

Zero & Near-Zero Emission Trucks: Their Role in the South Coast Basin

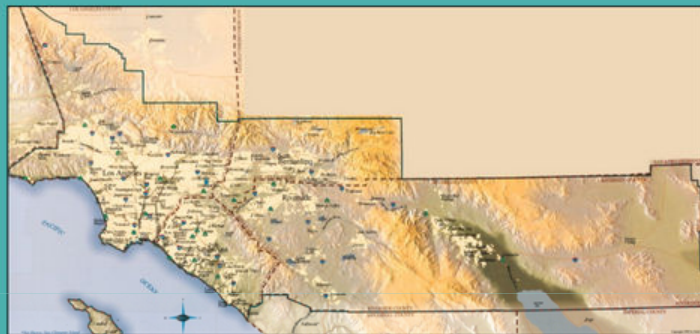


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South Coast Air Basin

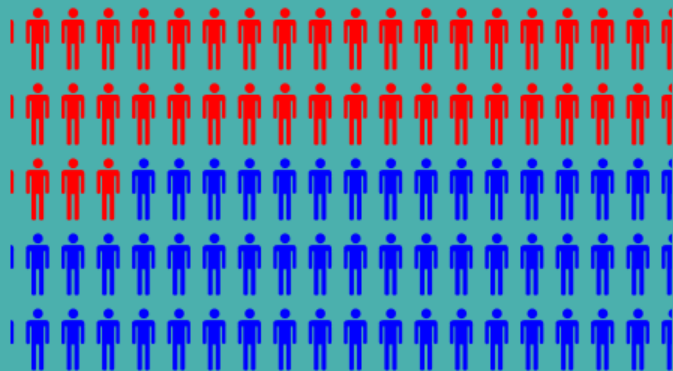
4

- Counties of
- * Los Angeles
 - * Orange
 - * Riverside
 - * San Bernardino



44%

State's population in
South Coast



South Coast Air Basin

4

Counties of
* Los Angeles
* Orange
* Riverside
* San Bernardino

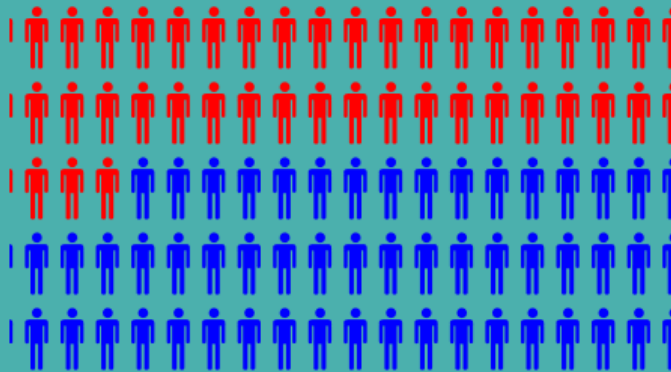
40%

Containerized Goods
to Nation

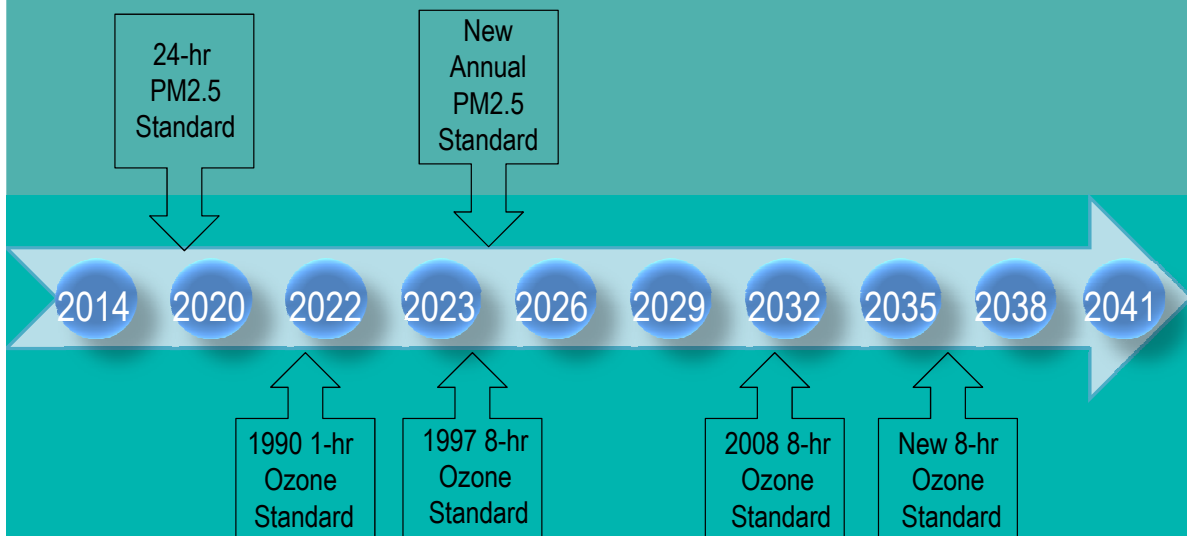


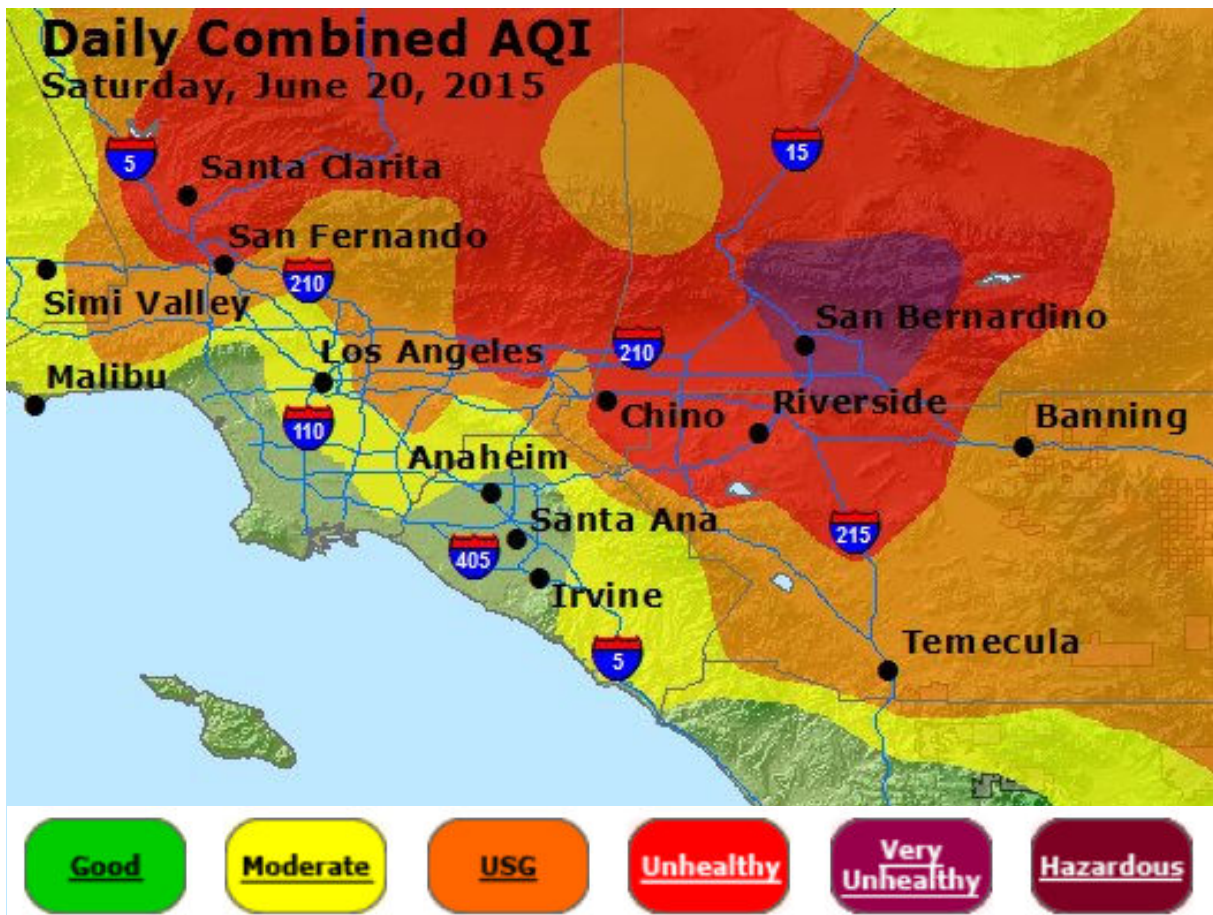
44%

State's population in
South Coast

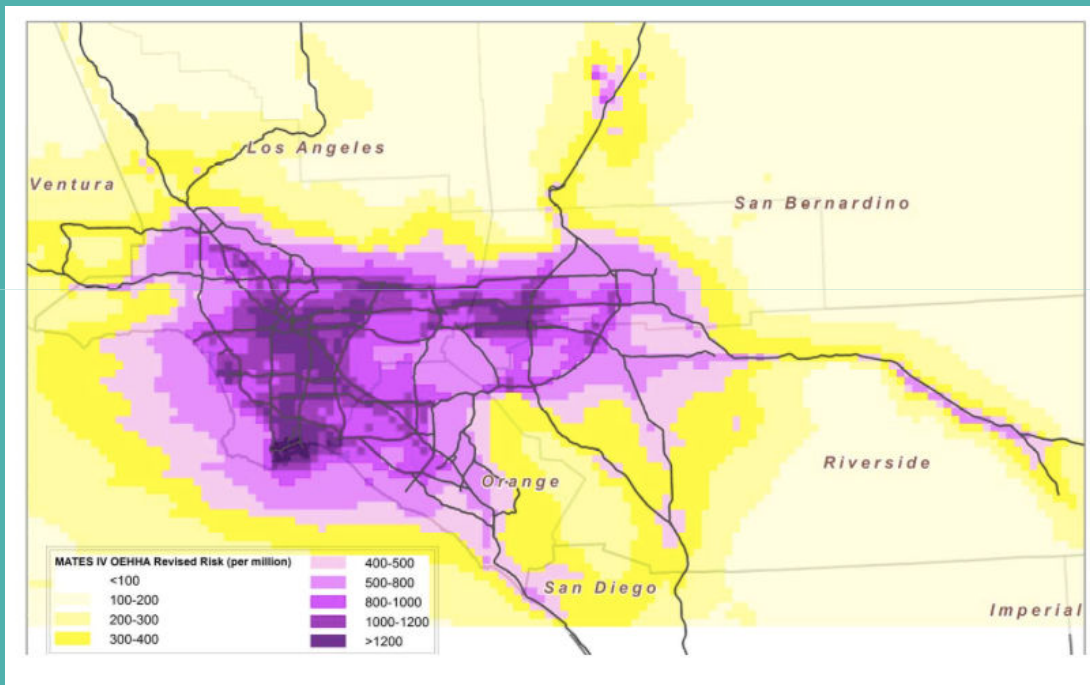


National Ambient Air Quality Standards





Risk with New OEHHA Methodology



+4,100 deaths year

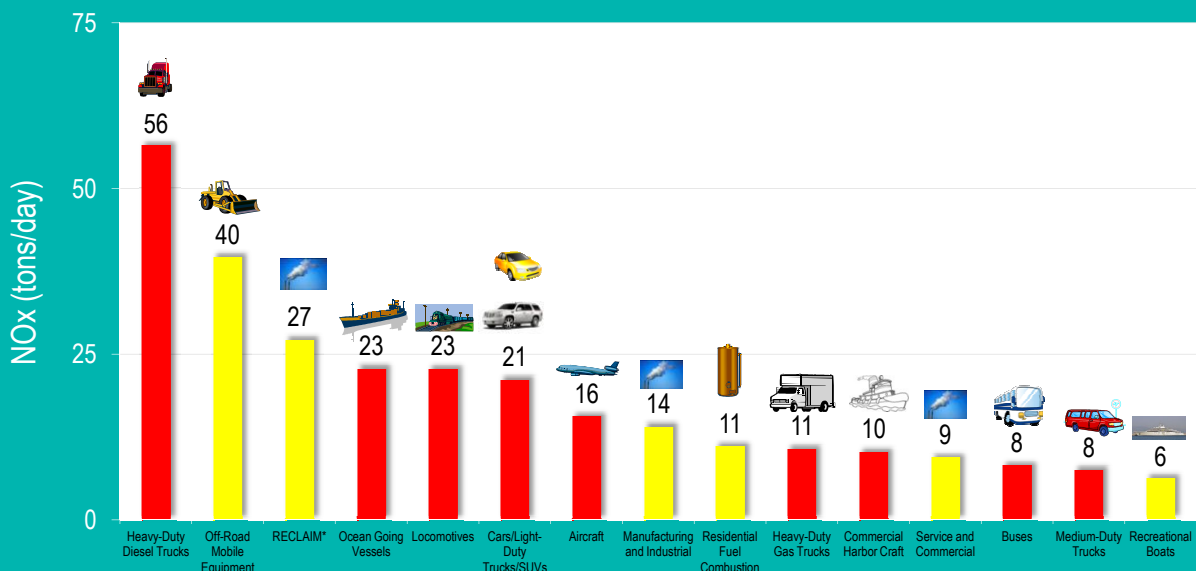
Additional costs include

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

\$ BILLIONS

Source: SCAB cardiopulmonary mortality estimate: CARB 2015

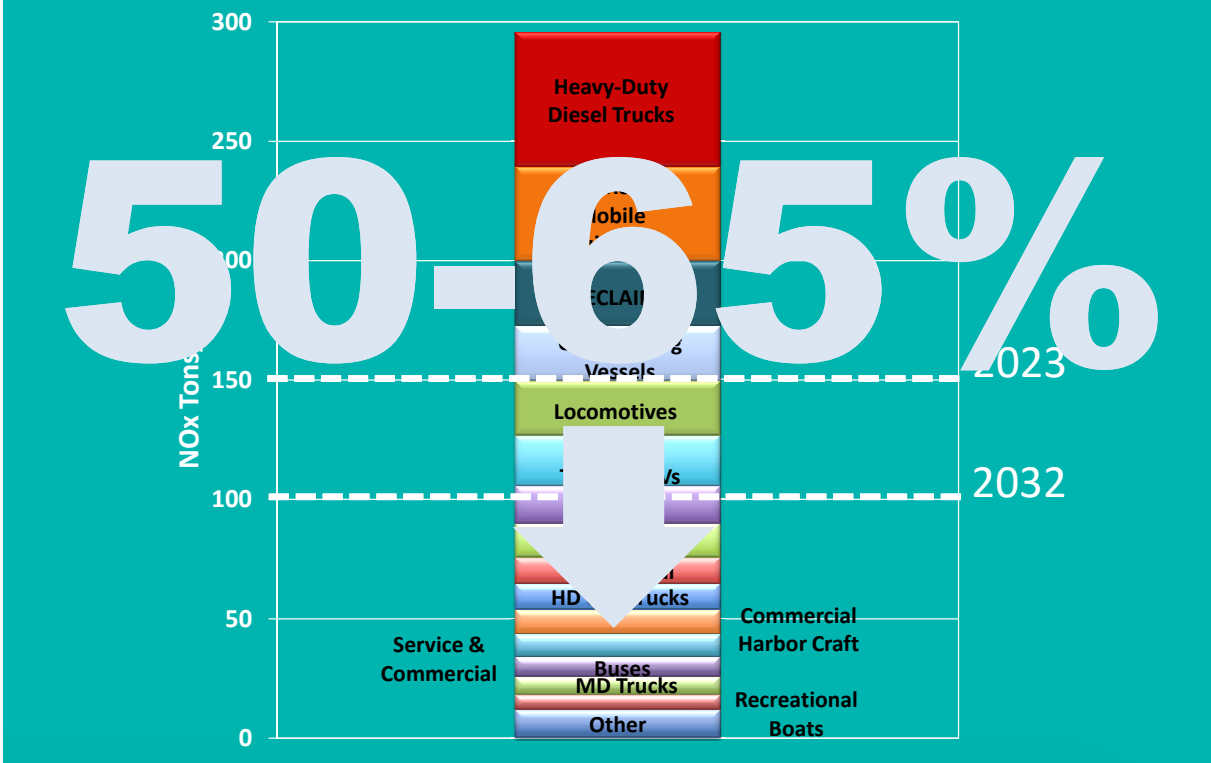
Top NOx Sources in 2023



*RECLAIM: 320 largest stationary sources, including all refineries and power plants

Source: Draft 2016 AQMP Emissions Inventory – June 2015

Top NOx Sources 2023



Zero Emission Mile Vehicles

MY 2015



Chevy Volt



Nissan Leaf



Ford Focus Electric



Ford Fusion Energi



Ford CMax Energi



Toyota Prius Plug-in



Fiat 500e



BMW i3



Chevy Spark EV



Kia Soul EV



Hyundai Tucson Fuel Cell



Tesla Model S



Mercedes B Class



VW eGolf



HD NG Engines

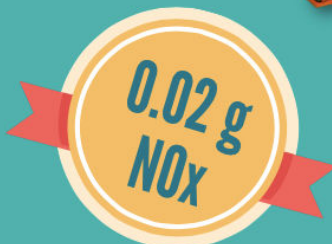


Westport

8.9L



12L



Partners



Southern California Gas Company



Total Cost

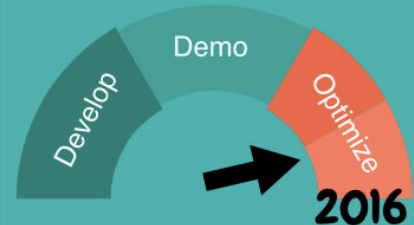
\$13.6 million



Application



Schedule





Battery Electrics

TransPower.

US Hybrid

Partners

\$11.0 million

Total Cost

Application

Schedule

Schedule

2018



TransPower and IKEA Test Tractor

November 10, 2015 in *Alternative Fuels, Electric Drive, EVs, industrial, investments, Research, Technology, Testing, transit* by [Jon LeSage](#) | [No Comments](#)

Year-long Test Results from Electric Truck

HD Plug-in Hybrids

VOLVO TRUCKS

BAE SYSTEMS

Partners

\$21.0 million

Application

Class 8 short haul

Schedule

Demo

Optimize

2017-2018



eHighway

- Three different architectures

- Diesel hybrid



- CNG hybrid












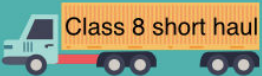

- Battery



- Trucks can be used on or off catenary
- Investigate local and regional applicability





<p>H₂ Fuel Cell</p>  <p>BAE SYSTEMS</p> <p>US Hybrid</p> <p>TransPower</p>	<p> Partners</p> <p> Total Cost</p> <p> Application</p> <p> Schedule</p>	<p> </p> <p> </p> <p>\$20.0 million</p> <p> Class 8 short haul</p> <p> 2018 - 2019</p>
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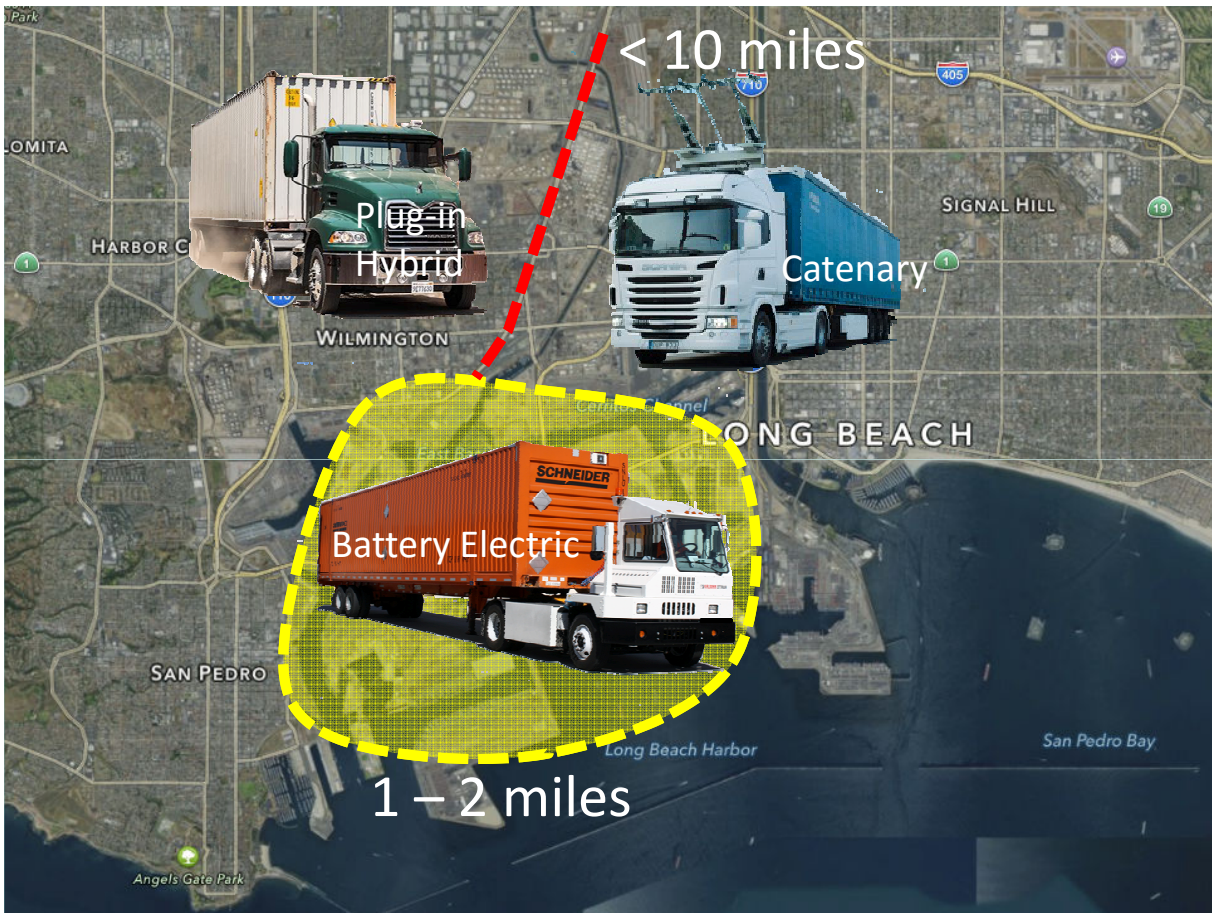
DOE ZECT 2

- Zero Emission Cargo Transport
- SCAQMD applied and won \$10M DOE grant
- Criterion for technology providers
 - Must have fuel cell bus experience
 - Must partner with major truck manufacturer
 - Three technology providers



Technologies

	Transpower	US Hybrid	BAE
FC Bus Experience	ISE BC Transit	UTC assets	American FCB Sunline
Fuel cell (kW)	Hydrogenics 2 x 33	PureMotion 80	Ballard 100
H2 (kg)	25 - 30	20	30
Batteries (kWh)	125	26	100
Truck Manufacturer	International	Kenworth	Kenworth



Takeaways

- Criteria pollutant/toxics reductions needed now
- Portfolio of architectures/infrastructure must be examined
- The same trucks can be used in a variety of duty-cycles (e.g., yard, short-haul)
- Need national markets to accelerate turnover

