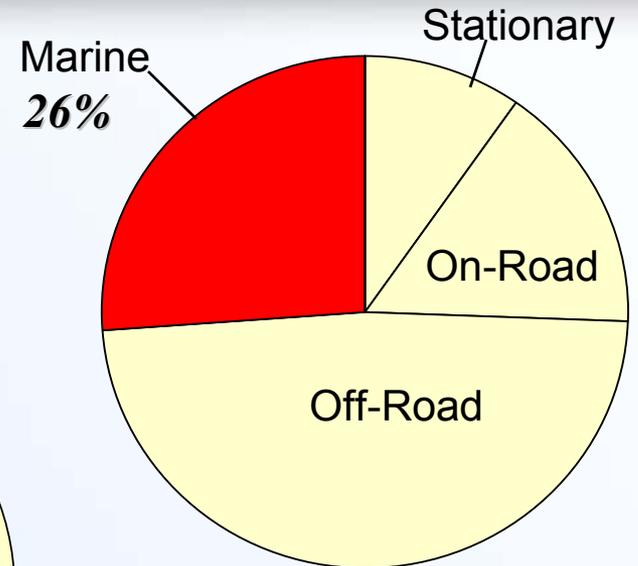
Commercial Marine Vessel Contribution to Statewide Diesel PM Emissions



2000



2010



2020

Existing Emissions Controls Oceangoing Ships

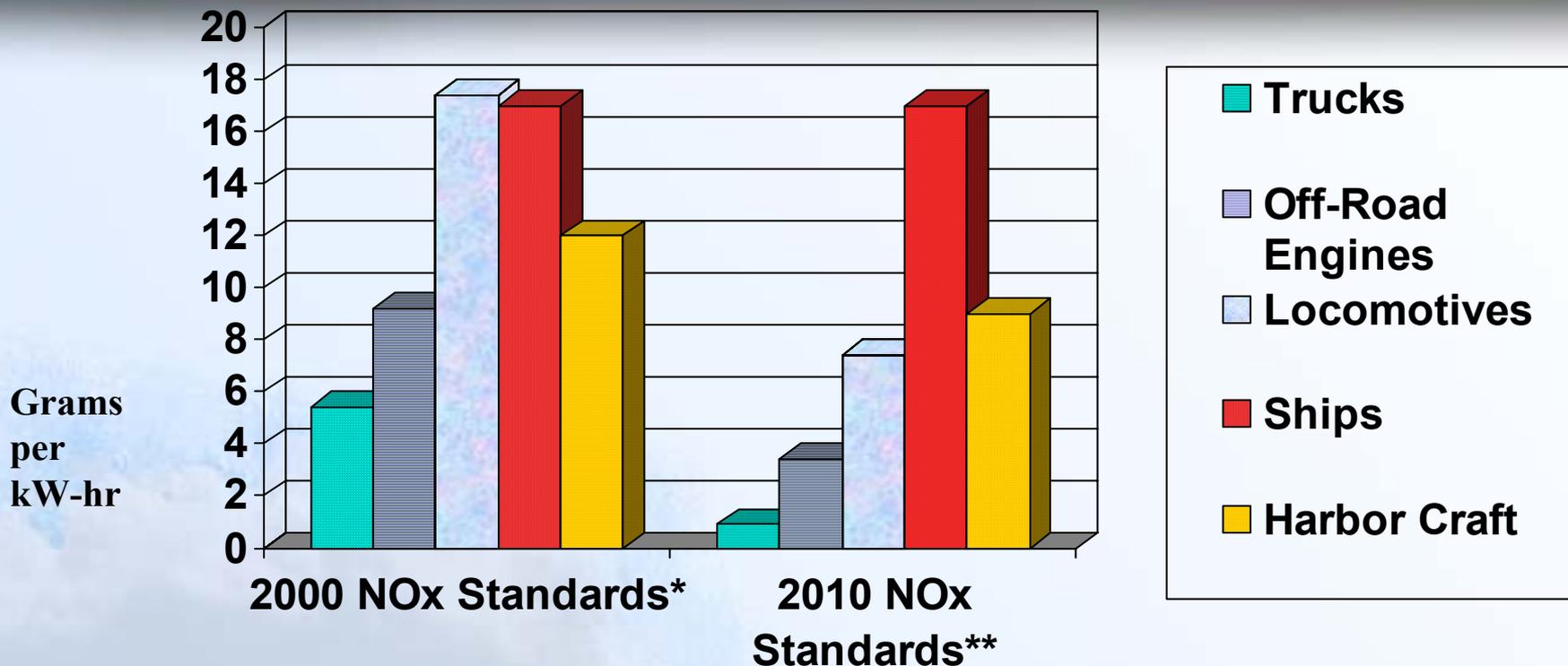
- IMO & U.S. EPA new engine standards provide modest NOx reductions
- IMO limits sulfur content of bunker fuel to 4.5%
- Voluntary speed reduction program at the Ports of Los Angeles & Long Beach

Existing Emissions Controls

Harbor Craft

- U.S. EPA “category 1 & 2” new engine standards
- California ferries required to use CARB on-road diesel
- Carl Moyer Program accelerates introduction of cleaner diesel engines

Comparison of NOx Emission Standards



* 2000 line haul locomotive and harbor craft emissions levels are uncontrolled averages.

** U.S. EPA harbor craft 2010 engine standards range from 7.2 to 11 g/kW-hr.

Statewide Marine Vessel Measures

- Reduce emissions from existing harbor craft
- Reduce emissions from in-use oceangoing ships
- Adopt more stringent new engine standards

Reduce Emissions From Existing Harbor Craft

- Reduce emissions through the use of add-on controls, cleaner fuels, and repowering with new engines
- Adopt programs 2004-2005, implement in 2005
- ARB lead agency

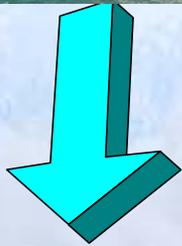


Reduce Emissions From Existing Oceangoing Ships

- Evaluate five emission reduction options
 - Cleaner fuels, Operational controls, Incentive programs, Opacity limits, Cold ironing (on-shore power)
- Adopt programs 2004-2005, implement 2005-2010
- Cooperative effort



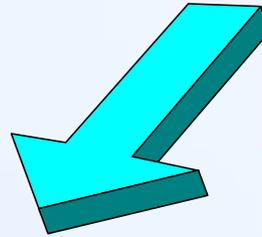
Cleaner Fuel Opportunities for Harbor Craft and Oceangoing Ships



CARB Diesel:

Harbor craft

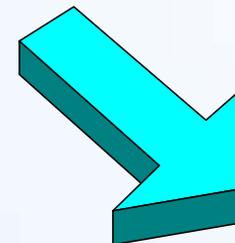
- ~10-25% *PM* Redn.
- ~6% *NOx* Reduction
- Greater use of add-on controls



Marine Distillate:

Ships at Dockside (auxiliary engines)

- ~60% *PM* Reduction
- ~6-10% *NOx* Redn.
- ~90% *SOx* Reduction



Lower Sulfur Marine Bunker Fuel:

Oceangoing ships at sea (main engines)

- ~20% *PM* Reduction
- ~40% *SOx* Reduction

Reduce Emissions from Existing Oceangoing Ships: Auxiliary Engines

- Cold-ironing for ships that frequently visit South Coast ports
 - Evaluate 2004
 - Adoption 2005 (pending evaluation)
- Reduce emissions from auxiliary engines on ships while hotelling
 - Evaluate 2004
 - Adopt by 2006 (pending evaluation)

Adopt More Stringent New Engine Standards

- Adopt federal standards or work with the IMO on international standards
 - **NOx standards based on the federal Tier II and III off-road standards**
 - **PM standards based on state-of-the art technology**
- Adopt programs 2004, implement 2008-2010
- Concept for federal action



Focus on Port Land-side Emission Sources



Land-based Maritime Emissions are Expected to Increase

- Significant concentration of emissions sources at ports
- Dramatic growth in trade forecasted
- Additional emission reductions may be needed to address community impacts

Reduce Port Land-side Emissions Sources

- Address ports in 3-step process
 - Create port specific inventories
 - Assess impacts of existing measures
 - Develop additional port-specific measures
- Adopt programs 2004-2005,
implement 2004-2010
- ARB lead agency



