

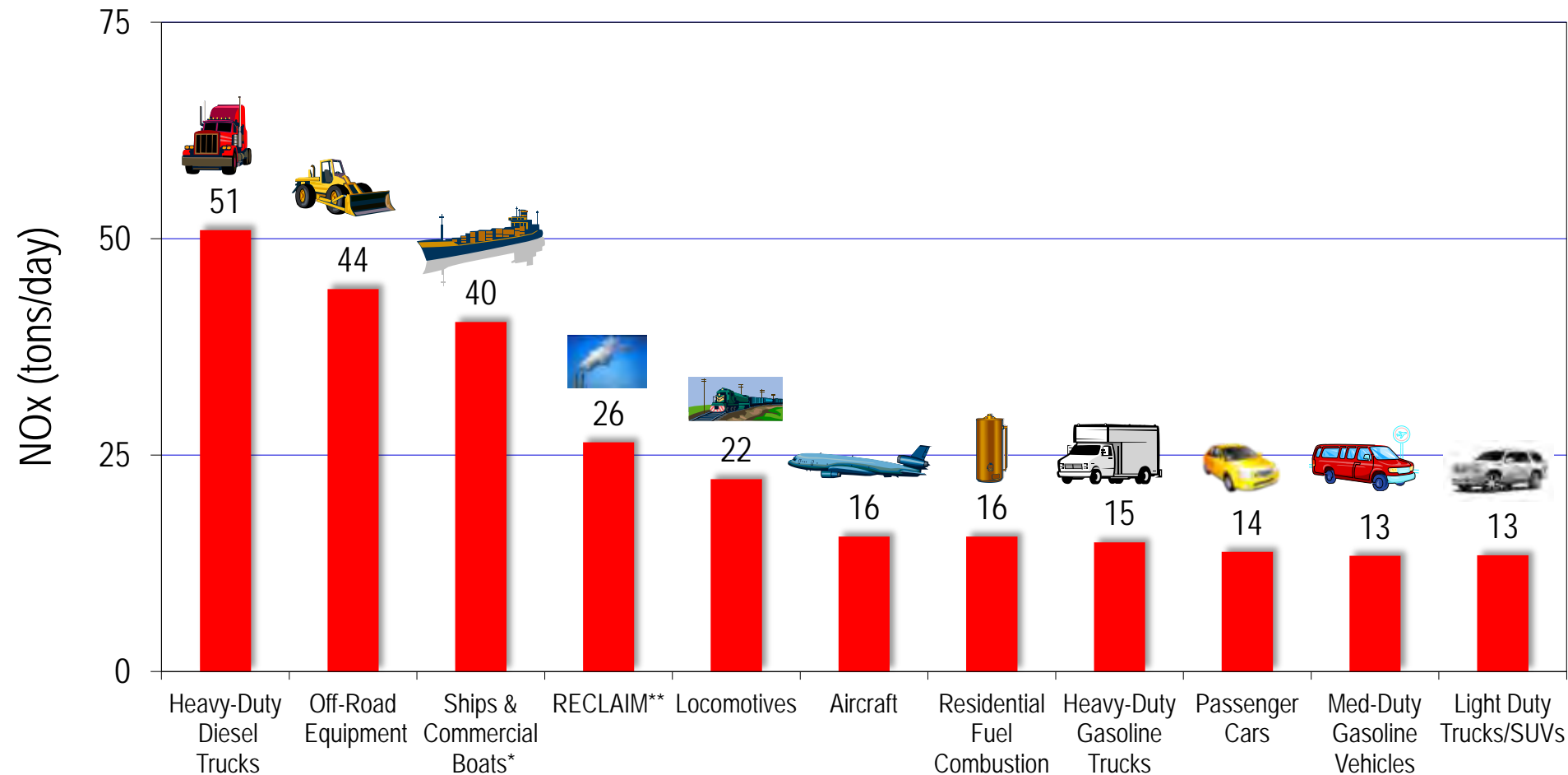
Vision for Clean Air: *A Framework for Air Quality and Climate Planning*



Henry Hogo
South Coast Air Quality Management District

Clean Fuels Program Advisory Group Meeting
August 29, 2012

Top NOx Sources in the South Coast Air Basin in 2023



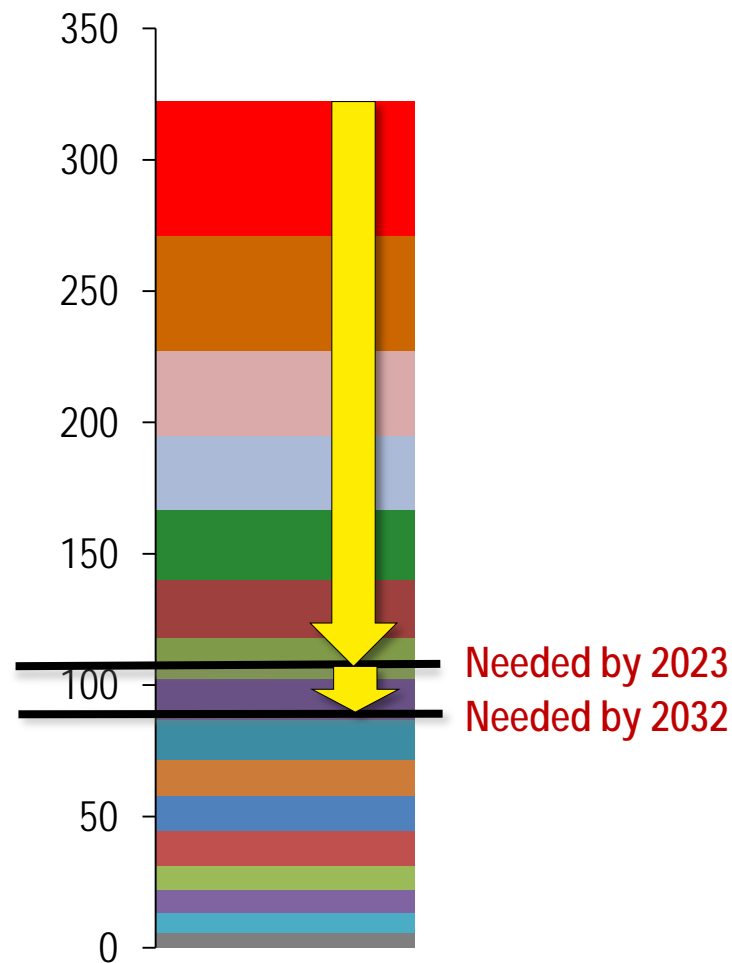
* Oceangoing vessels = 33.8 tons/day

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

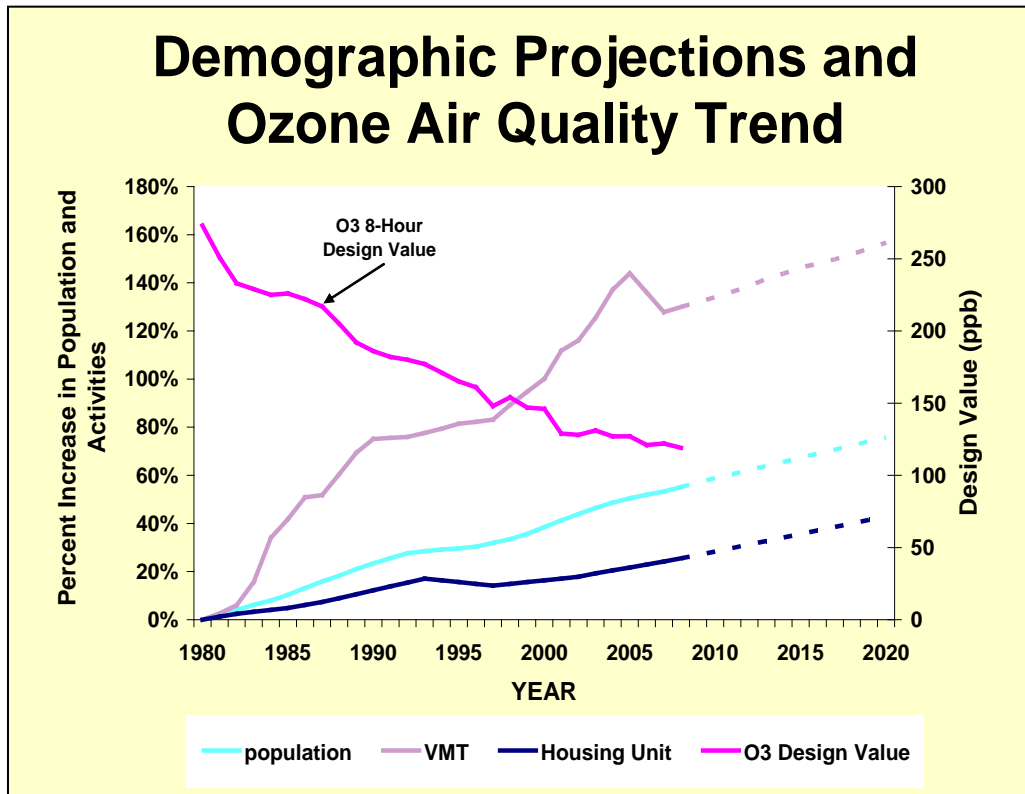
Source: (SCAQMD, 2012 Draft Air Quality Management Plan)

Needed NOx Emission Reductions to Achieve 8-Hr Ozone Air Quality Standards in the South Coast Air Basin

- Heavy-Duty Diesel Trucks
- Off-Road Equipment
- Ocean-going Vessels
- Other
- RECLAIM (Large Stationary)
- Locomotives
- Aircraft
- Residential Fuel Combustion
- Heavy-Duty Gasoline Trucks
- Light-Duty Vehicles
- Medium-Duty Trucks
- Light-Duty Trucks
- Manufacturing and Industrial
- Commercial Boats
- Service/Commercial
- Recreational Boats



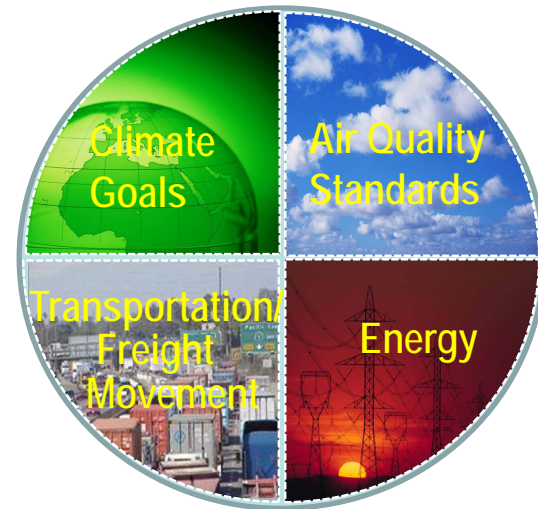
Air Quality Progress With Growth Key Reason: *Technology*



- South Coast AQMD Policy Generally *Growth Accommodating*
- Sources Generally Controlled over 90%
- Technical Challenges Increasing
- Increasing Marginal Control Costs . . . Diminishing Marginal Returns

A Vision for Clean Air: *Framework for Air Quality and Climate Planning*

- Follow-up to “Powering the Future”
- Short-, Mid-, and Long-Term Visioning to Integrate Multi-Pollutant, Multi-Deadline Air Quality Planning
- Resource Document for
 - SIP (PM2.5 & Ozone)
 - ✓ Targets (2023, 2032 – Ozone)
 - AB32 Scoping Plan Update
 - ✓ Targets (2020, 2050 - GHG)
 - CARB Freight Transport Plan
- Air Toxic Reduction - Co-Benefits



South Coast
Air Quality Management District



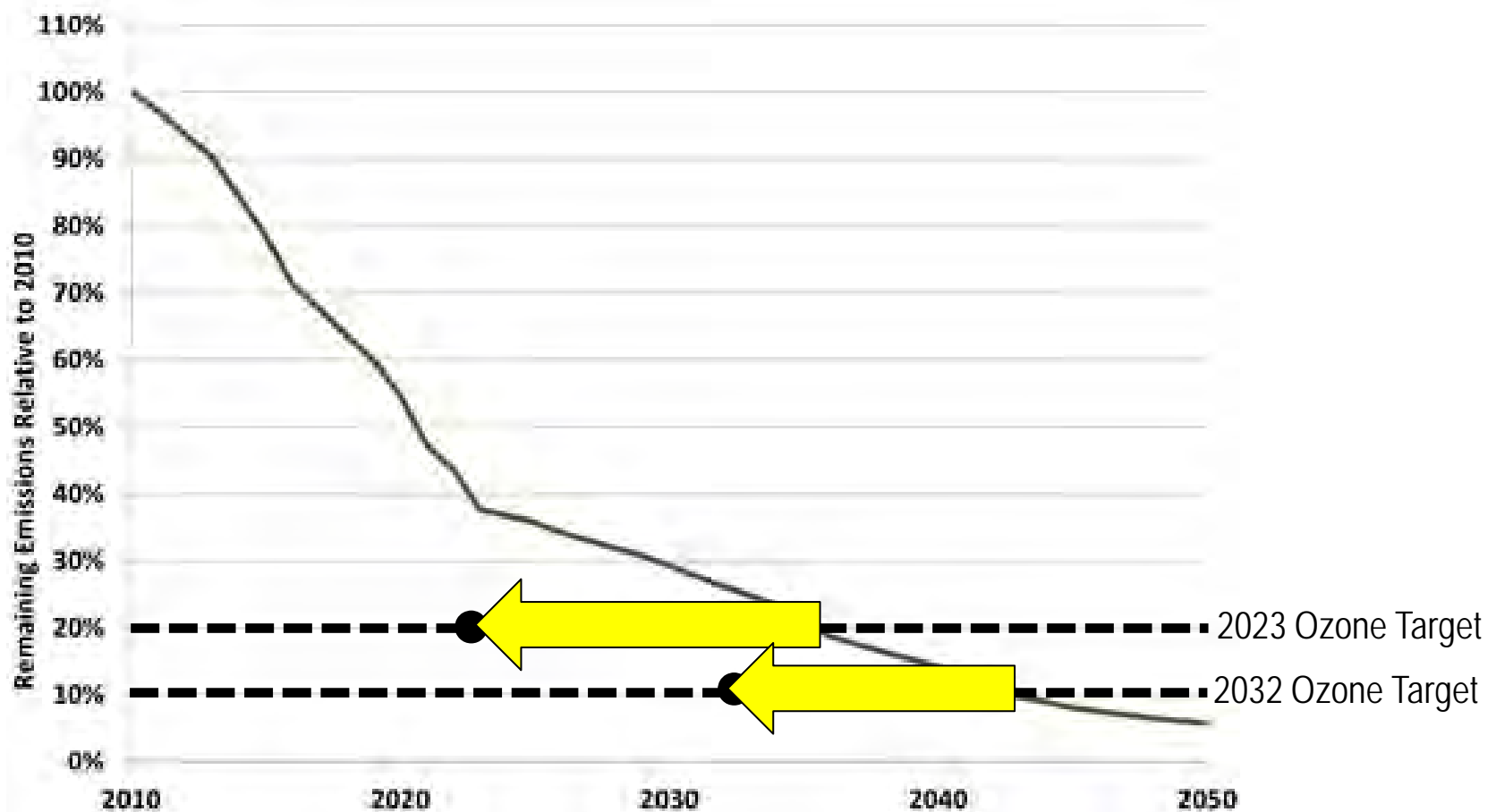
California Environmental Protection Agency
AIR RESOURCES BOARD



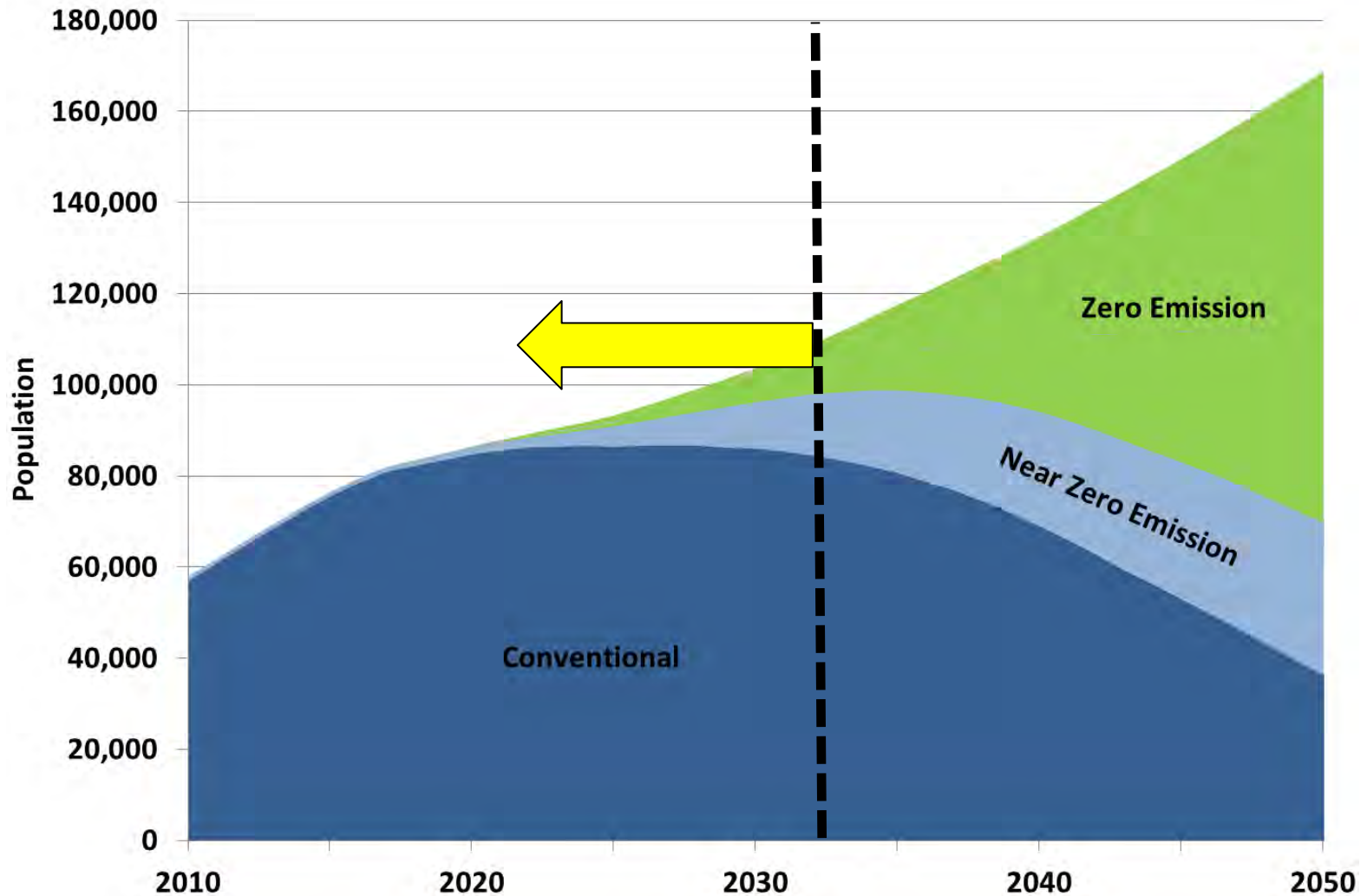
San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

Examples Illustrating Process

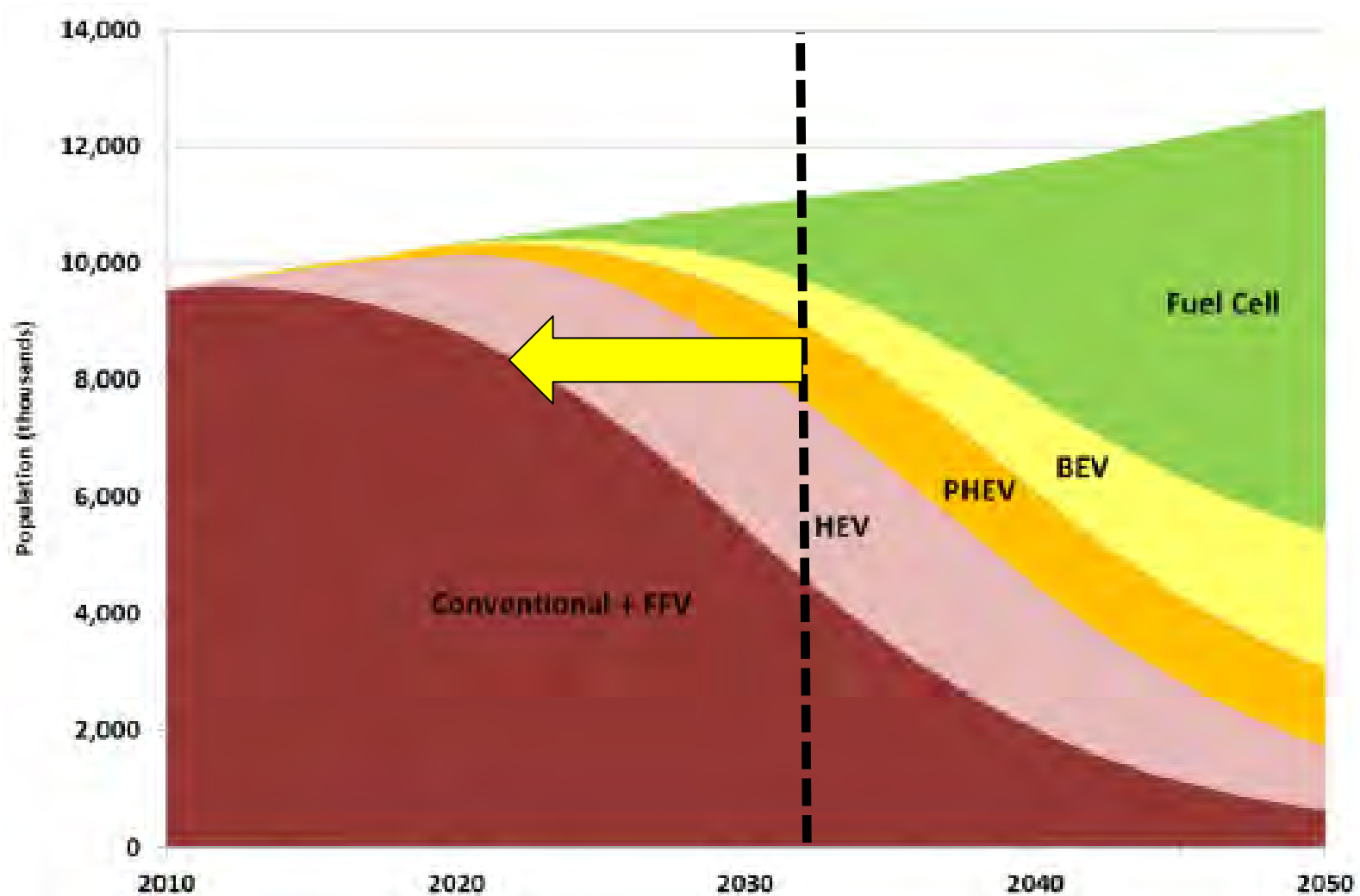
Heavy-Duty Truck Scenario – South Coast NO_x Emissions



Technology Transformation (South Coast Heavy-Duty Trucks)



Technology Transformation (South Coast Passenger Cars)



Key Sectors Investigated

- Passenger Transportation
- Freight Movement
- Off-road
- Agriculture (San Joaquin)
- Energy

Coordinated Air Quality and Climate Planning: *Key Concepts*

- Technology Transformation
- Early Action
- Cleaner Combustion
- Multiple Strategies
- Federal Action
- Efficiency Gains
- Energy Transformation

Proposed Actions

- Focus on Key Mobile Source Sectors
- Identify Zero- and Near-Zero Emission Technologies, Where Appropriate
- Identify Cleaner Combustion Technologies, Where Appropriate

Key Mobile Source Sectors

- Light-Duty Vehicles
- Transit and School Buses
- On-Road Heavy-Duty Vehicles
- Agricultural Vehicles
- Locomotives
- Ocean-Going Marine Vessels
- Harbor Craft
- Off-Road Equipment – Construction; Industrial
- Cargo Handling Equipment
- Aircraft

Example Potential Technologies

Technology	Application
Electric	On-Road; Off-Road
Battery-Electric	On-Road; Off-Road
Fuel Cell	On-Road; Off-Road
Plug-In Hybrid Systems	On-Road; Off-Road (Conventional/Alternative Fuels)
Alternative Fuels	Dedicated or with Hybrid Systems
Cleaner Combustion	Next Generation Emission Controls Beyond Existing Emission Standards (LEV IV; Tier 5)

Example Potential Technologies (Marine Vessels)

Technology Type	Technology
Engine	<ul style="list-style-type: none">• Common Rail Fuel Injection• Slide Valves• Electronic Fuel Control• Electronically Controlled Lubrication Systems• Automated Engine Monitoring/Control Systems
Engine Support	<ul style="list-style-type: none">• Water Injection• Exhaust Gas Recirculation• High Efficiency Turbo Charging• Scavenging Air Moistening/Humid Air Motor• Two Stage Turbo Charging
After-Treatment	<ul style="list-style-type: none">• Selective Catalytic Reduction (SCR)• Exhaust Gas Scrubbers
Alternative Fuels	<ul style="list-style-type: none">• Liquefied Natural Gas
Alternative Supplemental Power Systems	<ul style="list-style-type: none">• Wind and Solar Power• Marine Fuel Cell• Marine Hybrid Systems• Waste Heat Recovery

Timeline for Actions

	2012	2013	2014	2015	2016	2017	2018	2019	2020+
Scoping and Planning	[Black bar spanning 2012 to 2015]								
Prototype Development and Demonstration	[Black bar spanning 2013 to 2016]								
Select Technologies and Conduct for Field Evaluation	[Black bar spanning 2014 to 2017]								
Full Scale Demonstration and Commercial Deployment	[Black bar spanning 2015 to 2020+]								

Activities/Next Steps

- Draft Document Released - June 2012
- ARB Board Briefing – June 28, 2012
- AQMD Board Briefing – July 13, 2012
- Draft 2012 South Coast AQMP –
7 Actions Proposed
- Public Workshop – August 21-23, 2012
- Public Comments – September 21, 2012
- ARB Board Report – October 2012