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Mobile Source Strategies to address Climate and Ozone Requirements

Joshua Cunningham
Chief, Advanced Clean Cars Branch
California Air Resources Board

December 4, 2017
Need large emission reductions beyond current programs

**NOx, South Coast**
Under Current Programs

**GHGs, Statewide**
Under Current Programs


Achieving success in transportation sustainability

• Promote vibrant communities and landscapes through better planning efforts to curb vehicle-miles-traveled and increase walking, biking and transit

• Build on the State’s successful regulatory and incentive-based policies to quickly make clean cars, trucks, buses, and fuels definitive market winners

• Coordinate agency activities to ensure that emerging automated and connected vehicle technologies reduce emissions

• Improve freight and goods movement efficiency and sustainability to enable California’s continued economic growth

• Connect California’s communities with a state-of-the-art high-speed rail system
Updated Minimum Compliance for LDV ZEV Regulation by 2025


*For each scenario, it is assumed 347,000 ZEVs and PHEVs have been placed in California through 2017 model year. See Section II.B.2 and Section V.C (Table 8).
Scenario development to evaluate strategies for long-term emission reductions

- CARB Vision modeling tool
- Current scenarios developed for Mobile Source Strategy report, released May 2016
- Same mobile source strategies used in 2017 Scoping Plan
- Updated light duty technology assumptions from Midterm Review (MTR) to be added to EMFAC 2017 and new Vision scenarios going forward
What might the light duty sector need to do to achieve needed reductions?

- Compared to MY2025 vehicles, MY2035 vehicle emissions would be:
  - ~50% lower GHGs (emission rate declines 5-7% year-over-year)
  - ~40% lower NOx

- Significant increases in renewable fuel feedstocks and energy supply

- Slower growth of vehicle miles traveled (VMT) from LDVs

By 2050, 100% sales of ZEVs and PHEVs
LDV Fuel Economy Projections by Tech Type

GAS, BEV, FCEV: Growth rates post 2025 derived from 2013 NAS study.

PHEV: Growth rate derived from GAS and BEV.
   Higher growth rate due to increasing eVMT fraction.

Miles per gallon-gasoline equivalent (mpg-ge)

MPG-GE represents new vehicle fuel economy in real-world on-road conditions. GAS is a category that includes both gasoline and non-plug-in hybrid vehicles combined. The 2013 NAS Study is the 2013 National Academy of Sciences “Transitions to Alternative Vehicles and Fuels” Report.
Scenario statewide on-road GHG emissions
LDV and HDV well-to-wheel emissions
Sensitivity Scenario on PHEV sales and eVMT

Sensitivity scenarios from CARB’s Midterm Review report, Jan 2017

- High PHEV Sales + Low eVMT: +15 to 60% GHG increase if much larger PHEV sales
- High PHEV Sales + High eVMT
- Low eVMT
- High eVMT

Change in GHG Emissions (mmt CO2e)

2025 2030 2035 2040 2045 2050