

The Role of Goods Movement

Sylvia Oey



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Goods Movement Sources

Goods Movement Emission Reduction Plan: All Goods Movement Sources

Ocean- going ships

Cargo ships

Cruise ships

Commercial harbor craft

Cargo handling equipment

Heavy-duty diesel trucks

Trains

Proposed SIP: Port-Related Sources

Ocean- going ships

Cargo ships

Cruise ships

Commercial harbor craft

Cargo handling equipment

+ **Port trucks**

~~Trains~~

~~Long-haul trucks~~

(Long-haul trucks and trains
addressed in diesel strategy)



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Port Growth Projections 2001-2020

- Continued increase in international trade -- cargo through ports triples by 2020
- Emissions grow at a slower rate due to controls and efficiency improvements



South Coast Goods Movement Emissions

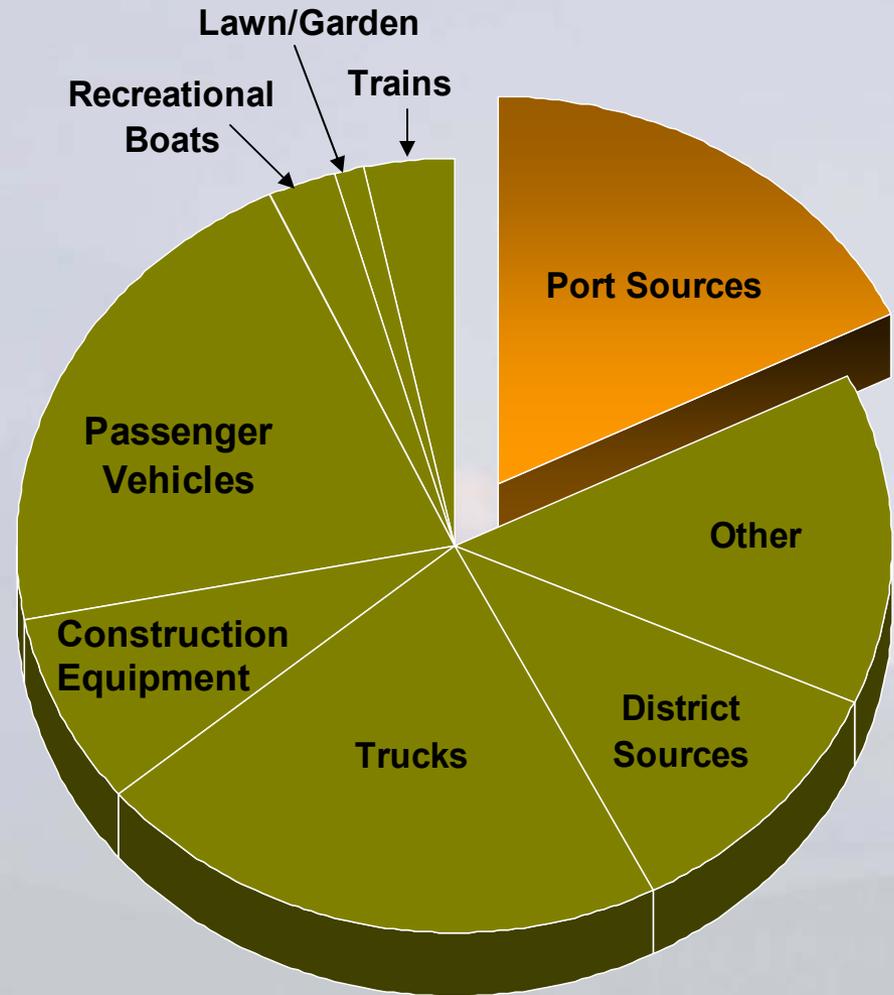
Port related sources:
contribution in tons per day
with existing controls

	2005	2014
ROG	> 01%	> 01%
NOx	10%	18%
SOx	49%	67%



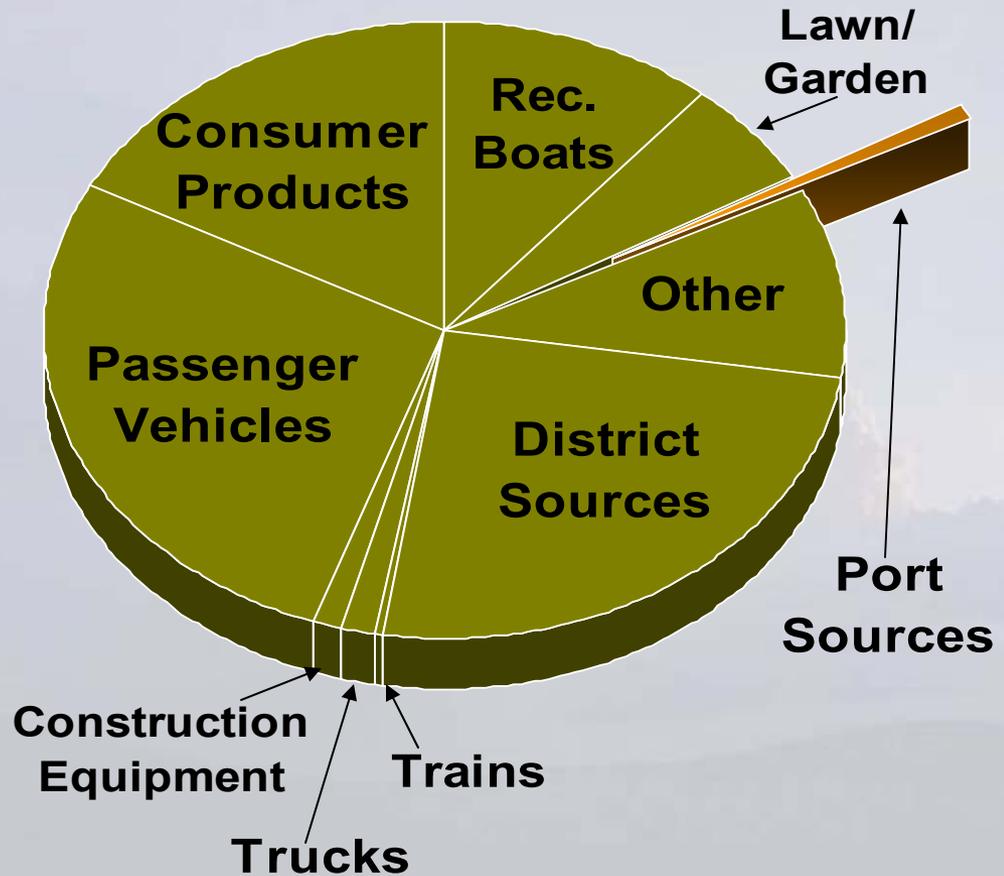
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South Coast 2015 NOx Baseline inventories



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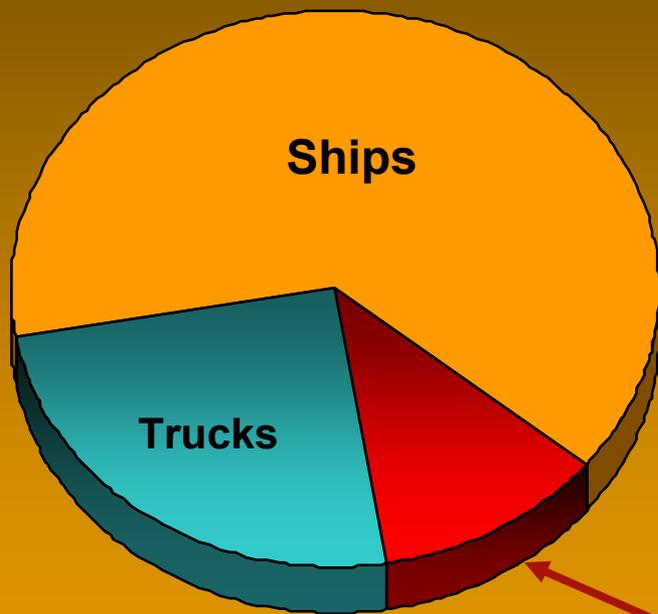
South Coast 2015 ROG



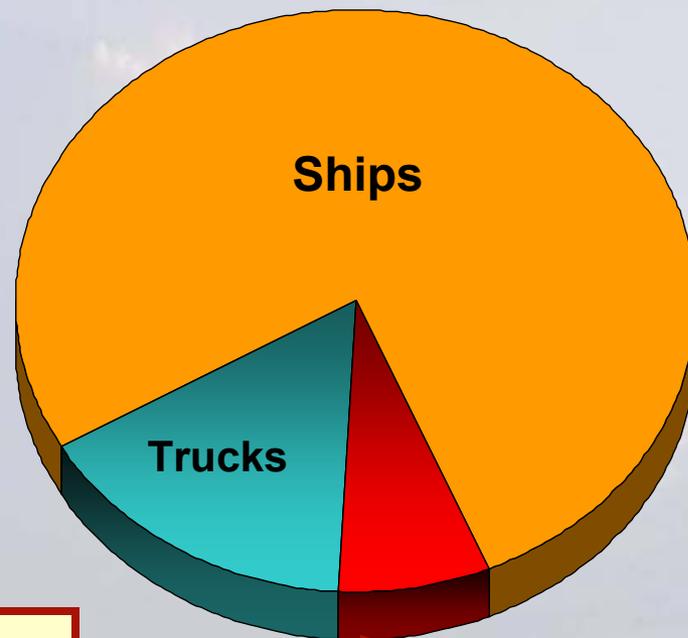
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Nitrogen Oxides from Port-Related Sources

South Coast Air Basin, with existing program



2005: 33 TPD



2015: 117 TPD

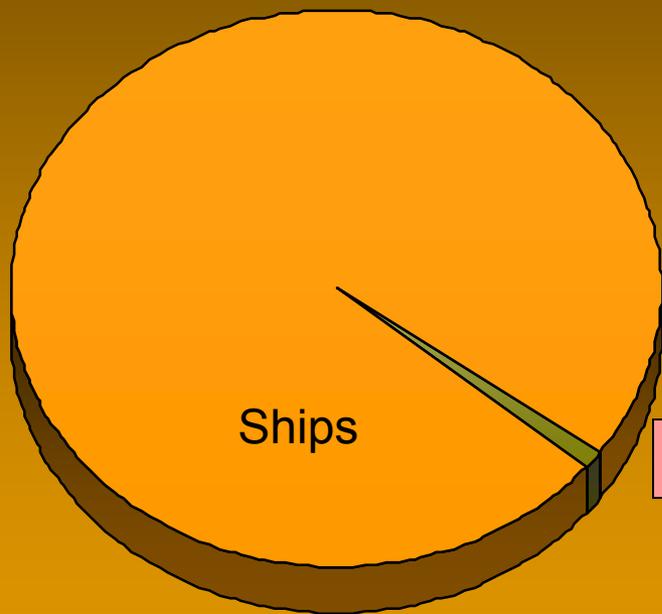
Cargo Handling
Equipment



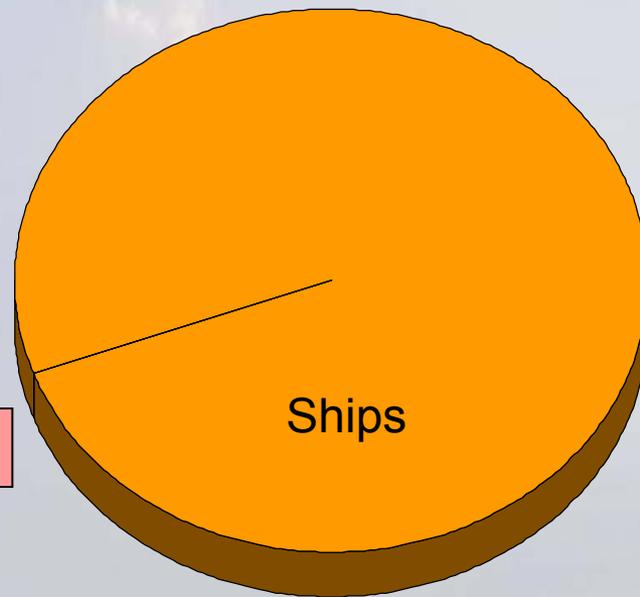
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Sulfur Oxides from Port-Related Sources

South Coast Air Basin, with existing program



2005: 31.3 TPD



2014: 47 TPD



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Adopted Port Sources Rules

- ✓ **Low sulfur fuel for trucks, cargo handling equipment, and harbor craft**
- ✓ **Truck idling limits**
- ✓ **Marine auxiliary engine fuels**
- ✓ **Diesel cargo handling equipment rule**
- ✓ **Ban on cruise ship incineration**



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Ships Control Concepts

- **Main engine clean fuel**
 - **0.1% sulfur fuel near shore**
- **Shore-based power in port (cold ironing) or equivalent**
- **Cleaner new engines and add-on controls**
- **Increased vessel speed reduction**



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Ship Concept Impacts (South Coast, 2015)

	NOx	SOx	DPM
Auxiliary Engines Uncontrolled	39.6	25.9	3.3
Clean Fuel Rule (adopted)	-2.4	-24.9	-2.8
Hotelling Reductions	-18.5	-0.4	-0.3
Main Engines Uncontrolled	33.4	20.7	2.6
Clean Fuel Rule	-2.0	-19.8	-2.2
Cleaner Engines	-9.9	-0	-0.1
Total Reductions	32.8	45.1	5.4



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Additional Ship Reductions: Potential Ports and Local Actions

- **Reduce emissions via
lease or permit restrictions**
 - **Increase use of clean
technologies**
 - **Reduce vessel speeds**
 - **Increase clean fuel &
electricity infrastructure**
- **Coordinate with other West
coast ports**
 - **Sulfur Emission Control
Area (SECA) request**
 - **Coordination on clean
technologies**



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ARB Shore Power Report (March 2006)

- **Most cost-effective for passenger, container, and refrigerated cargo ships**
- **Prime candidate ports: LA, Long Beach, Oakland, San Diego, SF, Hueneme**
- **2/3 of capital & benefits at LA/Long Beach**
- **Anticipated Board consideration late 2007**



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Ocean Going Vessels Clean Fuel Options

- Fuels used now contain up to 45,000 ppm sulfur
- Extend auxiliary engines clean fuel requirement to propulsion engines
 - 1,000 ppm (.1%) starting in 2010
- Seek sulfur emission control area (SECA)
 - caps fuel sulfur at 15,000 ppm



Harbor Craft Control Concepts

- ARB fleet rule for existing engines (underway)
- Shore-based electrical power in port
- Tighter U.S. EPA emission standards for new engines (or ARB adoption)

Projected 2015 reductions	ROG	NOx	PM
Fleet Rule	0.4	3.5	.12
Engine Standards	< 0.1	0.2	.01



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Cargo Handling Equipment

- ✓ **ARB rule for new and existing equipment (Adopted December 2005)**
 - **85% PM control on all engines by 2015**
 - **Best available controls technology**
 - **New equipment**
 - **Verified emission control systems retrofits**
 - **Reductions reflected in inventory**



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Port Truck Control Concepts

- ✓ **ARB rule for international trucks
(Adopted January 2006)**
- ✓ **Enhanced enforcement of truck idling limits in communities**
- **Port “drayage” truck modernization program**



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Port Truck Modernization

- **Port truck mitigation report**
- **Basic elements in plan**
 - **Incentives to replace oldest trucks and retrofit the rest**
 - **ARB rule to push owners to incentives**
 - **Ports as gatekeepers for clean fleet**
- **Outreach, information gathering now underway**



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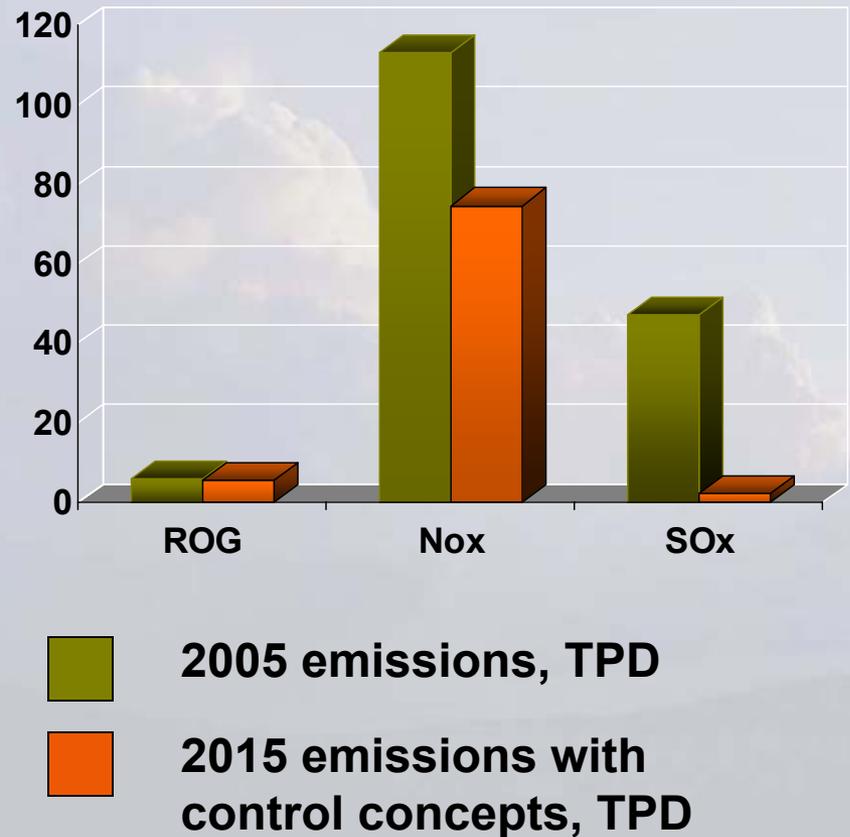
Port Trucks Control Concept Impacts (South Coast, 2015)

	2005	2015	2020
NOx Emissions Uncontrolled	19.7	18.8	16.0
Port Truck Concept Reductions		2.0	8.2



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South Coast Benefits of Port Sources Control Concepts



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