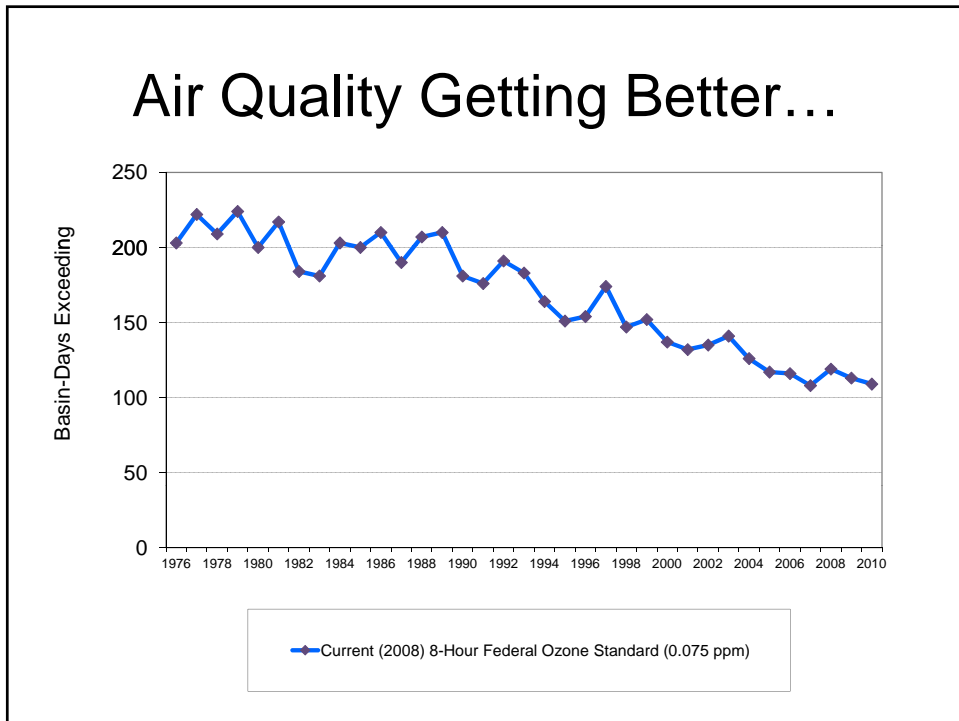


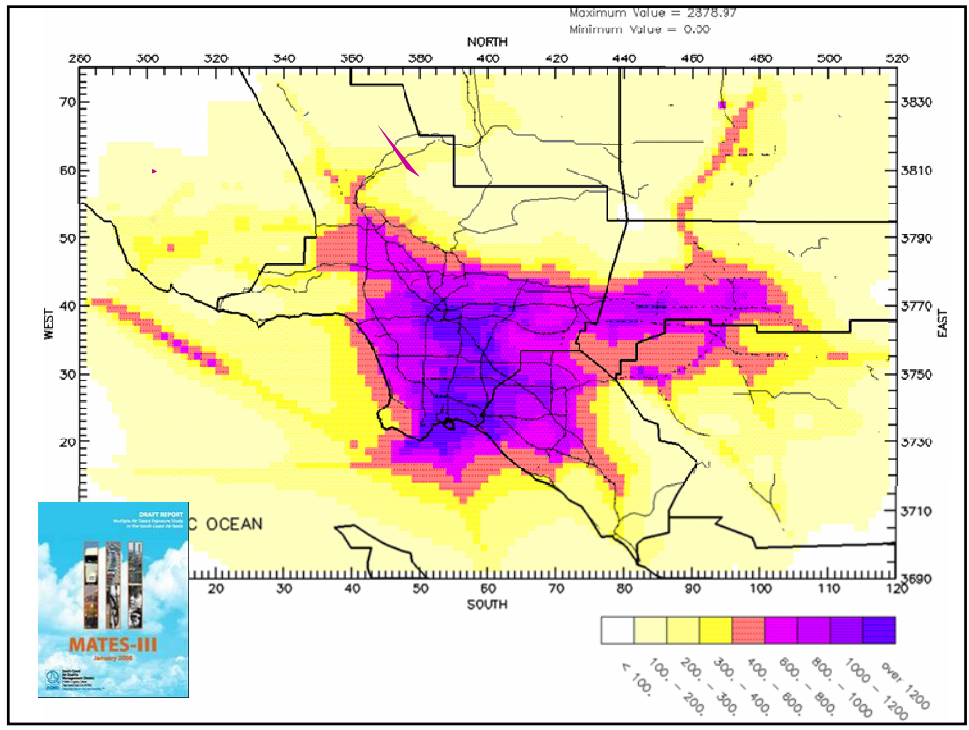
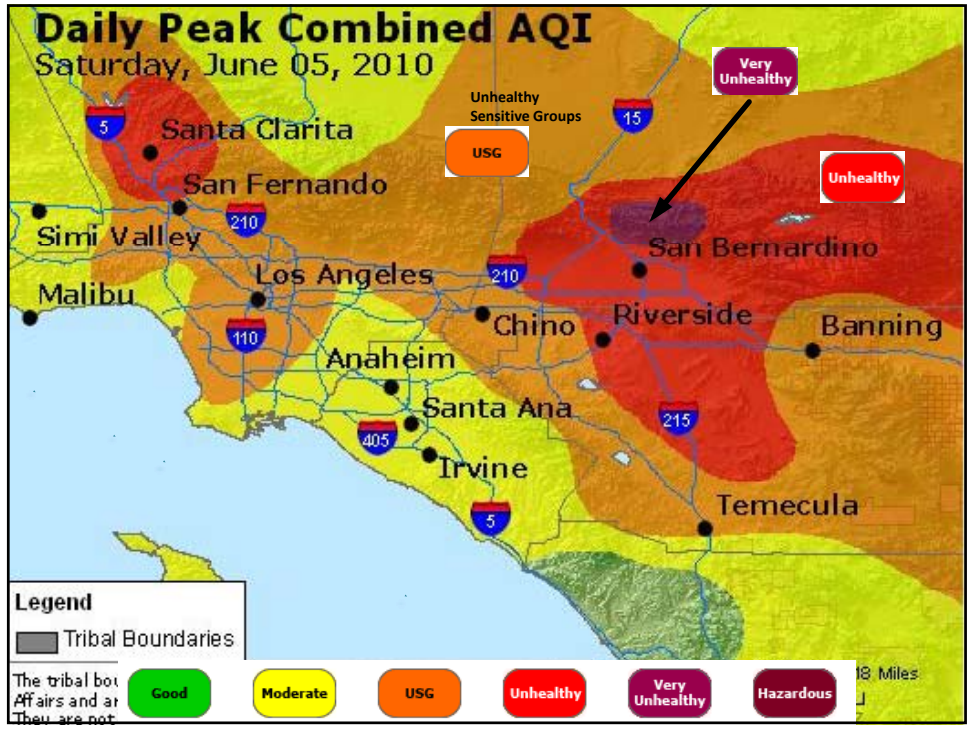


South Coast AQMD

- Over 44% of CA population
- Ports of Los Angeles and Long Beach – 6th largest in world
- 1.5 million medium and heavy-duty vehicles
- 10 million passenger cars









+ 5,000 deaths
year

Additional costs include

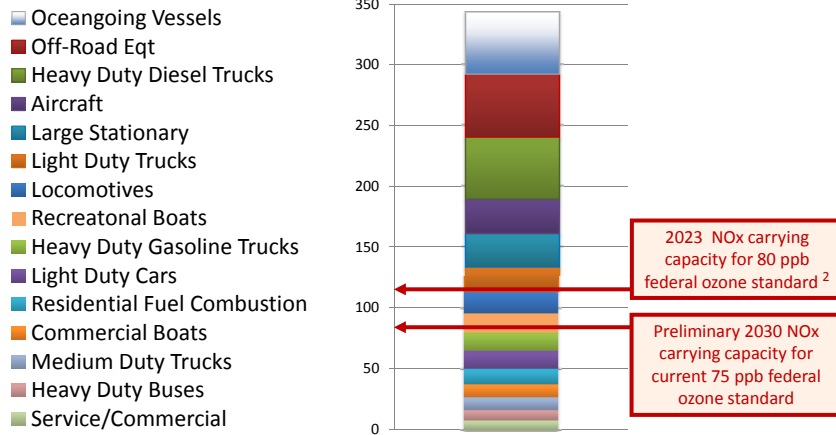
- Hospitalizations
- Cases respiratory illness
- School absences
- Lost workdays



90% mobile
sources

NOx emissions

Top 15 NO_x Categories: 2023 NO_x Emissions With Adopted Rules Preliminary SCAQMD Estimates¹



¹ Preliminary emissions estimates based on data updated from 2007 AQMP where available; CARB 2010 emissions projections for trucks and off-road equipment; IMO Tier 1–3 for ocean vessels; EPA 2008 rule for locomotives; 2007 AQMP short-term measures for other categories. Range for oceangoing vessels (20–52) based on varying deployment assumptions for IMO Tier 2 and 3 vessels and range of ports' cargo forecasts.

² 1997 80 ppb federal ambient ozone standard. Source: 2007 AQMP.



AQMD Technology Portfolio

- Near-term to longer-term
- “Planting many seeds”
- Developing “Pathways”



Fuel Cells & Electric



Renewables





Plug-ins



Clean Transit



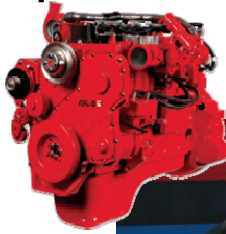
Heavy-Duty Natural Gas

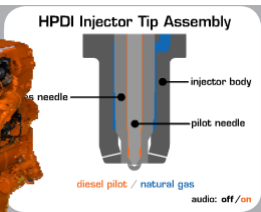



CNG

NG Engine Development

- Cummins Westport 8.9L ISL-G
 - NGNGV2 Initiated ~2001
 - Certified in 2007
- Westport Innovations 15L ISX (HPDI)
 - Development in 2004
 - Certified in 2010







Success Stories

- LAMTA – Transit Buses
 - California’s largest transit agency (3rd largest in Nation)
 - 100% CNG in January 2011
- School Buses
 - Replaced close to 1,000 pre-1987 buses with new CNG buses since 2001
 - Largest number of replacements in CA (\$150 million)
- Refuse Haulers
 - 34% alternative fuel
 - Waste Management has largest NG fleet in the nation



Ports Clean Truck Program



- Prior to drayage trucks regulation (Jan 2010)
- 1,307 trucks
 - 854 diesel
 - 453 LNG
- Co-funding by AQMD, Ports, DOE and EPA for cleaner LNG trucks





Alternative Fuels Challenge

- “Net zero” emissions
 - tailpipe = power plant equiv.
 - NG, H2, diesel
- In-basin electricity generation very clean. Initial estimates*
 - 0.02 g/mile ➔ SULEV equivalent
 - ~0.007 g/bhp-hr NOx ➔ 95% decrease

* based on drayage truck duty-cycle and in-basin generation only

MD/HD Technology Strategy

- “One-size-fits-all” does not apply
- Near-term focus on toxics/health effects
- Longer-term focus on regional attainment
- Identify high potential duty-cycles for zero or near-zero emissions (hybrids, catenary, AER)
- If path to zero is not feasible or takes too long, need other mitigation strategies
- Infrastructure

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Balancing Act

- Support technology *development*
- Incentivize technology *deployment*
- Establish near- *and* long-term strategies
- Develop policies *and* regulations to support
- Build *partnerships* to leverage efforts



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