

# Zero Emission Medium & Heavy Duty Vehicle Demonstrations



Naveen Berry  
Technology Demonstration Manager, SCAQMD

October 18, 2016  
CaFCP



South Coast  
Air Quality Management District

# South Coast Air Quality Management District

**4** Counties

Los Angeles

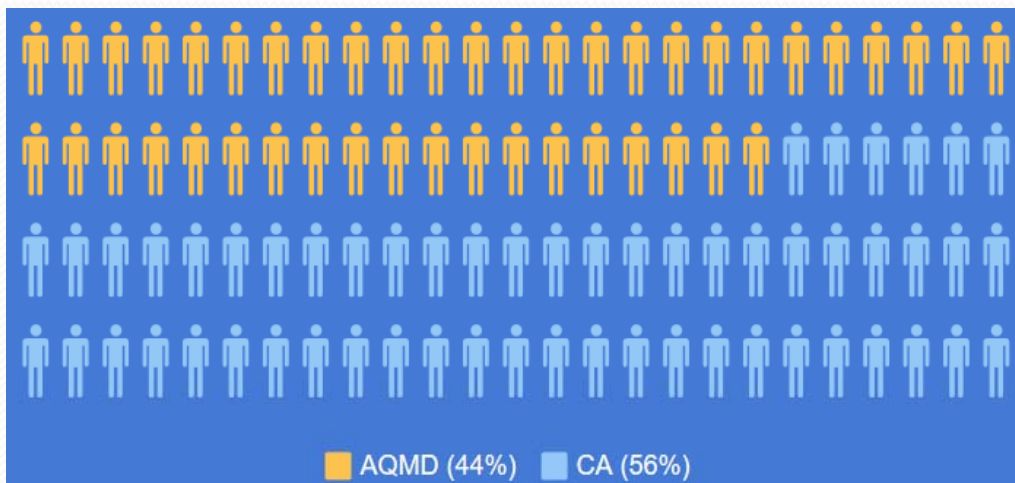
Orange

Riverside

San Bernardino

**44%** of

State's Population



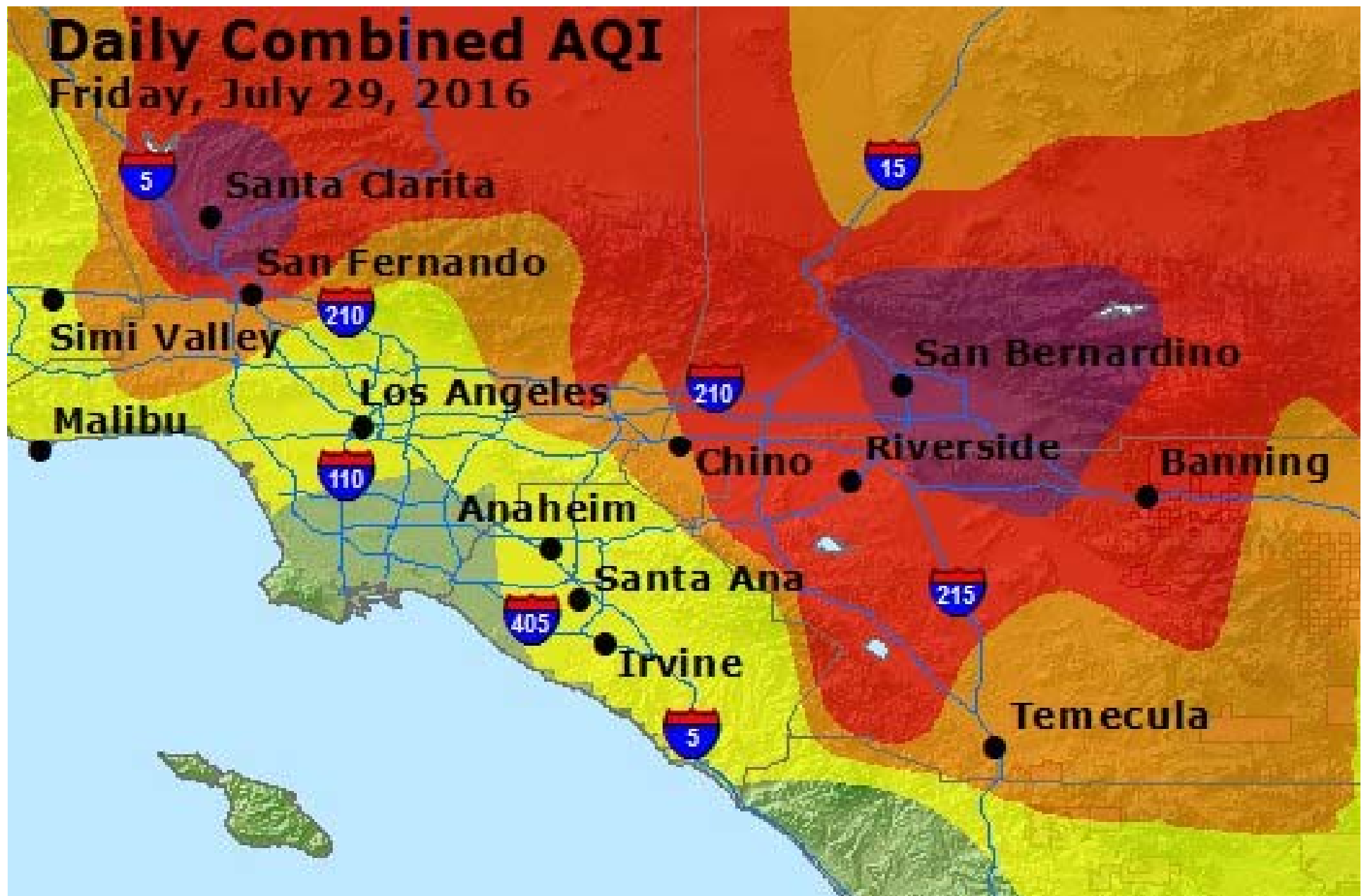


# Challenges



# Daily Combined AQI

Friday, July 29, 2016



Good

Moderate

USG

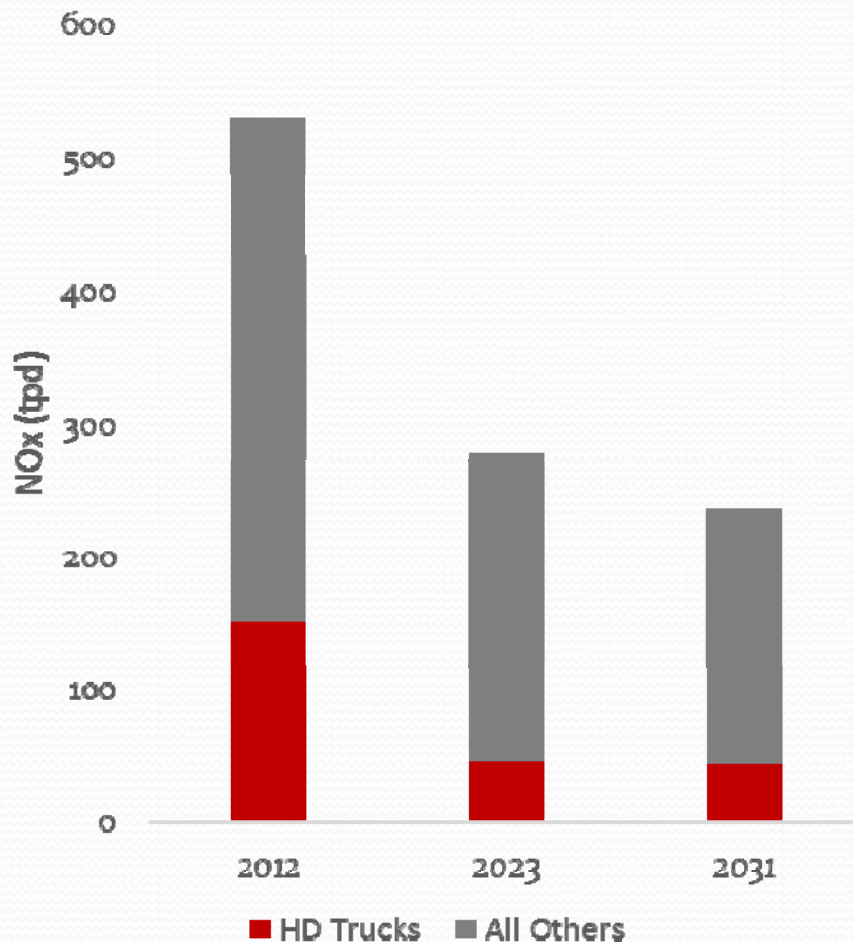
Unhealthy

Very  
Unhealthy

Hazardous

# NOx Emissions Inventory

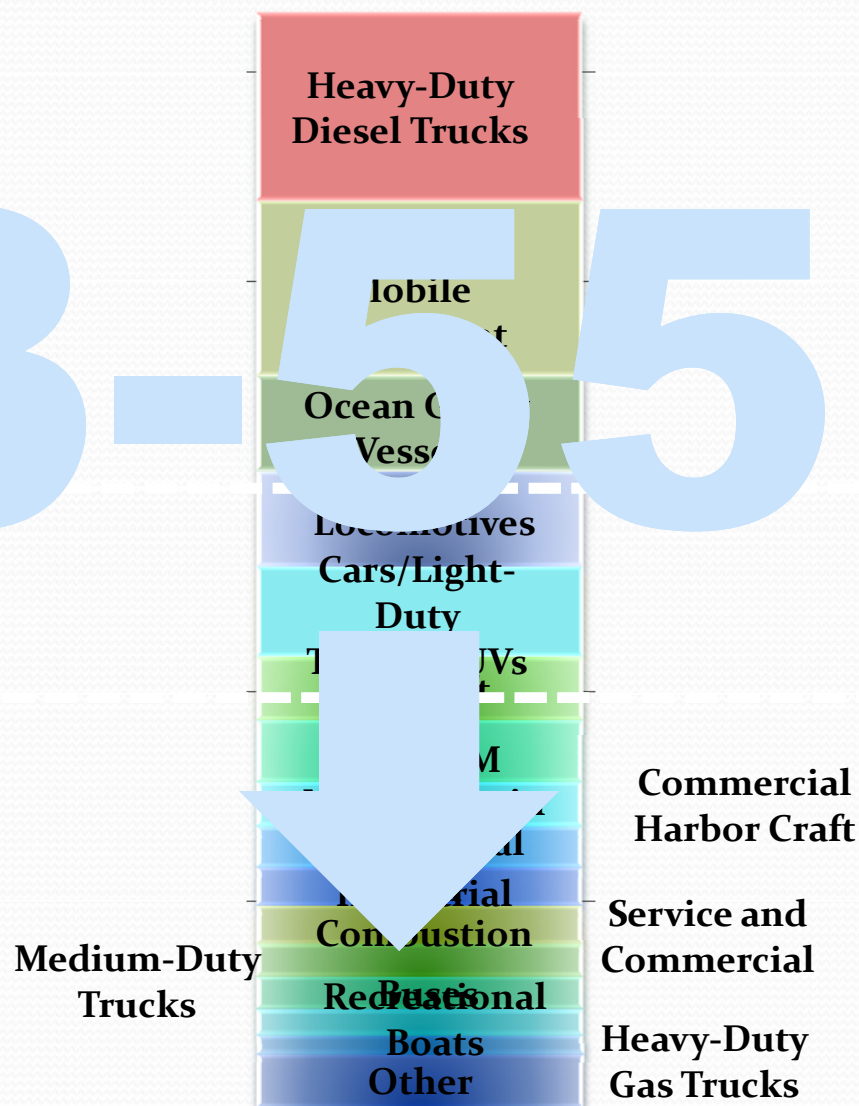
## Heavy-Duty Trucks



- Heavy-duty (HD) trucks remain one of the largest source of NOx emissions in the South Coast Air Basin
- Disproportionate impact on communities near the San Pedro Bay Port and along goods movement corridors

# NOx Reductions Needed

43-55%





# Buses

- SCAQMD Demonstration projects with SunLine & LACMTA – 20 Years
  - Fuel Cell 30' and 40' Fuel Cell Transit Buses
  - H<sub>2</sub>ICE/HCNG
  - H<sub>2</sub> Infrastructure
- Recent Greenhouse Gas Reduction Funds Award
  - 25 Fuel Cell Electric 40' Transit Buses
    - 10 for Orange County Transportation Authority (OCTA)\*
    - 10 for Alameda-Contra Costa Transit District (AC Transit)
    - 5 for SunLine Transit (SunLine)\*\*
  - Hydrogen Refueling – New Station at OCTA
  - Upgraded Stations –AC Transit



South Coast  
Air Quality Management District

\* SCAQMD Cost Share

\*\*FTA funds for upgrading H<sub>2</sub> station

# Medium-Duty Fuel Cell Range Extender

- Convert walk-in van with fuel cell hybrid electric drive system
- Capable to support a full range of parcel delivery operations
- Utilize commercially available components:
  - 120 kW Nidec motor
  - 36 kW Nuvera PEM fuel cell
  - 45-60 kWh lithium ion battery pack
  - 10 kg hydrogen storage
- 125-mile range with 65 mph top speed
- Comparable or higher power and torque compared to diesel delivery trucks





# Heavy-Duty (Class 8) Trucks Demonstration Portfolio

Technology	ZECT I	eHwy	ZECT II	GGRF	Total
BEV	6	1*		37	44
PHEV	5	2*	1*	6	14
FCEV			6		6

\*Catenary trucks



# Heavy-Duty (Class 8) Fuel Cell Trucks

## Contractors & Projects

- BAE/Kenworth - Fuel cell range extended drayage truck
- TransPower - Fuel cell range extended drayage truck
- U.S. Hybrid - Fuel cell powered drayage truck
- Hydrogenics/Daimler – Fuel cell range extended drayage truck

## Barriers & Challenges

- Fueling Infrastructure: Availability and location
- Costs: Fuel Cells, batteries and infrastructure
- System Integration: Safe and efficient deployment of the technology

