

Emission Reduction Plan for Ports and Goods Movement in California



**Briefing for Port of San Diego Staff
May 2, 2006**



Air Resources Board
California Environmental Protection Agency

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Air Pollutants from Goods Movement

- Particulate matter (PM)
 - Diesel PM
 - Nitrates (NO_x) and sulfates* (SO_x) that form particles
- Ozone
 - From NO_x and reactive organics (ROG)

*Not yet included in goods movement analyses

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Need for Plan

- Administration's Goods Movement Action Plan
- Community health and environmental justice
- ARB's Diesel Risk Reduction Plan
- Air quality standards and plans (SIPs)

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2005 Health Impacts from Goods Movement

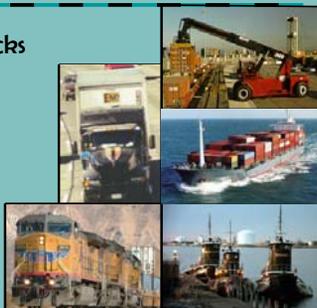
	<u>Cases/Year</u>
Premature death*	2,400
Hospital admissions (heart)	830
Hospital admissions (lung)	2,000
Acute bronchitis	5,100
Asthma/other respiratory	62,000
Absences/restricted days	4.4 million

*Uncertainty range is 720 to 4,100 deaths/year

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Key Emission Sources

- Heavy diesel trucks
- Locomotives
- Ships
- Harbor craft
- Cargo handling equipment



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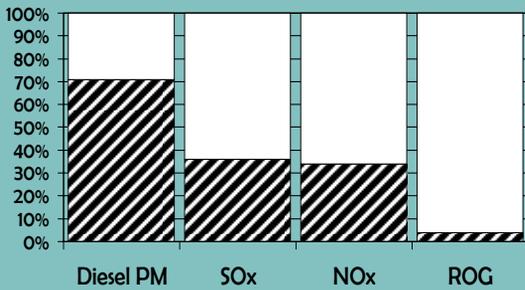
Ports—Increased Cancer Risk Ports of Los Angeles & Long Beach*

	Year 2002	
	<u>Lifetime Risk (chances/million)</u>	<u>People impacted</u>
	>500	50,000
	>200	400,000
	>100	1 million
	>10	>2 million

*October 2005 Draft ARB Study

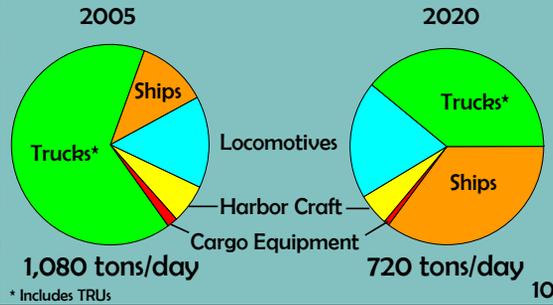
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Good; Movement Contribution to Statewide Emissions in 2005



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NOx from Good; Movement



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Growth Projections 2001-2020

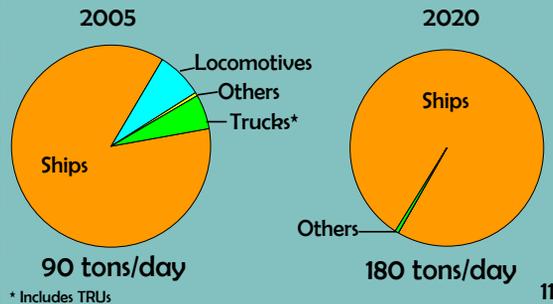
2001-2020

- Continued increase in international trade -- cargo through ports triples by 2020
- California population grows 25%
- Truck travel increases 50%
- Cargo carried on rail grows by 110%
- Emissions grow at a slower rate due to controls and efficiency improvements

All Plan numbers include growth

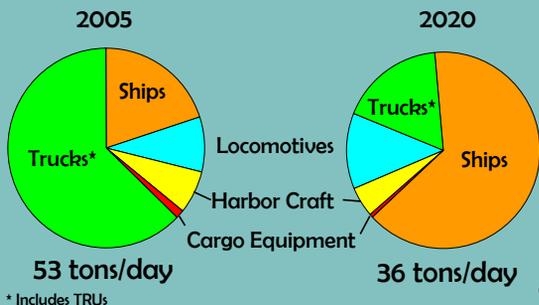
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SOx from Good; Movement



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Diesel PM from Good; Movement



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Goals for Good; Movement

"No net increase"

1. By 2010, reduce statewide emissions to the greatest extent possible and at least back to 2001 levels

Diesel PM risk

2. By 2020, reduce statewide risk 85%

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■ Goal; for Good; Movement

Attainment of federal standards

3. Reduce South Coast NOx 30% in 2015 and 50% in 2020 (preliminary targets)
4. Apply strategies statewide to aid all regions in attaining standards

Localized risk reduction

5. Reduce localized risk in communities adjacent to goods movement facilities

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■ Ship; In/Near Port

- ✓ ARB rule for cleaner auxiliary engine fuel (Adopted December 2005)
 - Strategy to cut dockside emissions
 - Use of plug-in shore power
 - Alternative at-dock technologies (like channeling exhaust through barge-mounted control devices)

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■ Regulation; and Strategies

- Regulatory actions are, and will remain, the framework for emission reductions
- Incentive programs are essential
- Leases, agreements, or trading are potential mechanisms



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■ ARB Report on Shore Power



“Evaluation of Cold-Ironing Ocean-Going Vessels at California Ports” (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

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■ Ship; New Strategies

- Cleaner new engines and fuels
- Add-on emission controls
- Operational changes
- Shore-based electrical power in port (aka, “cold ironing”)



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■ Target; for At Dock Control;

- Plan seeks increasing percentage of ship visits to use shore power or alternatives

	Ship Visits by Year		
	2010	2015	2020
Shore Power	20%	60%	80%
Alternate Measures	20%	40%	20%

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Ships at Sea



- Cleaner propulsion engine fuel
- Retrofit controls for existing engines
- Bring cleaner ships to California service
 - Step 1: 30% lower NOx and PM emissions than existing standards, beginning 2010
 - Step 2: Best technology at 90% NOx and at least 60% PM control, beginning 2015

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Harbor Craft New Strategies



- 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)

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Targets for Cleaner Ships

- Plan seeks increasing percentage of ship visits by vessels using cleaner technology

	Ship Visits by Year		
	2010	2015	2020
30% Lower Emissions	20%	50%	40%
Best Technology	--	25%	50%

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Trucks New Strategies



- Port "drayage" truck modernization program
- ARB rule for privately-owned truck fleets (underway)
- Enhanced enforcement of truck idling limits in communities
- ✓ ARB rule for international trucks (Adopted January 2006)

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SOx Emission Control Area (SECA) or Alternative

- Up to 45,000 ppm sulfur in ship fuel now
- A SECA caps fuel sulfur at 15,000 ppm
- ARB doing extensive SECA analyses
 - Need 5,000 ppm sulfur or less by 2015
- May not go far enough or fast enough
- Alternative is ARB rulemaking for CA only

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ARB Report on Port Truck Modernization

- "Evaluation of Port Trucks and Possible Mitigation Strategies" (April 2006)
- Basic elements in plan
 - Incentives to replace oldest trucks and retrofit controls on the rest
 - ARB rule to push owners to incentives
 - Ports as gatekeepers for clean fleet

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Rail Yard Locomotives New Strategies



- Upgrade switcher/local yard locomotives
 - Multiple off-road engines (gen-sets)
 - Diesel-electric engines (Green Goats)
 - Alternative fuels

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2006-2007 Pending US EPA Rulemaking & Actions

- Advanced technology standards for NO_x/PM
 - New and rebuilt locomotives
 - Auxiliary/main engines on ships in US waters
 - New harbor craft engines
- SO_x Emission Control Area for West Coast of North America

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Long-Haul Locomotives New Strategies



- National Tier 3 locomotive standards
 - 90%+ PM and NO_x control on new engines, cleaner rebuilds, diagnostics, anti-idling
- Tier 3 locomotives brought to California service

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Partnership Critical to Success

- Ports and shippers
- Railroads
- Truckers
- Air districts
- Local governments and communities
- US EPA/federal government

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Cargo Equipment New Strategies



- ✓ ARB rule for new and existing equipment (Adopted December 2005)
- 85% PM control on all engines

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Plan Meets Goals

- ✓ Goes further than no net increase by 2010, bringing emissions 20-40% below 2001 levels
- ✓ Reduces diesel PM risk 85% by 2020
- ✓ Achieves preliminary South Coast SIP targets for 2015 and 2020
- ✓ Achieves substantial reductions in South Coast, SJ Valley, Bay Area, San Diego, & Sacramento

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Plan Benefit; Public Health

- By 2020, over 1,500 premature deaths would be avoided
- Corresponding reduction in:
 - Hospitalizations for heart & lung disease
 - Asthma
 - Acute bronchitis
 - Absences from school or work

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Near-Term Actions: Initiate ARB Rulemaking/Effective Alternatives in 2006

- Port trucks
- Privately-owned truck fleets
- Low sulfur marine propulsion engine fuel
- Shore power for ships and harbor craft
- Harbor craft fleets
- New harbor craft engine standards
- Upgrade switcher/yard locomotives
- Bring cleaner ships to California

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Cumulative Costs; and Benefits

- Cumulative cost to implement plan strategies (2006-2020): \$6 to \$10 billion
- Goods movement contributes more than \$200 billion/year to California's economy
- Plan provides \$3-8 in benefits for each \$1 spent on controls

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San Diego County

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Board Action on April 20, 2006

Approved:

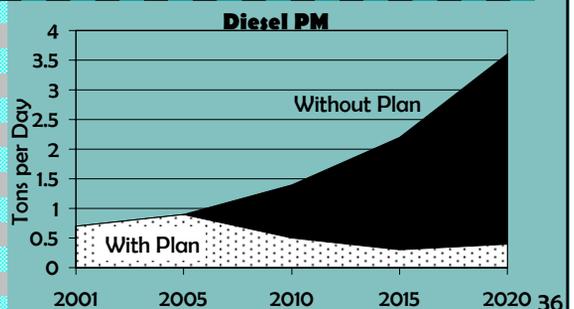
- Plan goals
- Overall strategy
- Near-term action items

Directed staff to:

- Expeditiously pursue rules and other actions
- Initiate public process to cut localized risk
- Report back in November

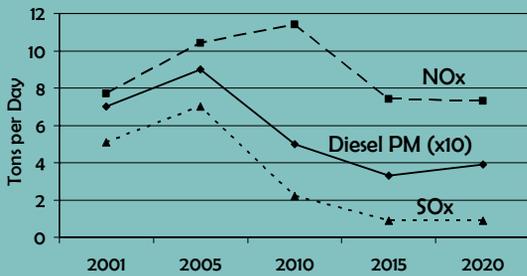
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San Diego - Plan Impact on Ships 2001-2020



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San Diego - Ship Emissions with Plan Strategies



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Localized Impacts

- Plan reduces, but doesn't eliminate, localized health risk
- ARB will initiate a public process to identify additional strategies to address
- Land use decisions matter
- Staff will continue advising local land use decision makers



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San Diego - Goods Movement Emission Reductions with Plan

	Percent Reduction 2001-2020
SOx	83%
Diesel PM	71%
NOx	46%
ROG	43%

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San Diego - Health Benefits of Plan

Estimated premature deaths in San Diego County attributed to emissions from goods movement:

- 150 premature deaths from current emissions
- Increases to 200 by year 2020, with growth and no new controls
- Plan strategies would avoid 120 in year 2020

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