Freight Transportation: Air Quality Impacts and Opportunities

Presented to
Southern California National Freight Gateway Collaboration
February 24, 2011

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 . . .
South Coast Air Basin

Federal Air Quality Standards Attainment Deadlines

• **Fine Particulates (PM\textsubscript{2.5})**
  – **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 NOx reductions beyond adopted rules
- Mobile sources (e.g. cars, trucks, ships, trains, aircraft) create 90% of NOx

- The ozone standard will likely require the greatest reductions...
South Coast Air Basin 8-Hour Ozone (ppb)

Current SCAQMD ozone: 112

1997 federal standard (target in 2007 AQMP): 80

Current federal standard (adopted 2008*): 75

Potential new federal standard range: 60 – 70
South Coast Air Basin

Top 15 NOx Categories: 2023 NOx 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 NOx Categories: 2023 NO\textsubscript{x} Emissions With Rules Adopted Through December 2010 Preliminary SCAQMD Estimates\textsuperscript{1}

\begin{itemize}
  \item Oceangoing Vessels
  \item Off-Road Eqt
  \item Heavy Duty Diesel Trucks
  \item Aircraft
  \item Large Stationary
  \item Light Duty Trucks
  \item Locomotives
  \item Recreational Boats
  \item Heavy Duty Gasoline Trucks
  \item Light Duty Cars
  \item Residential Fuel Combustion
  \item Commercial Boats
  \item Medium Duty Trucks
  \item Heavy Duty Buses
  \item Service/Commercial
\end{itemize}

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.

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