



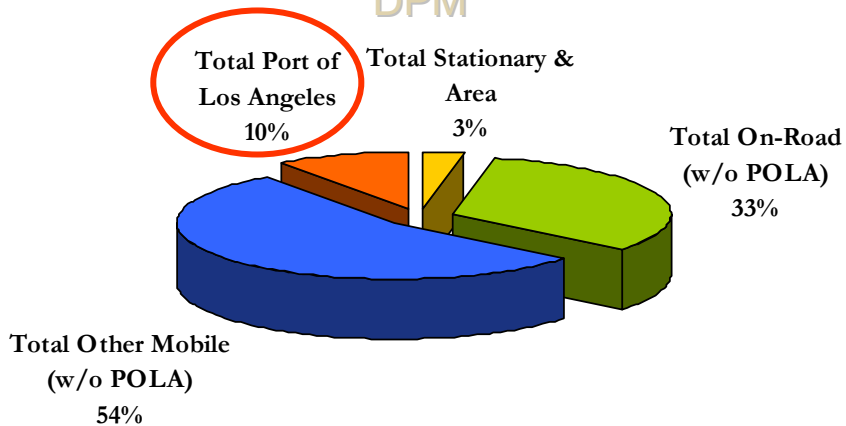
San Pedro Bay Ports Clean Air Action Plan 101

Presented by:
Ralph G. Appy, Ph.D.
Director of Environmental Management
Port of Los Angeles
-25 February 2008-

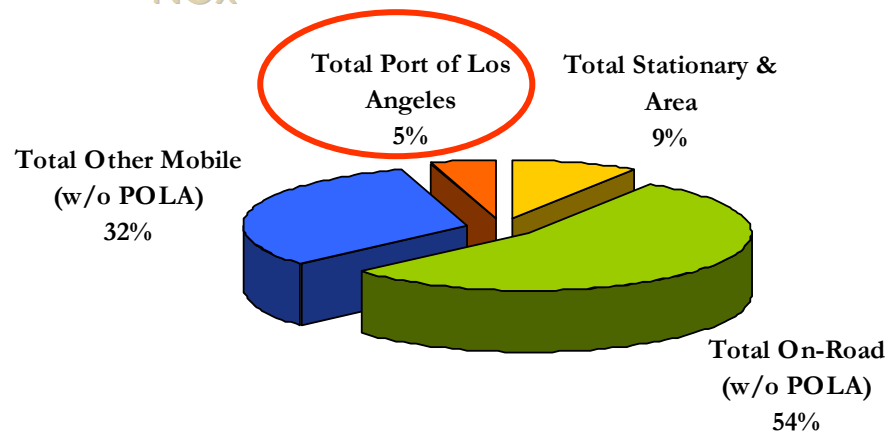
POLA's Contribution

2005 Total Basin Emissions

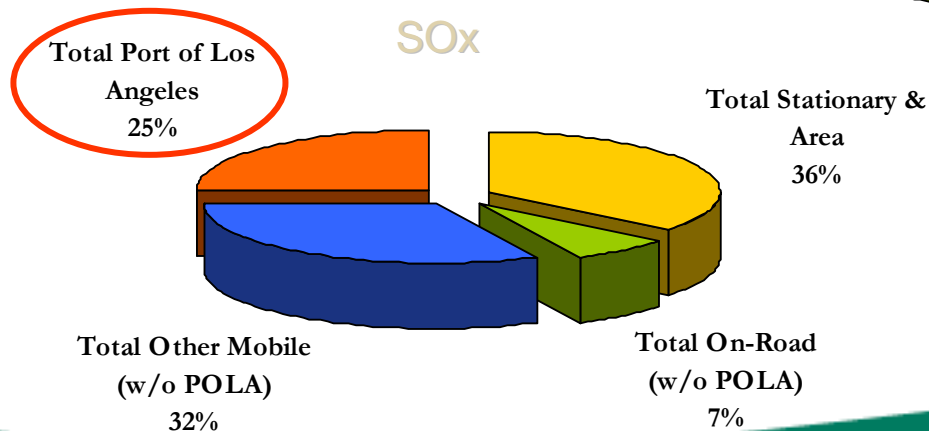
DPM



NOx

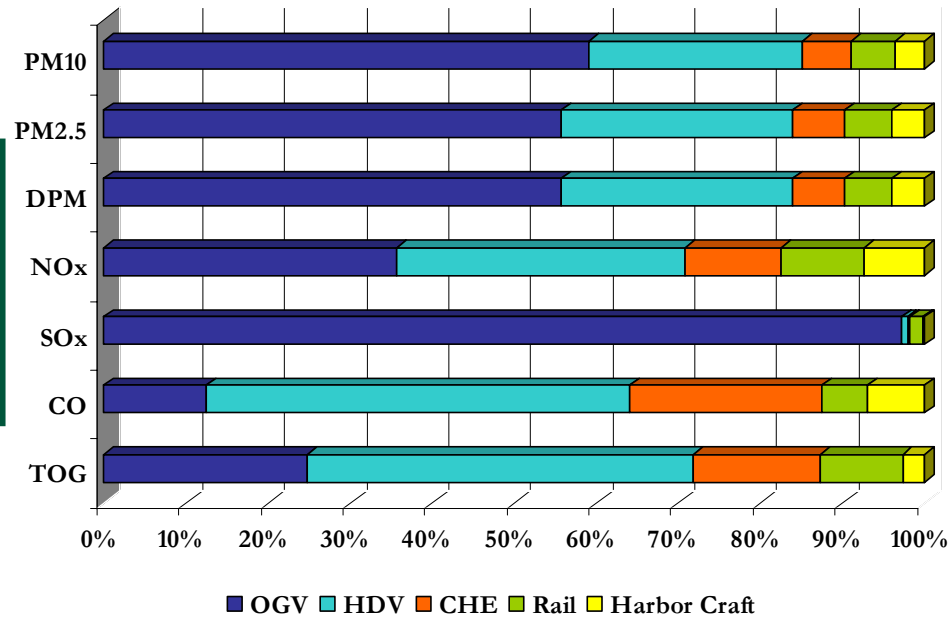


SOx



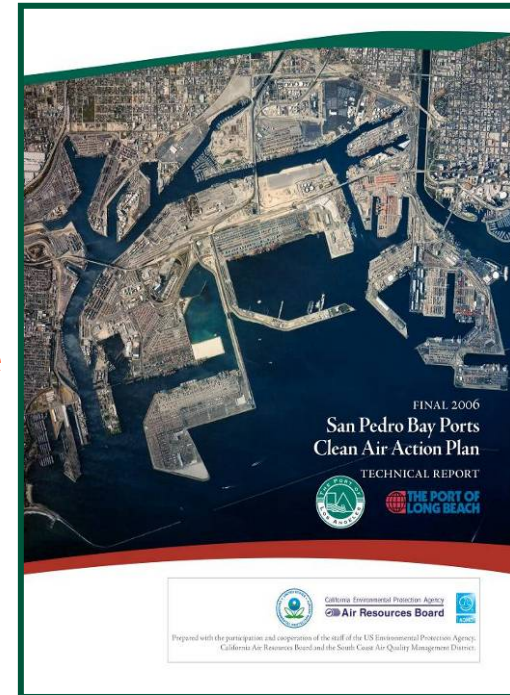
2005 Emissions Inventory

Category	PM ₁₀	PM _{2.5}	DPM	NO _x	SO _x	CO	TOG
Ocean Going Vessels	634	507	552	6,206	5,609	540	247
Harbor Craft	38	35	38	1,259	7	297	26
Cargo Handling Equipment	63	58	63	2,037	14	1,010	153
Locomotives	57	53	57	1,783	97	244	100
Heavy-Duty Vehicles	280	257	280	6,104	43	2,226	469
Total	1,072	910	990	17,389	5,770	4,318	995



CAAP Development

- Developed in cooperation with our partners, with stakeholder input
- Comprehensive Five Year Action Plan
 - Standards and goals - Implementation Strategies - **Update**
 - Control measures for source categories - **Update**
 - Technology Advancement Program - **Update**
 - Emission reduction Targets
 - DPM - 47% NO_x - 45% SO_x - 52%
 - \$2+ Billion Plan
- Adopted at joint port Board meeting in 2006

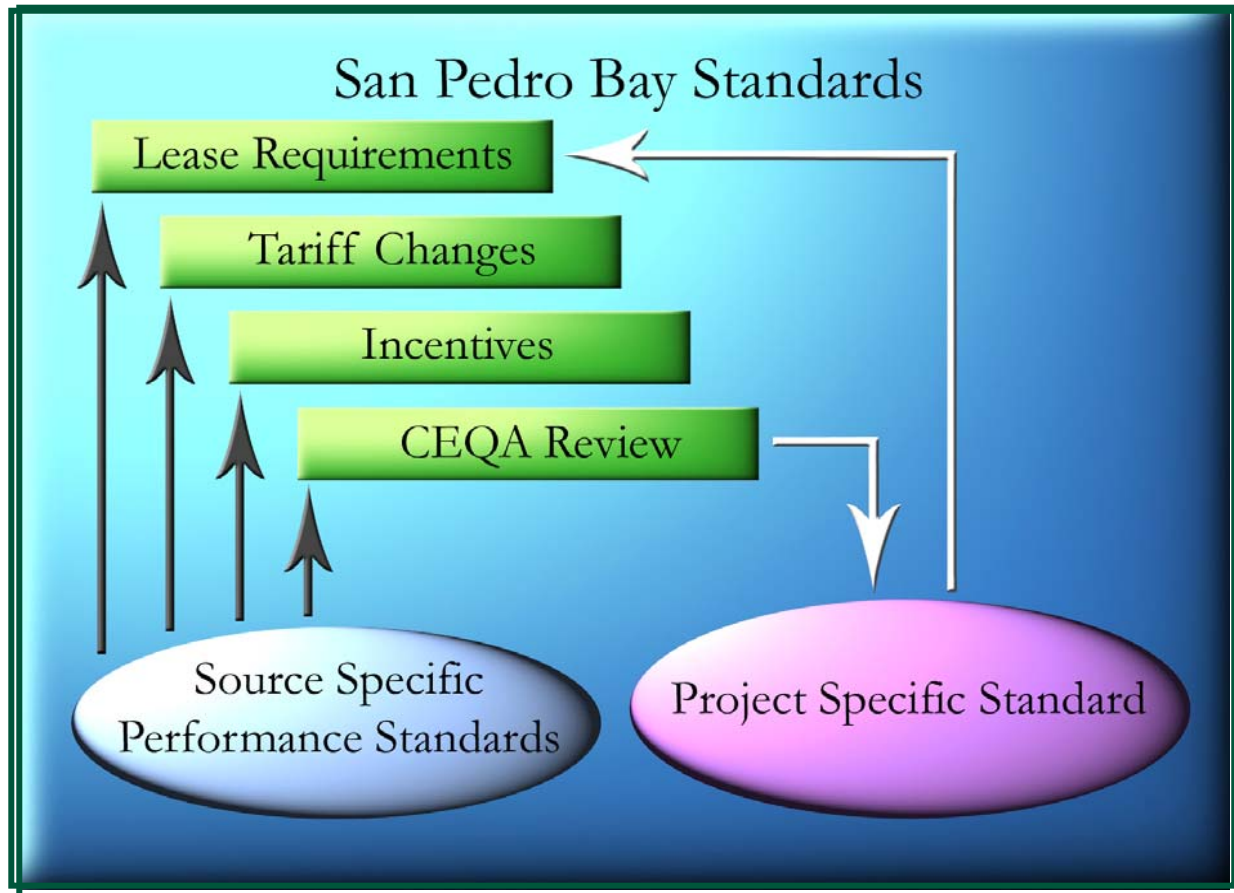


Clean Air Action Plan Drivers


- Minimize health risk from port operations
- Accelerate existing emissions reduction efforts
 - Bring “**green technology**” applications to the market
- Set consistent project-specific & source-specific standards
- Enable development



Relationships of Implementation Strategies



Major CAAP Milestone Update

- **Heavy Duty Trucks #1 priority – Tariffs in place – almost!**
 - **Development of Bay-Wide Standards – Ongoing – 2nd Quarter 08**
 - **Development of Source-Specific Tariffs**
 - **Vessel Speed Reduction (VSRP) – Ongoing incentive: 90% POLB; 85% POLA**
 - **At-Berth Ship Emissions: Ongoing – Project Specific schedule**
 - **Ship Fuel Standards: Tariff development underway – 2nd Quarter 08**
 - **Cargo Handling Equipment – CARB Rules, Project Specific schedule**
 - **Rail Switchers – Tier 2 locomotives in place**
 - **Class 1 Locomotives & New Rail Yards – Discussions underway**
 - **CEQA documents for specific projects with CAAP measures integrated into project/mitigation measures & leases – Ongoing; POLA- Trapac EIR**
 - **Technology Evaluations – Significant demonstrations**
 - **CAAP Revisions - 2008**
- 

Technology Advancement Program

The ports' TAP aims to:

- Encourage technology innovation
- Demonstrate effectiveness of new technologies
- Accelerate commercial availability of new technologies
- Improve emissions reductions
- Provide more options for meeting the goals of the CAAP

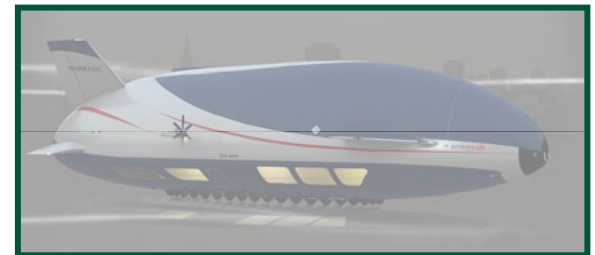


Funding:

- POLA/POLB: \$3 Million/year for 5 years
- AQMD/CARB: LNG Trucks and Other Technologies

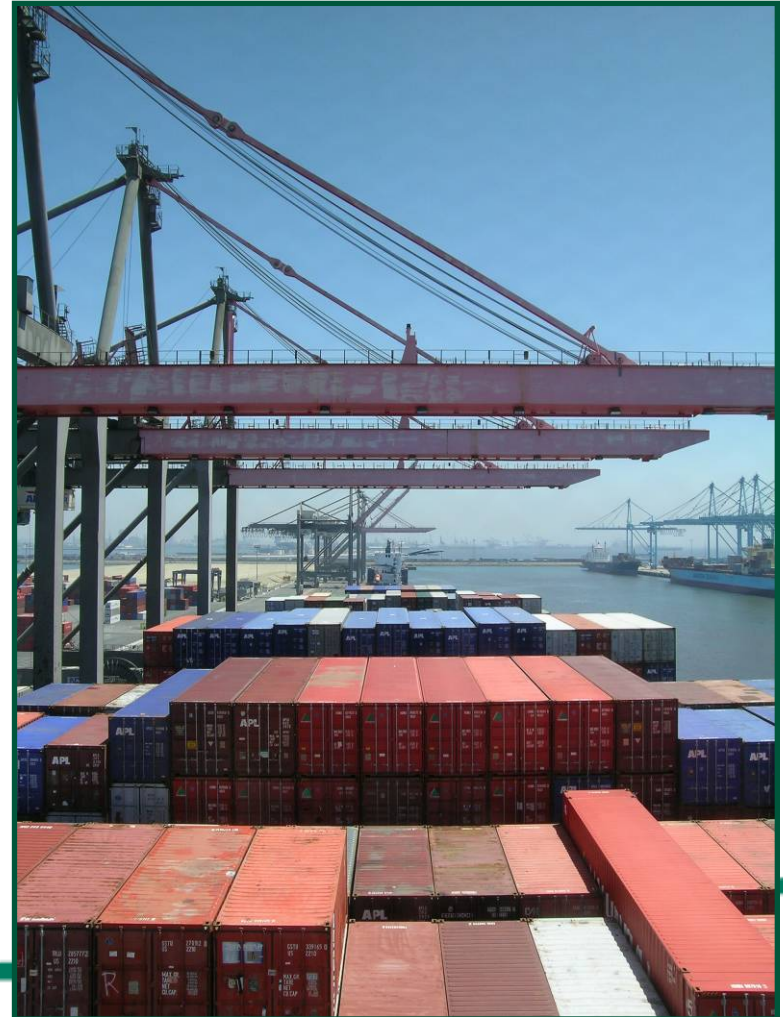
Focus Areas:

- CAAP Control Measure Requirements
- "Green Container" Transport Systems
- Emissions Inventory Improvements
- Emerging Technology Demonstrations



APL Singapore Vessel Retrofit

- Emulsified fuel for main & auxiliary engines
- Fuel efficient slide valve technology
- Both oxides of nitrogen & particulate matter reduced



Foss Maritime Diesel/Electric Tug Boat

- 1st time use of hybrid technology in a tug boat
- Downsized diesel engines
- **Anticipated benefits:**
 - Over 70% of engine time saved!
 - 20 – 30% fuel savings
 - 44% reduction of oxides of nitrogen and particulate matter



Hybrid Yard Hostler

- Hybrid yard hostler project developed by POLB
- Project partners
 - EPA, Kalmar, Long Beach Container Terminal, Calstart
- Develop and demonstrate performance of hybrid technology in yard hostler application



Pacific Harbor Line Locomotive Retrofit

- 1st time in the United States
- Tier 2 switch locomotive engines
- Retrofit with MobiClean™ Diesel Particulate Filters
- Anticipated benefit:
 - Over 90% of particulate matter reduced



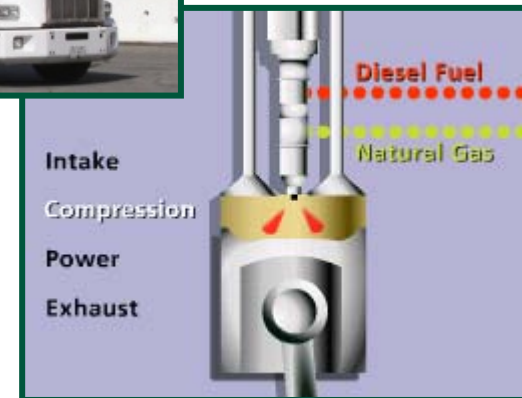
Balqon Electric Truck

- POLA/AQMD Project
- Development of a prototype low-speed full-electric tow tractor (Class 8)
- To be used for transporting containers to and from near-dock rail facilities
- Anticipated benefits:
 - Nearly 100% emission reductions



LNG Trucks

- **LNG Powered Westport High Pressure Direct Injection (HPDI) - 5% Diesel**
- **CAAP Annual Commitment**
 - POLA - \$8 Million
 - POLB - \$8 Million
 - AQMD - \$6 Million
- **Program**
 - \$184,000/per truck
 - Scrap pre-1994 truck
 - Minimum miles/year and trips/week
- **RFP released in 10/07**
 - 10 proposals received, 383 trucks
 - Ports agreed to fund 158 trucks
 - AQMD – 41 trucks
 - POLA and POLB – 117 trucks
 - POLA added additional \$5 million to supplement oversubscription



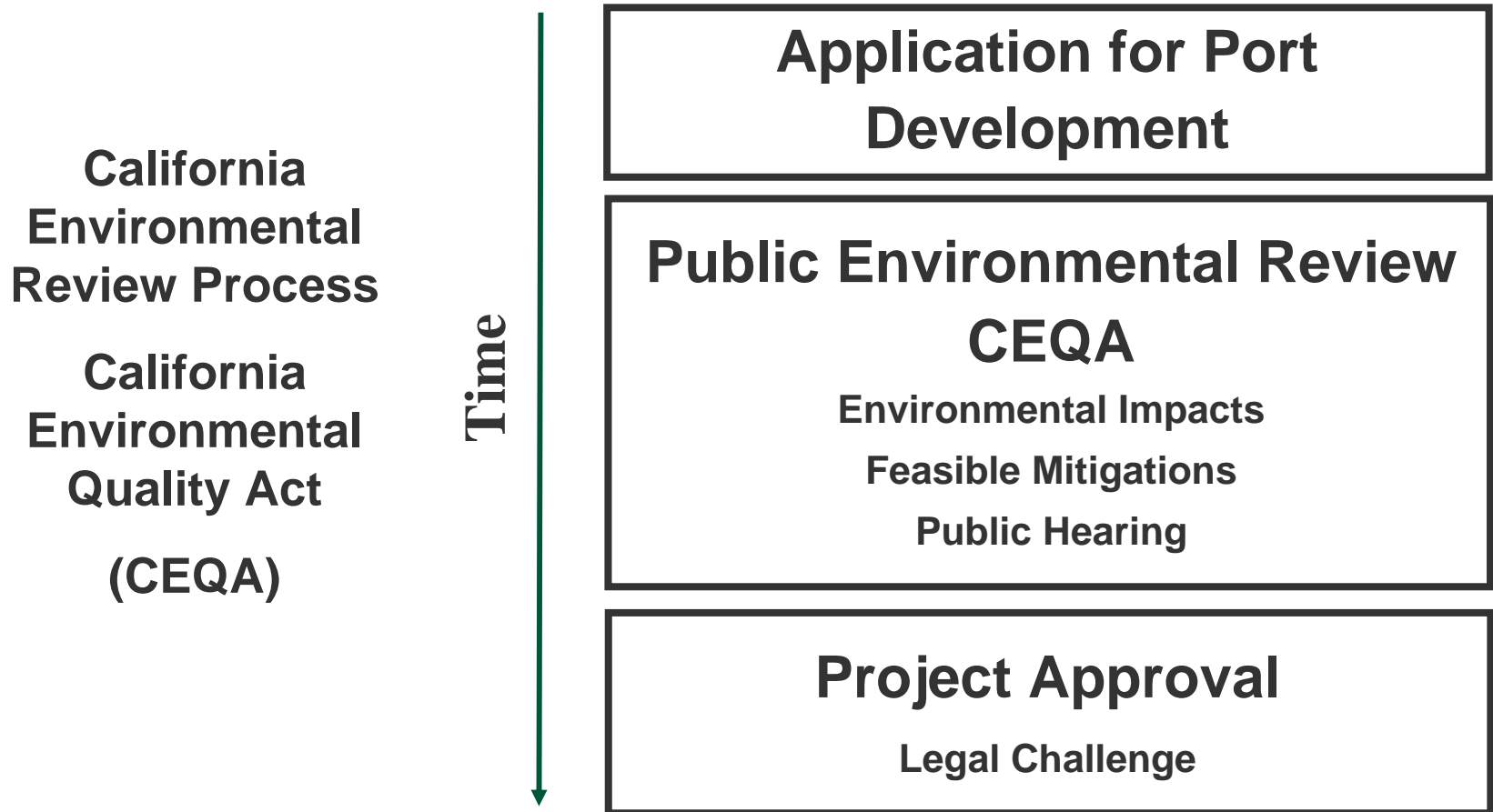
Electric Rubber Tired Gantry (RTGs) Cranes

- Crane/Ground Mounted
- POLA Project Development
 - Evergreen
 - WBCT - Yang Ming
- POLB - Customer RFP
- Anticipated benefits:
 - Significant PM, NOx, SOx, and CO2 reductions



CAAP Implementation Strategies

Project Level Standards- CEQA Measures

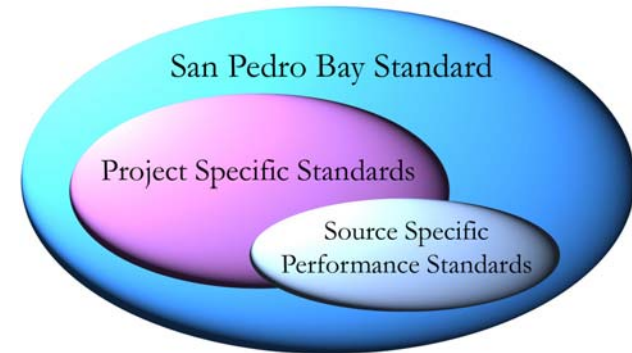


CAAP Implementation Strategies

CEQA Mitigation Measures - Example

Air Quality Mitigation Measures

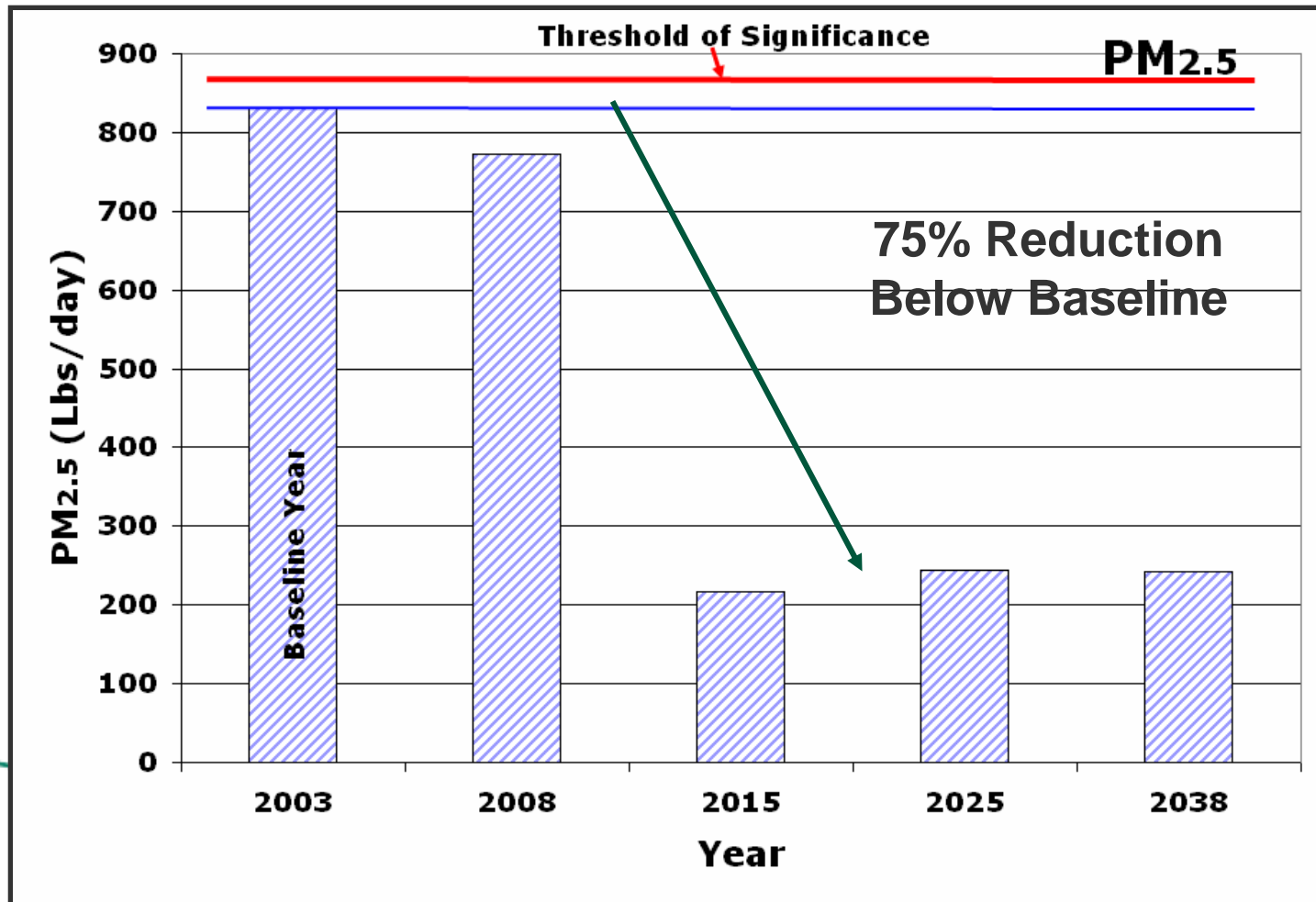
- **VSRP: 100%**
- **AMP: 50% 2010, 80% 2015, 100% 2018**
- **0.2% S. Fuel: 20% 2009, 50% 2012, 100% 2015**
- **Rail Yards: Cleanest Equipment (CAAP)**
- **Trucks: Per CAAP – 2007**
- **Yard Equipment: Per CAAP**
- **GHG: Future Ship Builds; Solar Power**
- **Future Technology: 7 Year Review, Cost Share**



CAAP Implementation Strategies

CEQA Mitigation Measures - Example

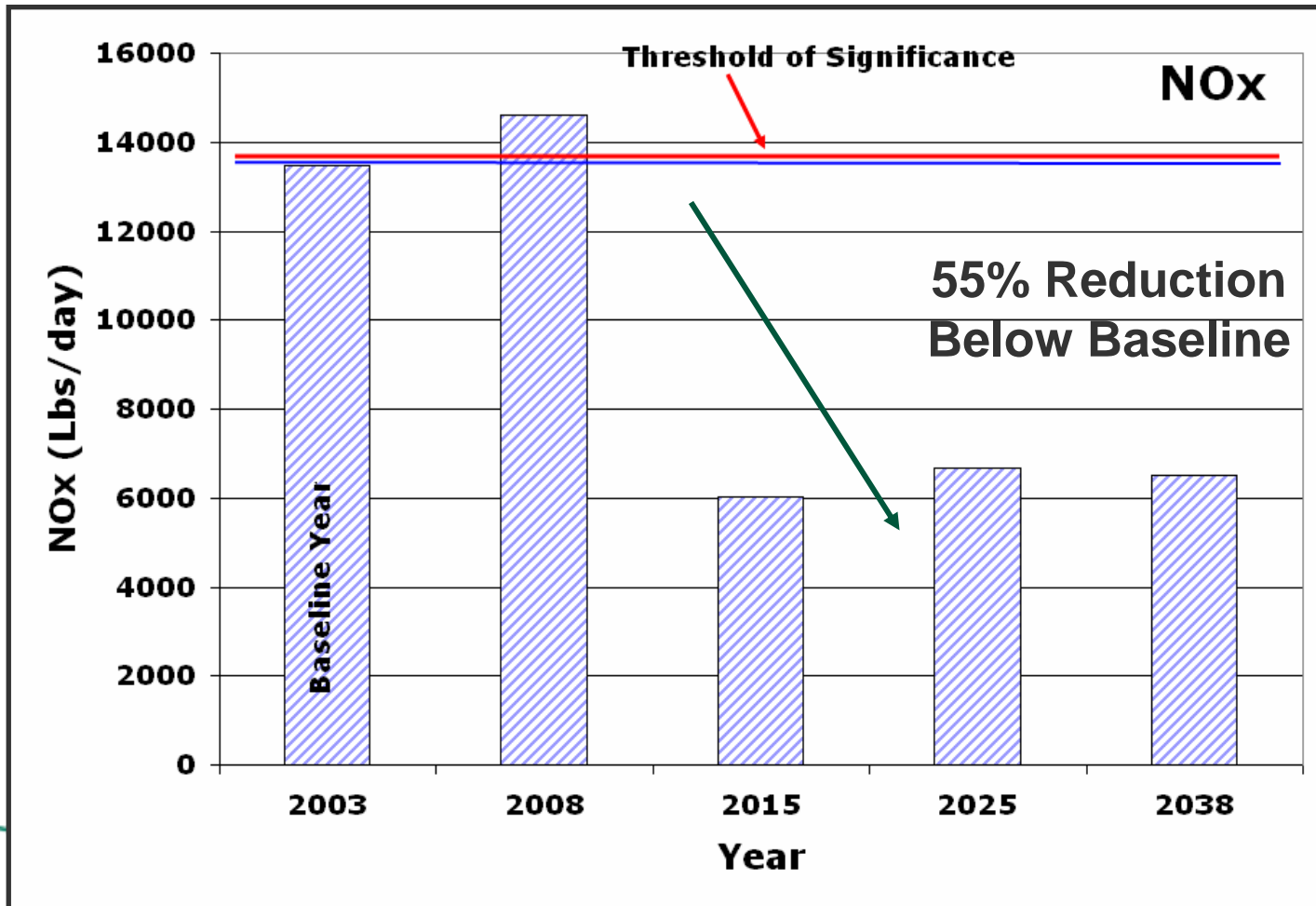
Particulate Matter (PM2.5) by Year



CAAP Implementation Strategies

CEQA Mitigation Measures - Example

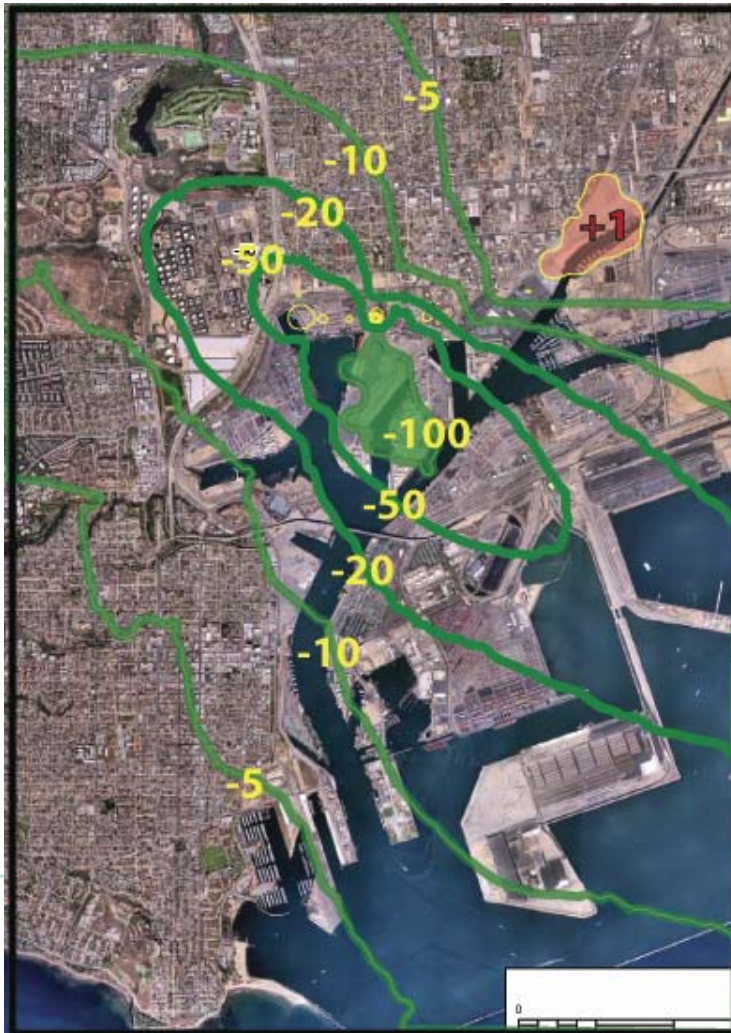
Nitrogen Oxide (NOx) Emissions by Year



CAAP Implementation Strategies

Residential Health Risk Estimates - Example

Mitigated Project



No Project



For New CAAP Information

Learn more about the Clean Air Action Plan - www.cleanairactionplan.org

