Port of Los Angeles
Zero Emission Strategies
May 8, 2013

THE PORT OF LOS ANGELES

Regional Air Toxic Health Risk Changes 1998 to 2005

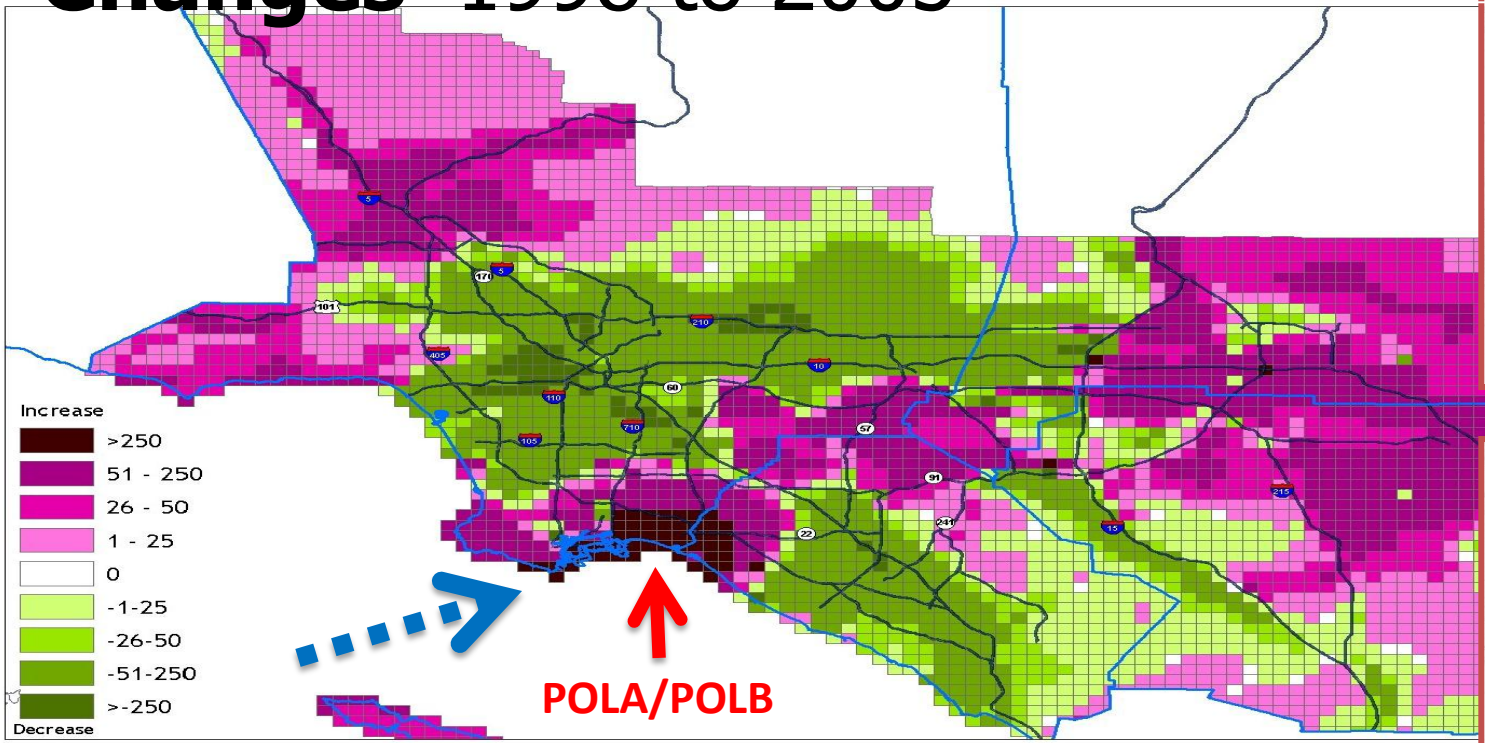


Figure 4-8
Change in CAMx RTRAC Simulated Air Toxics Risk (per million) from the 1998-99 to 2005 (using back-cast 1998 emissions and 1998-99 MM5 generated meteorological data fields)

Pollution, traffic are linked to illness

ENVIRONMENT: German study finds heart attacks are three times more likely in congestion. Bad air is blamed.

Latino areas are hit hard by environmental health threats

REPORT: Group suffers more from pollution than the rest of the population, study finds.

What Are Air Impacts from Operations?

Clean Air Action Plan

- Adopted in 2006
- Updated in 2010
- Emission Reduction Standards

	2014	2023
DPM	72%	77%
NOx	22%	59%
SOx	93%	93%

- Health Risk Reduction Standard
  - Reduce population-weighted cancer risk of port-related diesel particulate matter (DPM) by 85% by 2020 (compared to 2005 baseline)

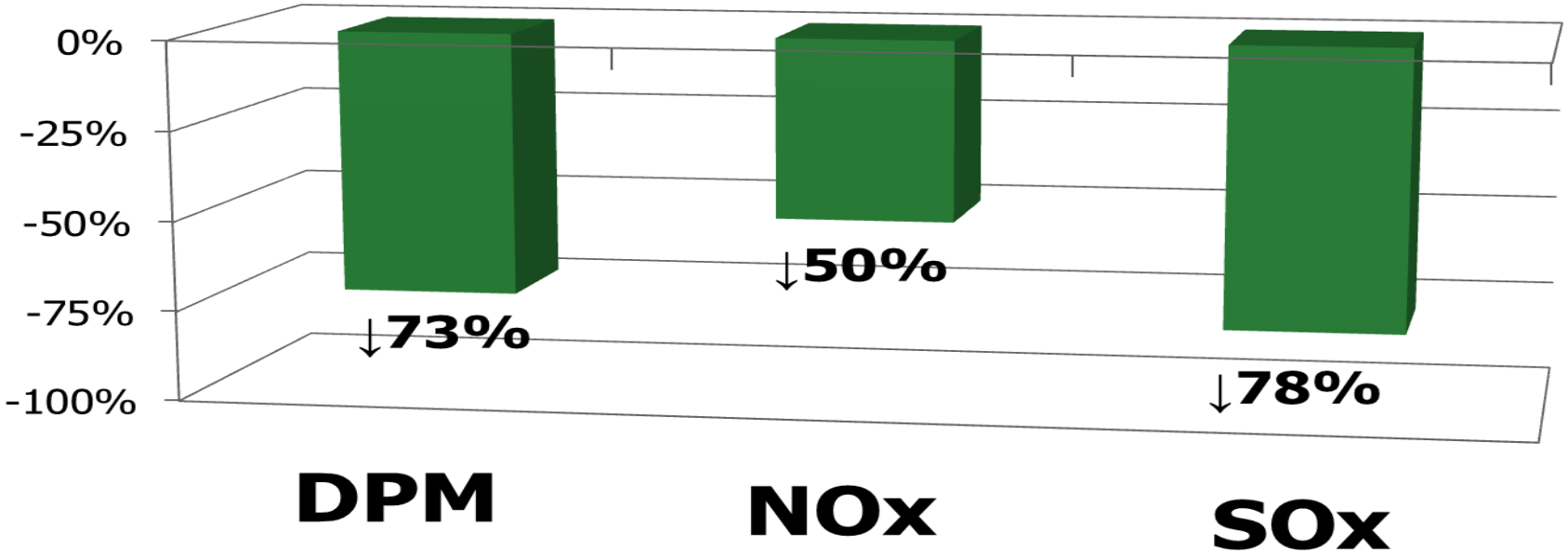
Clean Air Action Plan Elements

- Source Categories
  - Heavy Duty Vehicles
    - Clean Truck Program
  - Ocean-Going Vessels
    - Vessel Speed Reduction to 20nm and 40 nm
    - Shore Power
    - Low Sulfur Fuels
    - Incentivize Clean Ships/Environmental Ship Index Program
    - Incentivize New Technology Development
  - Locomotives, Cargo Handling Equipment, Harbor Craft
    - Set standards
- Tracking
  - Air Quality Monitoring
  - Emissions Inventory
  - Updates (2010)

POLA's History of Technology Advancement

- Technology Advancement Program (TAP)
  - Joint POLA/POLB Program est. 2007
  - $1.5 million per port per year made available
  - Funding for demonstration and testing
- LNG Trucks
  - LNG Truck Program 2006
  - Now over 900 LNG trucks serving the ports
- Electric Trucks

SPBP Emission Reductions Since 2005



So…What's Next?

- We already picked the "low hanging fruit"
- Future emission reduction targets are significantly more stringent
- Port growth continues…permitting is challenging

Port of Los Angeles Zero Emission Program

- Joint Zero Emission Roadmap Issued by POLA and POLB in July 2011
  - Response to need to continue emissions reductions in future years
- Goal is to develop zero emission technologies for port related sources, including trucks, cargo handling equipment and rail
- Initial focus is on trucks and cargo handling equipment

Alternative Maritime Power

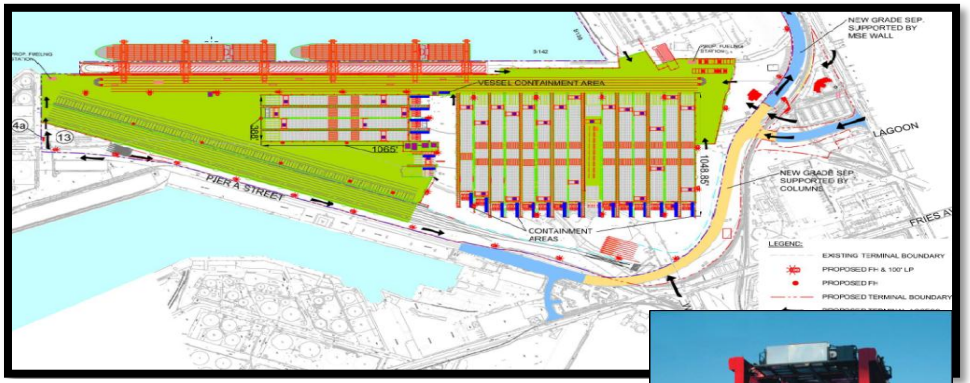
THE PORT OF LOS ANGELES

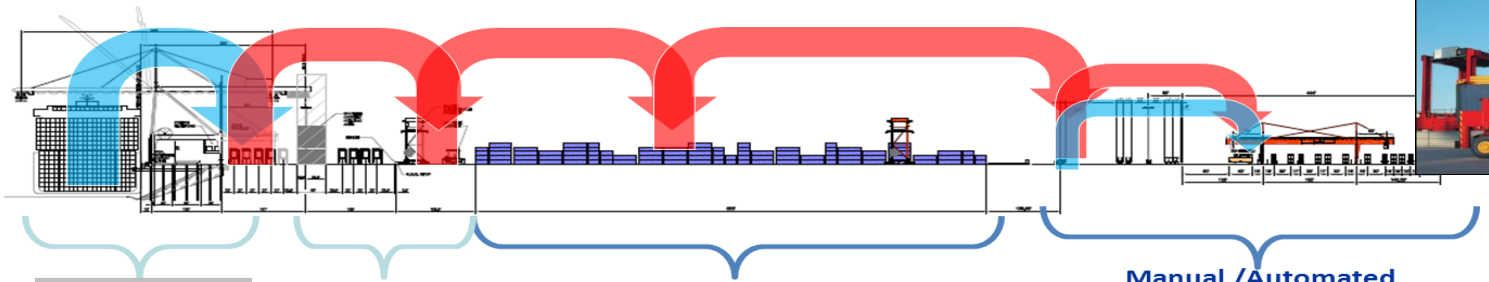
Tenant Projects

- Electric Rubber Tired Gantry Cranes
- Rail Mounted Gantry Cranes

Automated Terminal Development

- TraPac
  - Est. 2016
- APL
  - Under Consideration





Vessel Operation Manual

Automated Horizontal Transport (Shuttle Carriers/AGVs)

Automated Stacking Area (ASC)

Manual /Automated Landside Service (Trucks & Rail)

Foss Maritime Diesel/Electric Tug Boat

- 1st hybrid technology in a tug boat
- Delivered January 23, 2009
- Equipped with:
  - Diesel engine/Electric drive
  - Battery pack
- Benefits:
  - Over 70% of engine time saved!
  - 20 – 30% fuel savings
  - 44% reduction of oxides of nitrogen and particulate matter

Countywide Zero Emission Truck Collaborative

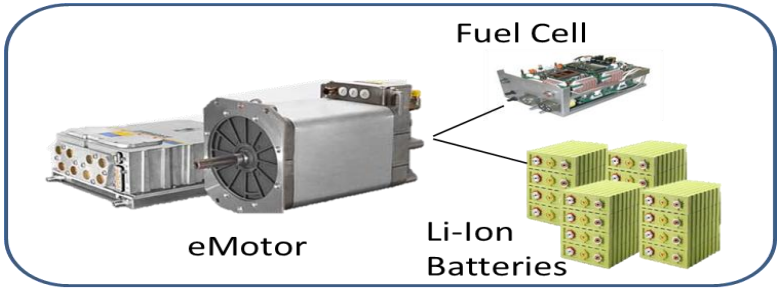
- Formed in response to Zero Emission Roadmap
- Metro is lead, also made up of POLA, POLB, AQMD, Gateway Cities, Caltrans
- Purpose - to ensure that zero emission technologies remain a priority
- Work together as a unified region to secure funding and/or spur policy changes at the state or national level.

Battery Electric Truck

- Technology Vendor: Balqon Corp.
- Plug-in, battery powered
- Yard Tractor and On-Road models
- Lithium Ion batteries

Hydrogen Fuel Cell Truck

- Technology Vendor: Vision Industries
- Equipped with:
  - Diesel engine/Electric drive
  - Fuel Cell
  - Battery pack
- 200 or 400 mile range configuration



Overhead Catenary Systems

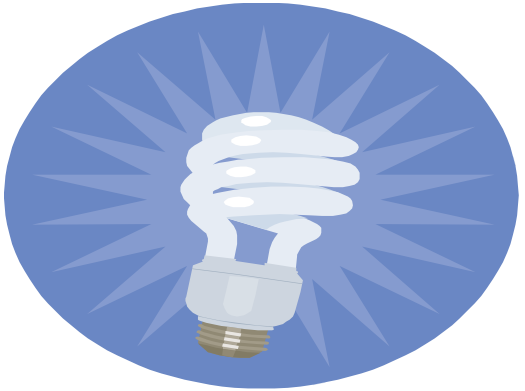
- Working with AQMD to fund OCS demo
  - $13.5 million for catenary and infrastructure
  - $3.2 million for trucks
  - Alameda Street in the City of Carson
  - Multiple architectures

Energy Management Action Plan (E-MAP)

- Port has increasing energy demands
  - Throughput
  - Shore power
  - Electric equipment
  - Automation

- Plan for growing energy needs while improving port competitiveness, security, and resiliency.

- Help to meeting state GHG goals (AB32).



E-MAP Focus Areas

- Efficiency
- Resiliency
- Availability
- Quality
- Cost Effectiveness
- Sustainability

E-MAP

- Assess existing conditions
  - Energy Audits
- Gather input
  - Workshops
  - Stakeholder groups
- Identify gaps and needs
  - Current
  - Future
- Identify potential solutions
- Set goals
  - Short-term
  - Medium-term
  - Long-term

The End – Q&A