

# Freight Transportation: Air Quality Impacts and Opportunities

Presented to  
Southern California National Freight Gateway Collaboration  
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Peter Greenwald, Sr. Policy Advisor  
South Coast Air Quality Management District



Cynthia Marvin  
Assistant Division Chief, Stationary Source Division  
California Air Resources Board

## South Coast Air Basin

# Key Goods Movement Air Pollution Impacts

- Local health risks caused by diesel particulates
- Regional air quality attainment . . .

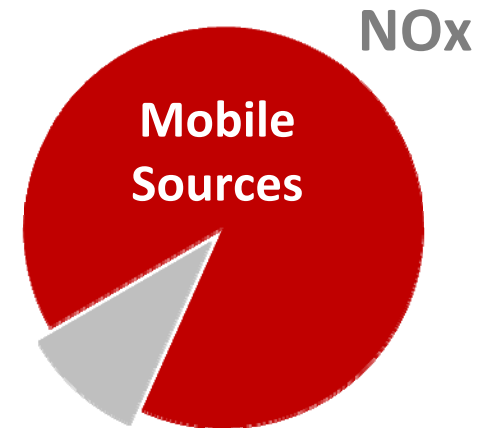


## Federal Air Quality Standards Attainment Deadlines

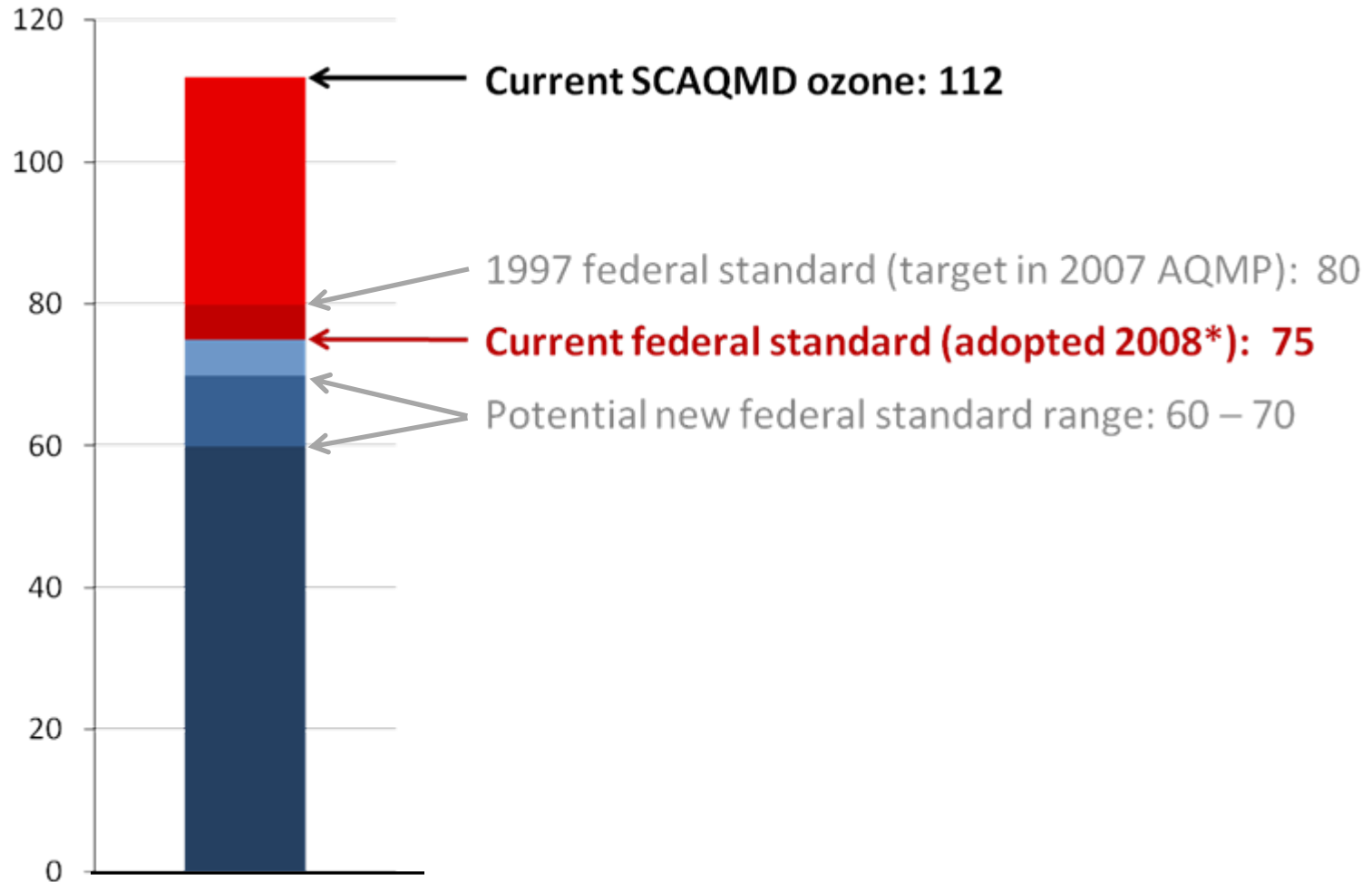
- **Fine Particulates (PM<sub>2.5</sub>)**
  - **2014** (annual average standard)
  - **2019** (24 hr average standard)
  - emissions that must be reduced:
    - nitrogen oxides, sulfur oxides, and directly-emitted particulates
- **Ozone**
  - **2023**
  - emissions that must be reduced:
    - nitrogen oxides and hydrocarbons

## Key Regional Air Quality Challenge: Reducing Nitrogen Oxides from Mobile Sources

- Attaining the federal 24-hr PM and ozone standards will require substantial NO<sub>x</sub> reductions *beyond adopted rules*
- Mobile sources (e.g. cars, trucks, ships, trains, aircraft) create 90% of NO<sub>x</sub>
- *The ozone standard will likely require the greatest reductions . . .*

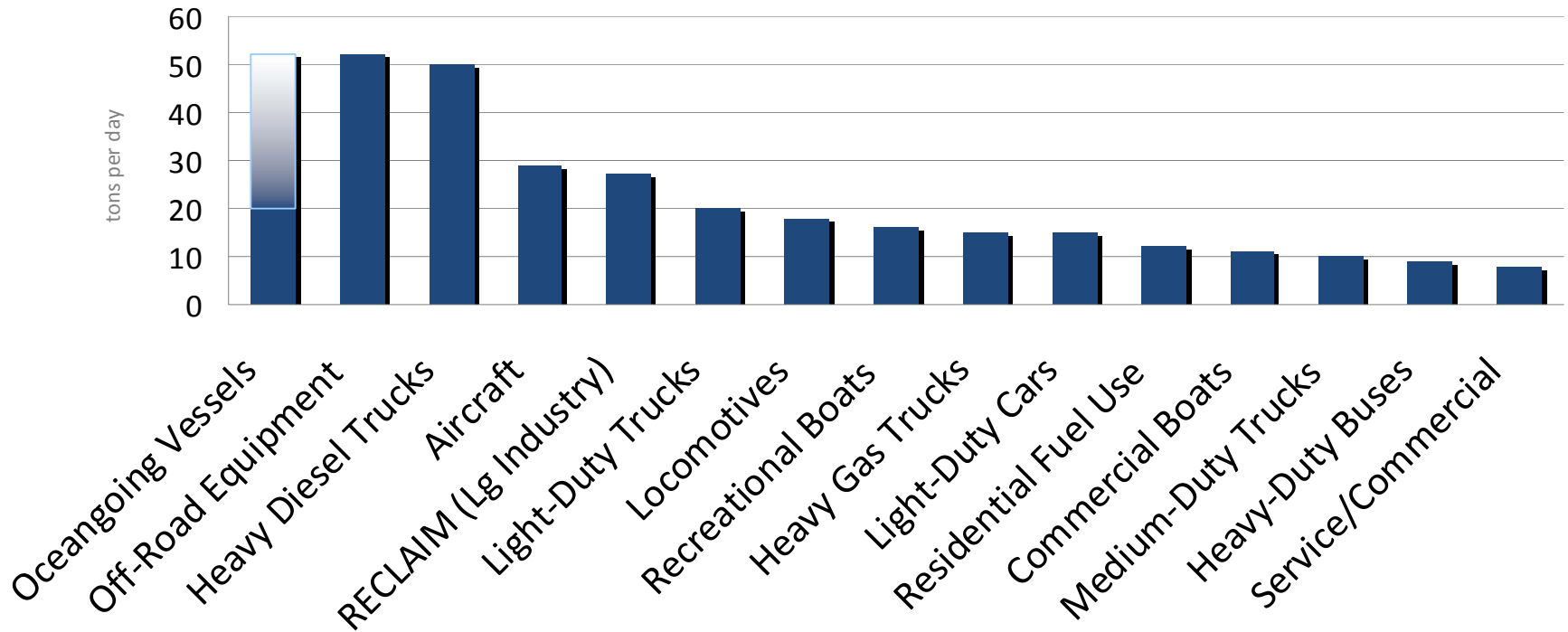


# South Coast Air Basin 8-Hour Ozone (ppb)



South Coast Air Basin

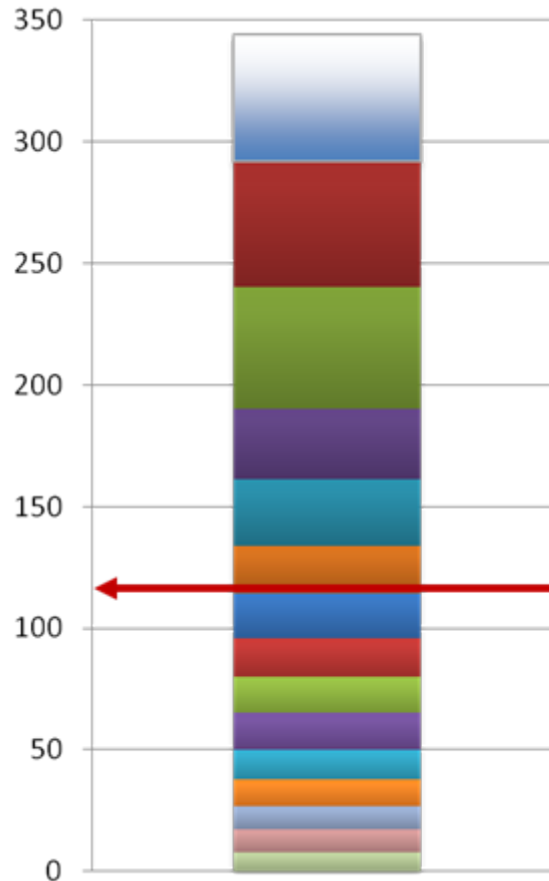
# Top 15 NO<sub>x</sub> Categories: 2023 NO<sub>x</sub> Emissions With Rules Adopted Through December 2010 Preliminary SCAQMD Estimates\*



\* 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 based on varying deployment assumptions for IMO Tier 2 and 3 vessels and range of ports' cargo forecasts.

# Top 15 NO<sub>x</sub> Categories: 2023 NO<sub>x</sub> Emissions With Rules Adopted Through December 2010 Preliminary SCAQMD Estimates<sup>1</sup>

- Oceangoing Vessels
- Off-Road Eq<sup>t</sup>
- Heavy Duty Diesel Trucks
- Aircraft
- Large Stationary
- Light Duty Trucks
- Locomotives
- Recreational Boats
- Heavy Duty Gasoline Trucks
- Light Duty Cars
- Residential Fuel Combustion
- Commercial Boats
- Medium Duty Trucks
- Heavy Duty Buses
- Service/Commercial



Region's 2023  
NO<sub>x</sub> carrying  
capacity for  
federal ozone  
standard <sup>2</sup>

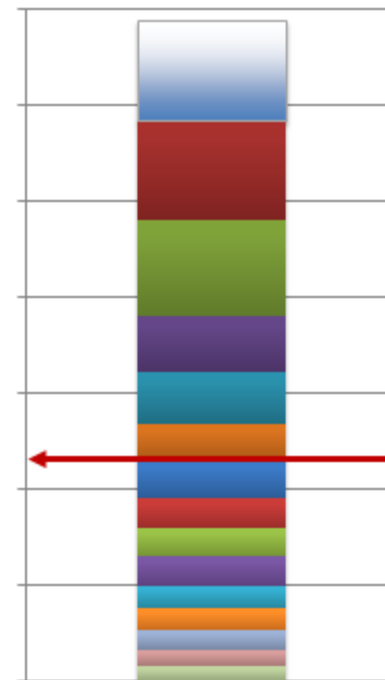
1. Preliminary emissions estimates based on data updated from 2007 AQMP where available: CARB 2010 emissions projections for trucks and off-road equipment; IMO Tier 1 – 3 for ocean vessels; EPA 2008 rule for locomotives; 2007 AQMP short-term measures for other categories. Range for oceangoing vessels (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. Current standard is 75 ppb.

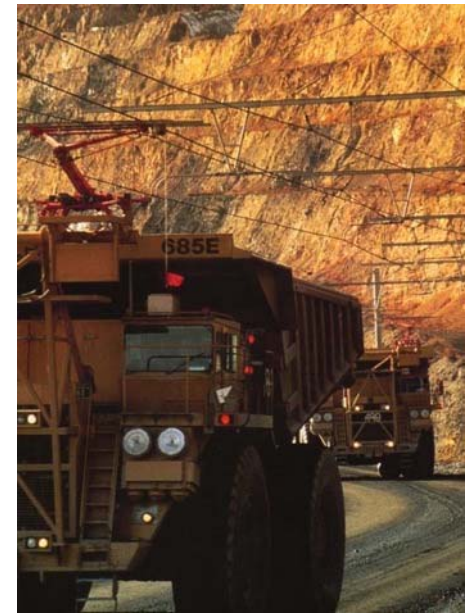
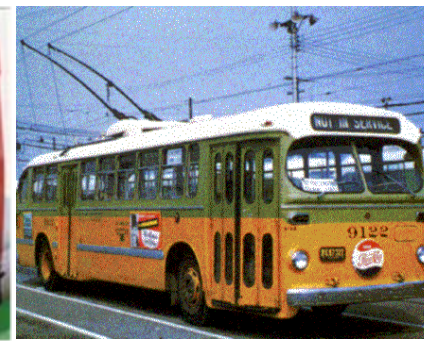
*Why not just accelerate fleet turnover to newer, cleaner, units?*

- **Autos and Trucks:** Vast majority of vehicles are already expected to meet most stringent adopted standards for new units by 2023.
- **Vessels and Locomotives:** Majority of units are *not* expected to meet most stringent adopted standards for new units by 2023, *but . . .*

- Even if all locomotives and vessels meet such standards, total regional emissions from all sources will still substantially exceed the carrying capacity.
- Thus, in addition to fleet turnover, lower emissions will be needed where possible . . .







## Zero-Emission Technologies Today

Clockwise from top left:

- Battery-electric with quick charge
- Shanghai Maglev
- Battery electric heavy duty truck (Balqon)
- Medium-duty battery-electric truck
- Electric car (Nissan Leaf)
- Catenary electric mining truck, Nevada
- Catenary electric bus (Los Angeles 1948)
- Electric freight rail, Italy
- Electric coal train, Australia
- Electric/diesel passenger train, New York
- Hydrogen fuel cell bus

# Air Quality Drivers

- Current and future SIP commitments
  - Define/achieve “black box” reductions
  - Transportation/general conformity budgets
  - Sanctions for any failure to deliver benefits
- Localized health risk/community concerns
- AB32 Scoping Plan for Climate Change:
  - Progress towards a lower carbon, more sustainable freight transport system
  - Measure to improve freight system efficiency

## 2010 Collaborative Direction

*“Define a system that meets the region’s long term mobility, safety, environmental and energy needs”*

- Regional air quality needs:
  - *achieve near-zero NOx and particulate matter emissions from landside freight transport by 2030, with substantial implementation of zero- and near-zero emission technologies by 2023*
  - *substantially reduce marine sector emissions*

# Common Interests

- Environmental quality
  - Health and climate
- Economic growth
  - Ability to grow freight volumes, improve reliability, and enhance port competitiveness
- Passenger mobility
  - Ability to reduce congestion/expand capacity
- Access to private capital investments
  - Major new infrastructure/equipment

## Suggested Next Steps

- Develop broad system definition that includes longer-term zero- and near-zero emission projects
  - Discuss expanded system definition concepts at next Collaborative meeting
  - Include system definition concepts in new RTP and AQMP
- Define and seek funding for California pilot “green freight” project

# Thank You

