

PLANNING FOR THE SCALE OF TRANSPORTATION ELECTRIFICATION NEEDED TO MEET FEDERAL AIR QUALITY STANDARDS IN THE SOUTH COAST AIR BASIN

South Coast AQMD Staff Presentation to
CEC Demand Analysis Working Group

November 14, 2019

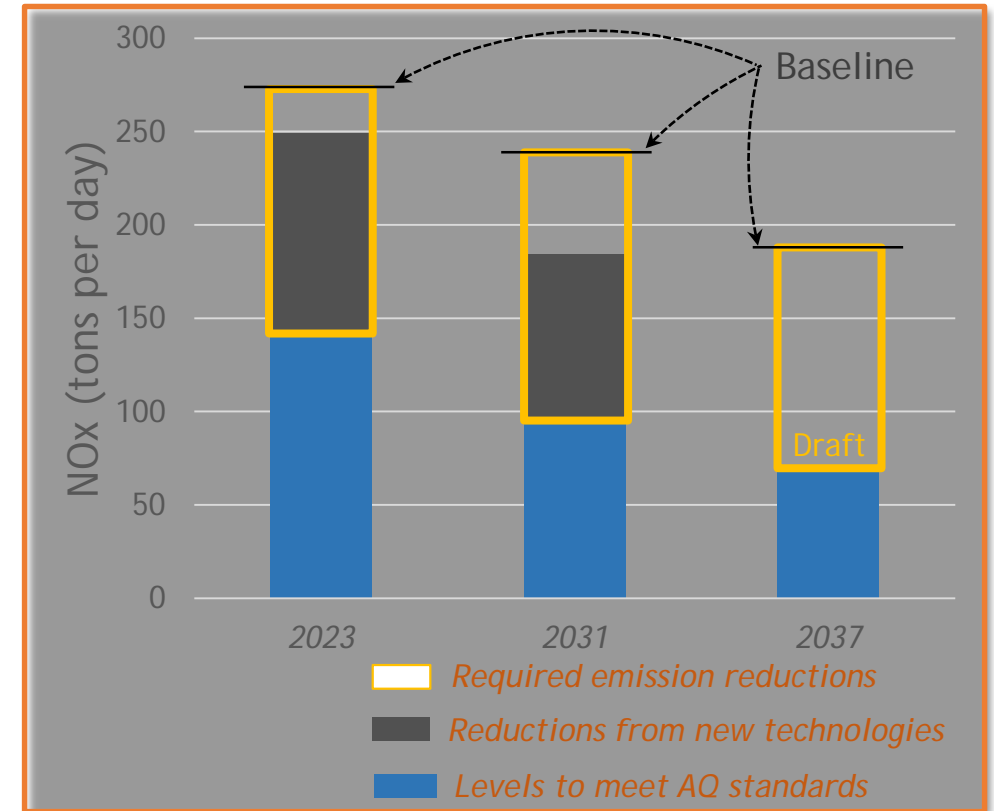
South Coast Air Quality Management District

- Multi-County
Air Pollution Control Agency
- Governed by 13-member
Board of local elected
and appointed officials
- 17+ million people
- ~28,000 permitted sources



Regional funding measure key to meeting air quality standards

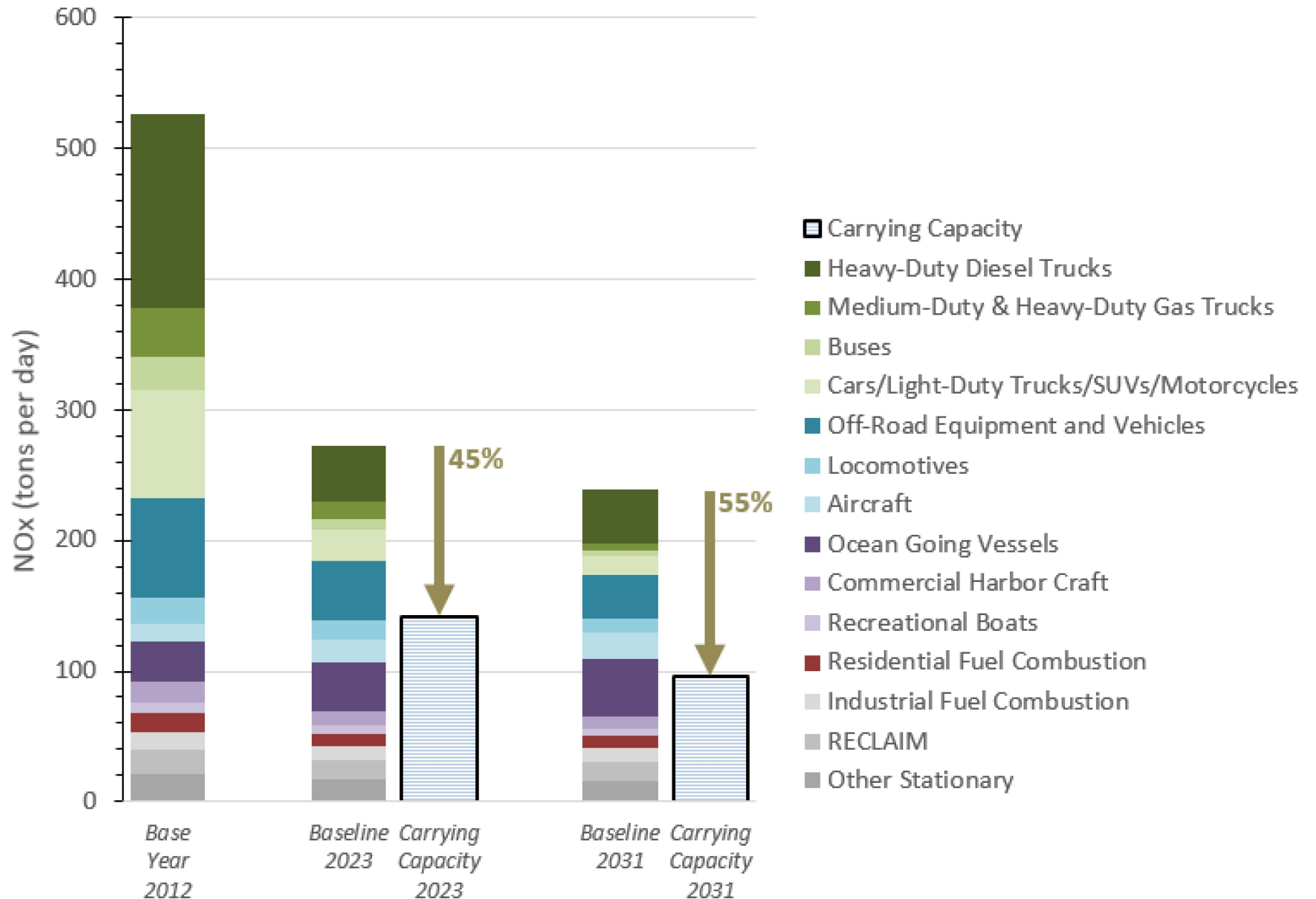
- To meet ozone standards, need to reduce NOx
 - 2023 requires 45% reduction
 - 2031 requires 55% reduction
 - *2037 likely requires ~62% reduction*
- Mobile sources generate over 80% of NOx
- Replacing vehicles and engines with advanced technology essential to reducing emissions
- **\$14.6 billion** needed between 2017-2031 to turn over vehicle fleets with NZE/ZE
- These measures also reduce GHG emissions



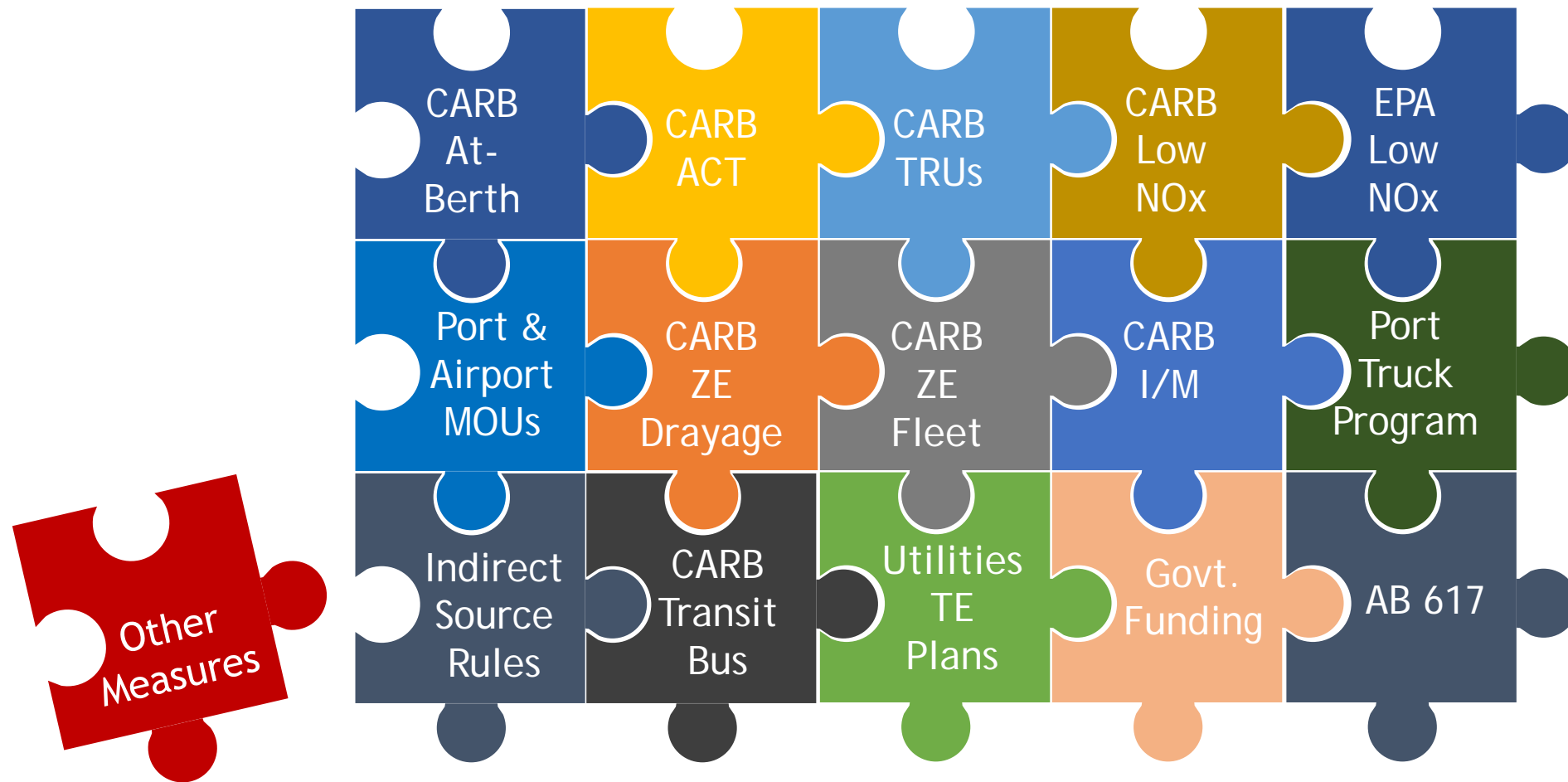
Failure to meet air quality standards could result in federal sanctions including loss of federal highway funding

Baseline NOx Emissions & Air Basin Carrying Capacity

- Baseline inventory assumes full implementation of existing rules as of 2016
- Carrying capacity based on modeling in 2016 AQMP



Key Activities to Reduce Mobile Source Emissions



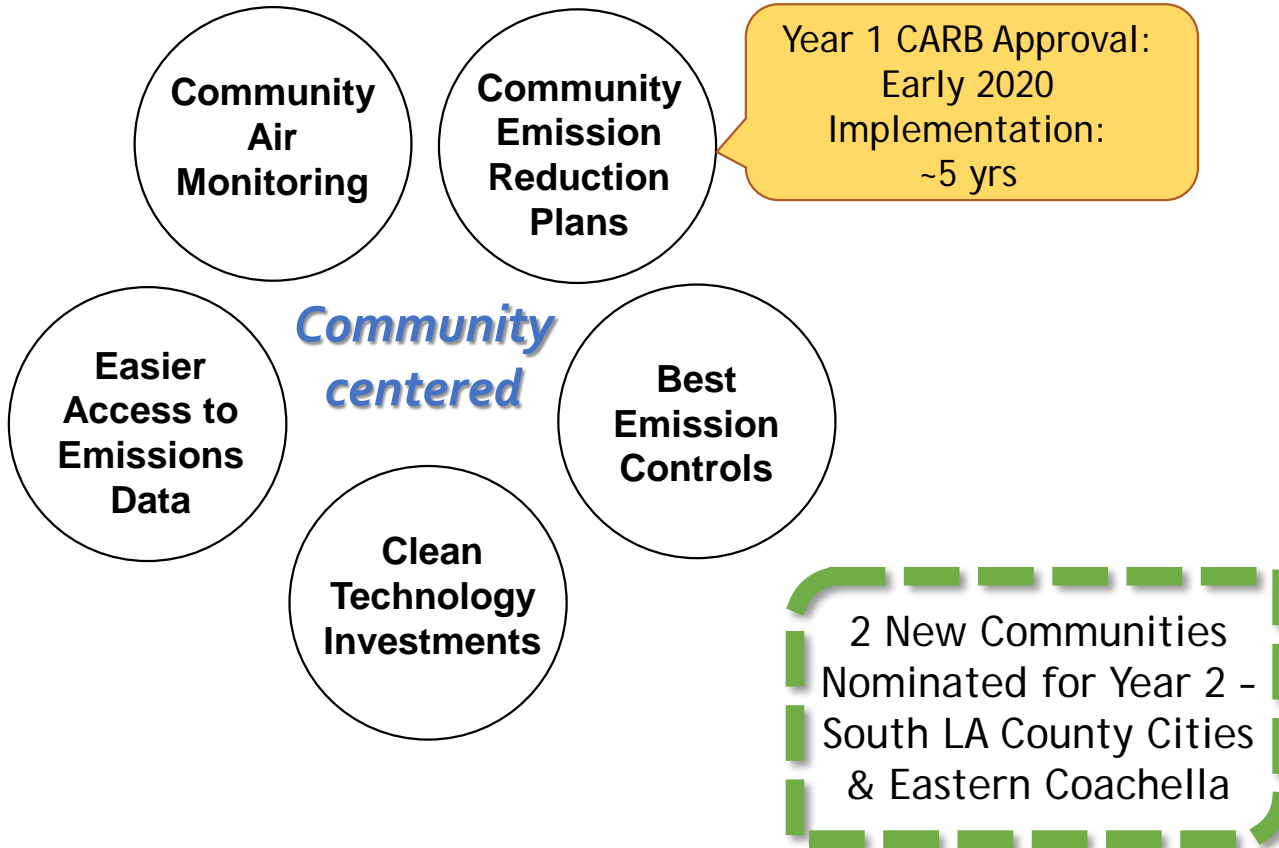
Key SCAQMD Activities - Facility Based Mobile Source Measures

- MOUs
 - Ports - Early 2020 Board Hearing
 - Clean Truck Program & Cargo Handling Equipment
 - Airports - Dec. 6 Board Hearing
 - Five airports developed Air Quality Improvement Plans - focus on ground support equipment
- Indirect Source Rules
 - Warehouses - May 2020 Board Hearing
 - Menu-based Points system (similar to LEED) - multiple options
 - Includes Electric Charging Infrastructure and Electric Truck Visits
 - Rail Yards - Dec. 2020 Board Hearing
 - Coordinated approach between CARB & local air districts -all sources tied to rail operations
 - Joint CARB/Air District Workshops being planned throughout the state - first one on 11/20/19

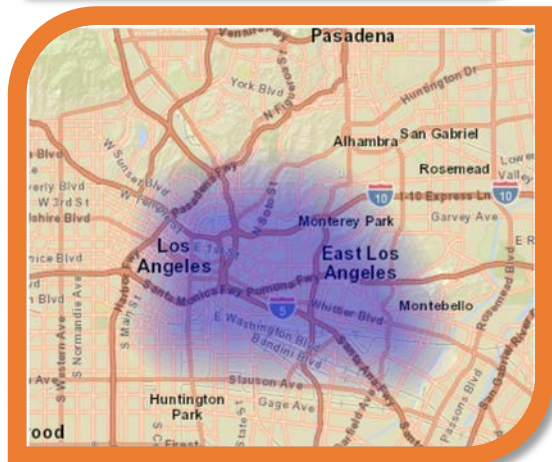
www.aqmd.gov/fbmsm

Key SCAQMD Activities - AB 617

Key Elements of AB 617



Warehouses, rail yards, and ports located in all three AB 617 'Year 1' communities



2 New Communities Nominated for Year 2 - South LA County Cities & Eastern Coachella

Key SCAQMD Activities - Incentive Funding Programs

Subsidies for Commercially Available Products

[e.g., Carl Moyer, AB 134, SB 856, VW, ...]

- Moyer = ~\$60M per year
- AB 134 = \$107.5M to SCAQMD
- SB 856 = \$245M statewide
- VW Mitigation = \$423M statewide
 - On-Road
 - Off-Road
 - Locomotives
 - Cargo Handling Equipment
 - Vessels
 - Shorepower
 - Infrastructure
- www.aqmd.gov/Moyer

Technology Demonstration & Advancement

[e.g., Clean Fuels Program]

- Clean Fuels ~\$14 million/yr
 - Electric/Hybrid Vehicles
 - Infrastructure
 - Engine Systems
 - Fuel Cells
 - Emission Controls
 - Studies

Attainment of Air Quality Standards Requires >\$1 billion/year to offset higher vehicle costs

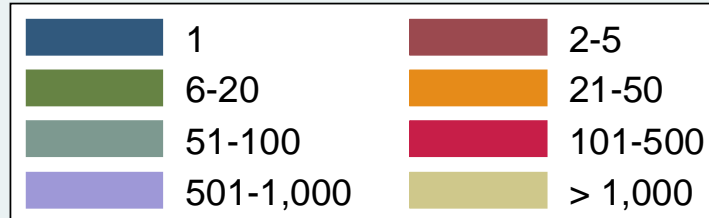
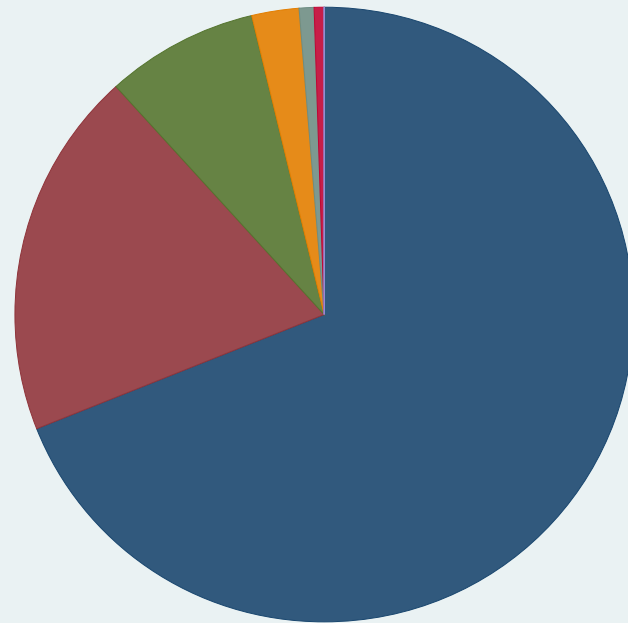
South Coast AQMD Vehicle Populations

Vehicle Sector	Approximate Population in SCAQMD (2019)
School Buses	7,600
Transit Buses	5,400
Light-Heavy Duty Trucks	242,000
Medium-Heavy Duty Trucks	127,000
Heavy-Heavy Duty Trucks	76,000
Cars, Light Duty Trucks	10,700,000
Locomotives (Calls)	11,000
Ocean Going Vessels (Calls)	3,800
Aircraft (Calls)	400,000
Off-Road	450,000
Port Cargo Handling Equipment	3,000

- Vehicle sectors with smaller populations often have much higher NOx emissions
- If electrified, charging needs per vehicle can be more than an order of magnitude higher than light duty vehicles

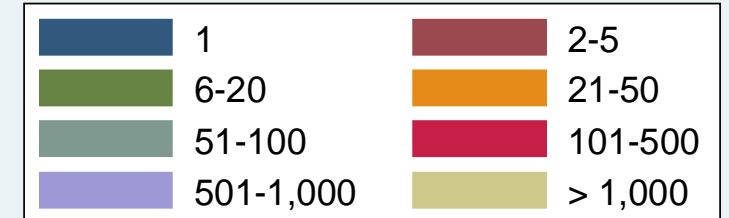
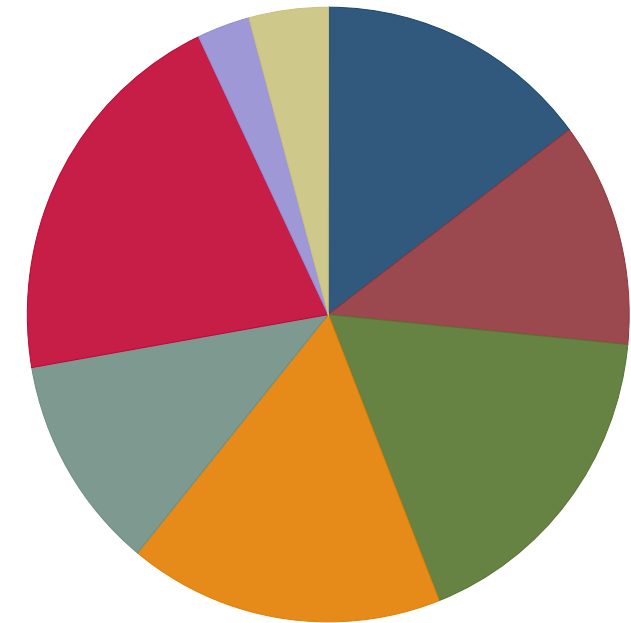
California Truck Fleet Characteristics

California Tractor Fleet by Fleet Size
Number of Fleets



Total number of fleets: ~49,000

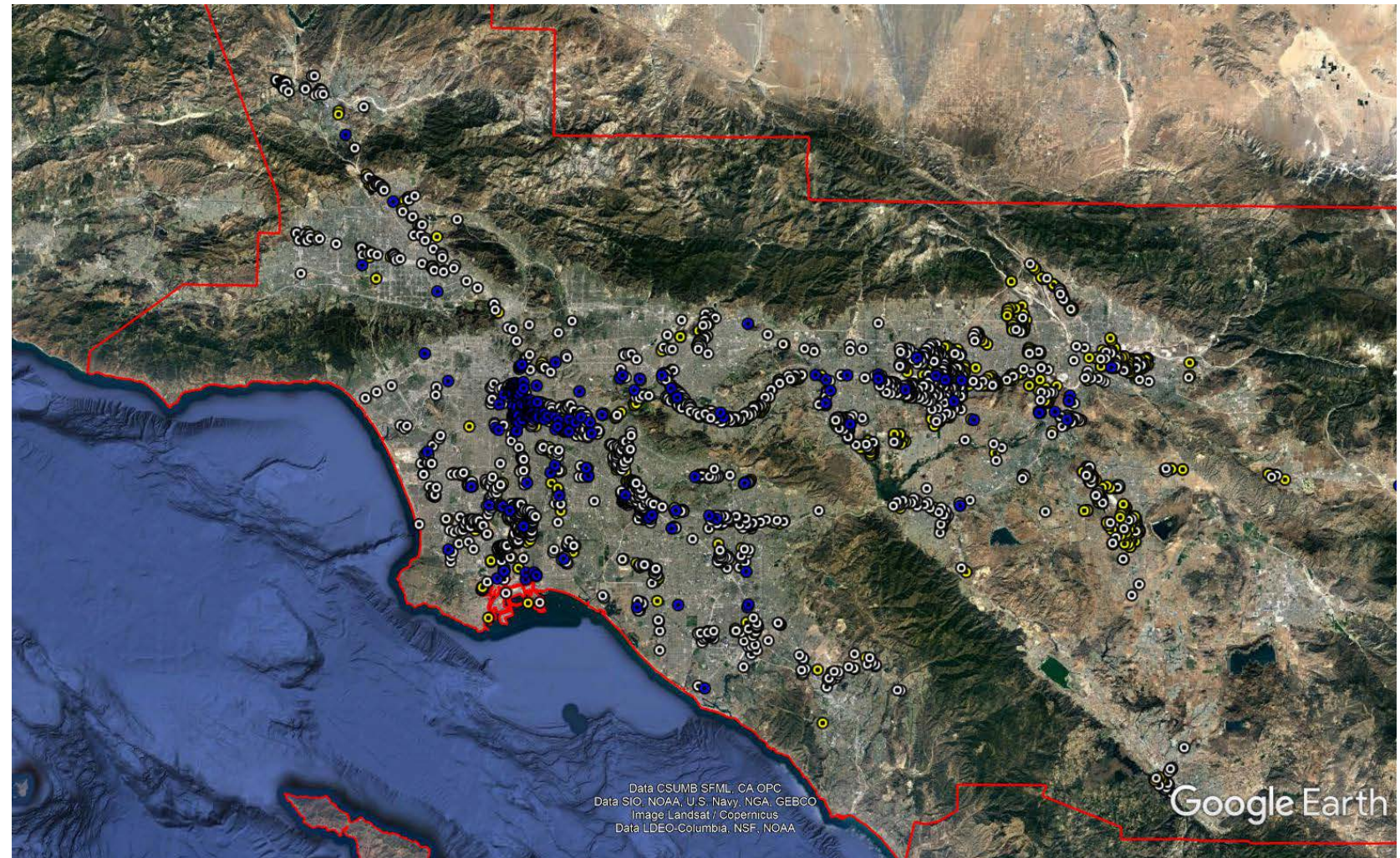
California Tractor Fleet by Fleet Size
Number of Tractors



Total number of tractors: ~230,000

Warehouse Population

- **≥500,000 sf** ~250
- **200k - 500k sf** ~1,100
- **100k - 200k sf** ~1,500
- **Cold Storage** ~200



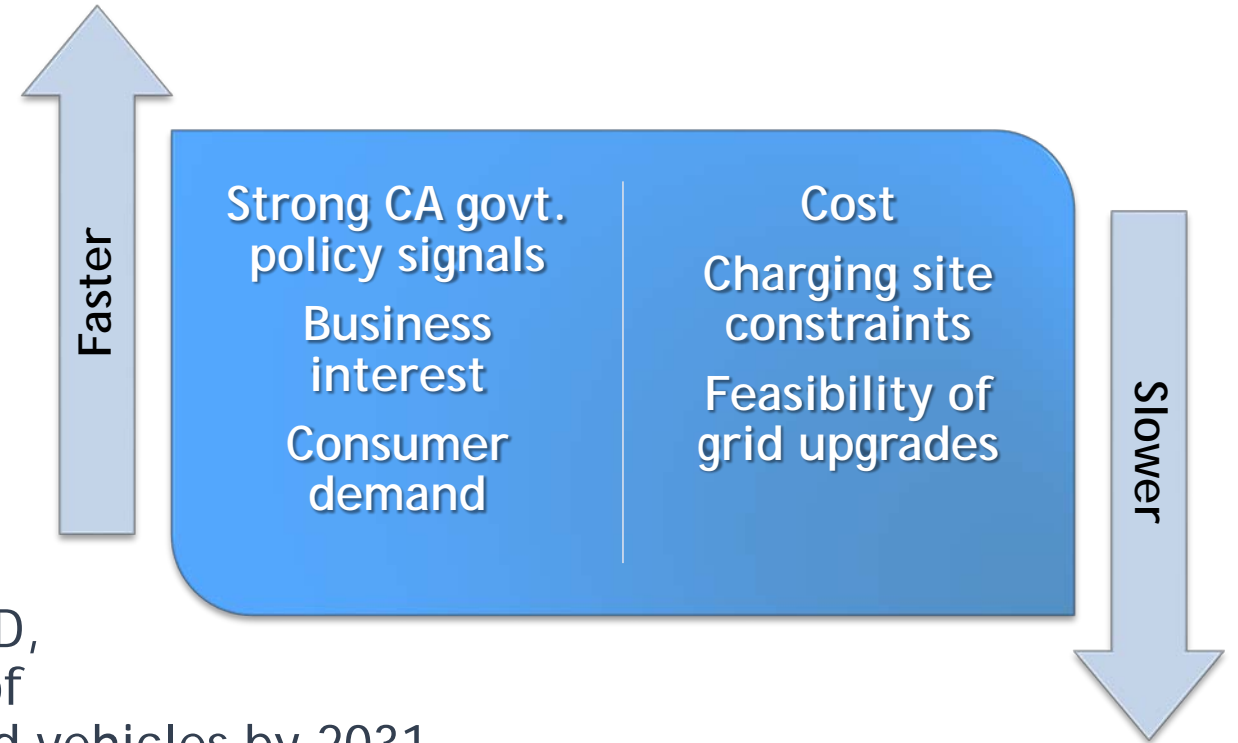
Charging Infrastructure - Constraints Expressed by Some Warehouse Operators

"Infrastructure is the hardest part"

- **Cost:**
 - Infrastructure cost (before and after the meter) and demand charges
 - New utility rate structures may not work for their site (e.g., operator has 3-yr lease, and no trucks)
- **Electrical load:**
 - One warehouse operator described that their building may currently draw 1.5 MW from the local utility, and may need triple that load to electrify a small fraction of their trucks
 - Cold storage warehouse operator expects they would need an additional ~10 MW
- **Use of Solar Panels to generate electricity:**
 - Site owner/operator may need to act almost as a utility - (not part of core business model)
 - Roof concerns: structural upgrades, roof penetrations
- **Parking Space constraints:**
 - Many sites do not have room for many vehicles to charge for several hours
- **Business models for electric vehicle charging still emerging**

Planning for Attainment

- CEC has many goals to address - attaining air quality standards must be one of top priorities
 - Direct health benefits of achieving federal air quality standards by 2031:
 - ~3,000 premature deaths avoided annually & \$31 billion in annual monetized health benefits
 - Sanctions
- Utilities rely on CEC forecast to plan for future needs
 - No utilities have published plans for attainment scenarios yet that include heavy reliance on electricity
- Many attainment scenarios possible in SCAQMD, all of them likely require 100's of thousands of zero emission off-road and heavy duty on-road vehicles by 2031



Potential TE Scenario to Attain Air Quality Standards in South Coast AQMD

Source Category	Approximate Total Number of Units Operating in SCAQMD (2019)	Quantity of Units Replaced During 5-Year Period 2021-2025 ¹			Quantity of Units Replaced During 5-Year Period 2026-2030 ¹		
		NZE ⁷	ZE ⁸	Highest Tier ⁹	NZE	ZE	Highest Tier
Cars and Light-duty Trucks	10,700,000	-	75,000	-	-	150,000	-
School Buses	7,600	-	6,000	-	-	1,600	-
Transit Buses	5,400	-	2,500	-	-	2,900	-
Class 4 Trucks	230,000	5,000	30,000	-	-	50,000	-
Class 5-6 Trucks	140,000	20,000	5,000	-	10,000	30,000	-
Class 7-8 Trucks	83,000	20,000	5,000	-	-	20,000	-
Off-Road A ²	144,000	-	-	10,000	-	50	13,500
Off-Road B ³	89,000	1,000	5,000	5,000	1,000	2,500	5,000
Off-Road C ⁴	225,000	-	100,000	-	-	50,000	-
Port Cargo Handling Equipment	3,000	500	1,250	-	-	1,750	-
Locomotives	17,000 ⁵	-	-	100	100	-	600
Metrolink	12	-	-	12	-	-	-
Vessels	3,800 ⁶	1,000	-	100	2,000	-	1,000
Aircraft	7,500 ⁵	-	-	-	-	-	100

May 29, 2019

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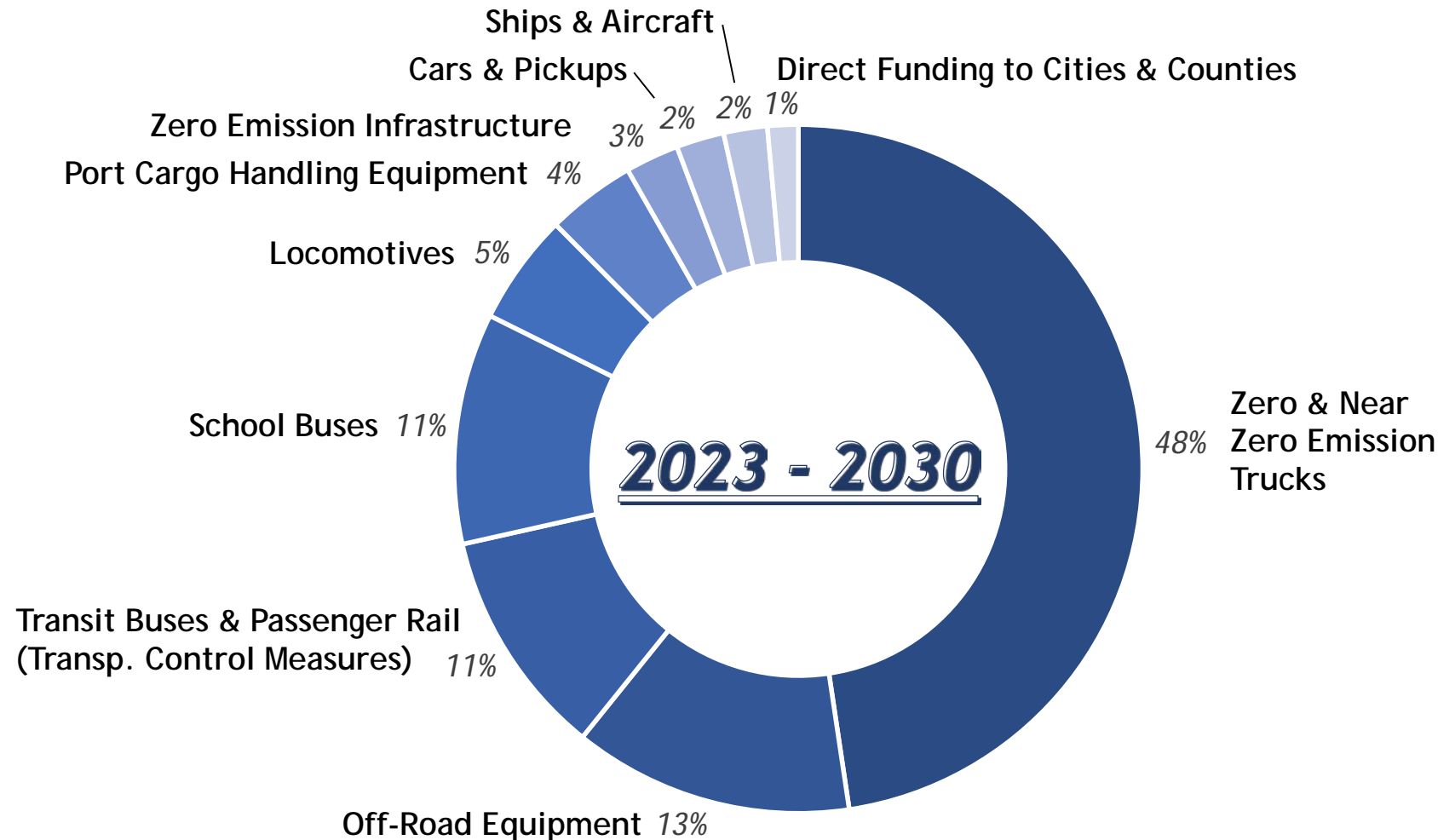
Planning Scenario to Meet Emission Reductions Needed from Transportation Sector in South Coast AQMD
Docket Number 19-IEPR-04 (Transportation)

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to discuss the air quality needs of our region in coordination with California Energy Commission's (CEC's) upcoming 2019 Integrated Energy Policy Report (IEPR) and AB 2127

- Scenario includes ~300,000 MD/HD ZE vehicles by 2030
- SCE's approved SB 350 plan only accounts for ~8,500 by 2023
- How would gap be filled?

Example Spending Scenario by Vehicle Type ~\$1.5 Billion per Year

- Preliminary spending scenario based on needs identified to meet air quality standards and potential revenue from a new one-half cent sales tax in South Coast AQMD
- One potential scenario; other scenarios possible
- Preliminary work, additional analysis still required



Concluding Thoughts

- Critical that IEPR includes guidance to electrical utilities in this current cycle regarding air quality needs
 - Quantitative and/or qualitative guidance useful
- Primary issue in South Coast AQMD is scale of grid needs for MD/HD applications for goods movement
- South Coast AQMD staff eager to work with CEC and other stakeholders to develop plans for needed TE infrastructure