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Description:	Presentation by Gary Yowell for SB 350 Transportation Electrification Webinar May 31, 2017. Presentation outlines staff developed tool to help utilities with EV assumptions.
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Transportation Electrification Common Assumptions (For Integrated Resource Planning Submittals) A CEC Effort in Consultation with ARB & CPUC

Webinar

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Outline

- Introduction
- Overview – explain process, underlying State's common assumptions, and results
- Demonstration – walk through spread sheet
- Questions/Answers – throughout discussion

Overview & Purpose

- Energy Commission effort in consultation with Air Resources Board and CPUC participation
- Most up-to-date assumptions from both agencies
- Help utilities quantify transportation electrification results faster and easier with more realistic results
- Help CEC/CPUC evaluate utility submittals with greater confidence in results

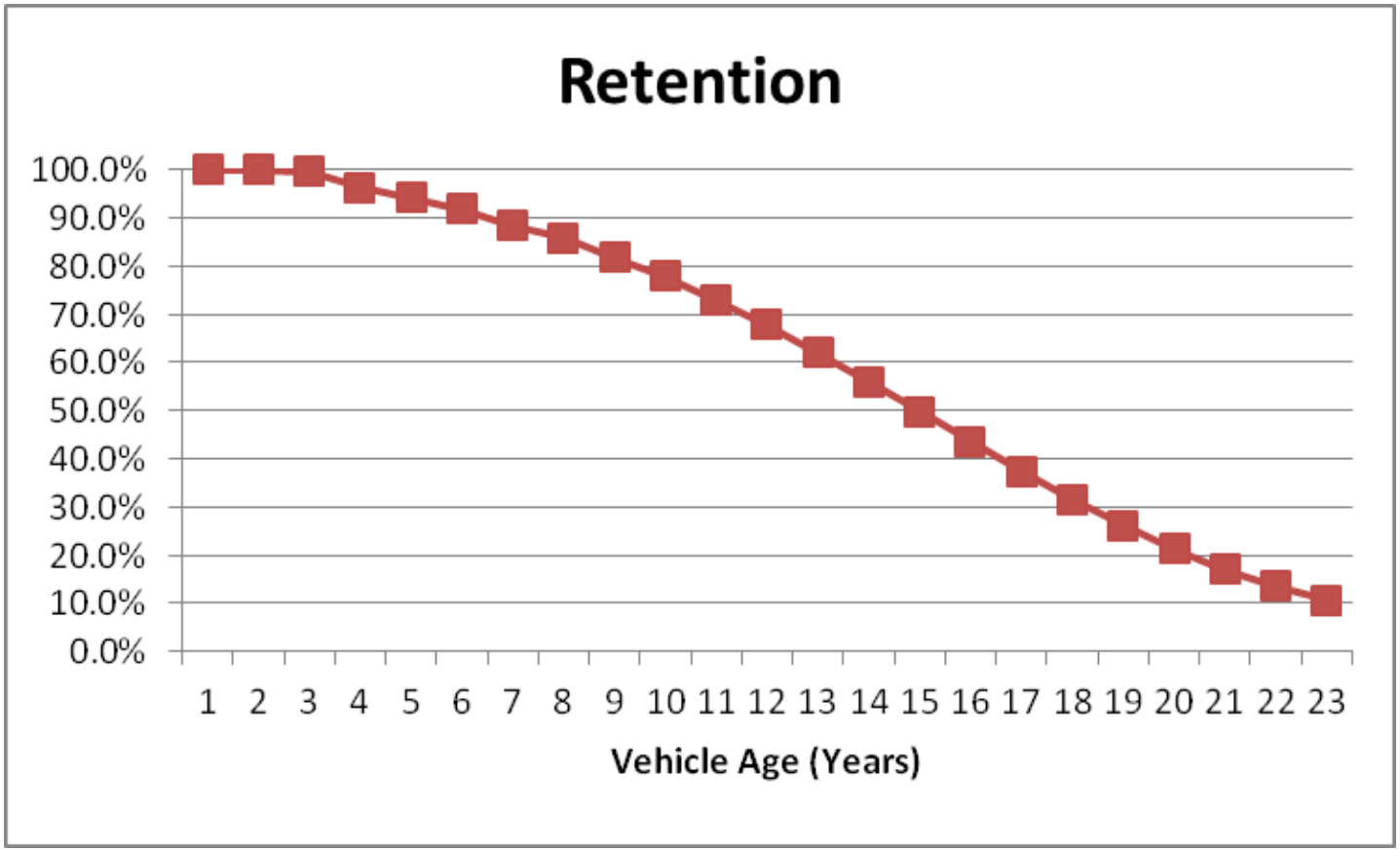
Inputs (Common Assumptions Utilities' Assumptions)

- Past PEV & Future PEV Populations
- MPG Past and Future (Two Choice Future)
- Vehicle Miles Traveled (VMT) / PEV type
- Vehicle Survival Rates
- CO_{2e} Gasoline Carbon Intensity 2015-2030
- CO_2 of Generation for PEVs 2015-2030
- NO_x and $PM_{2.5}$ of Generation for PEVs
- Future Composition of Electric Vehicle Fleet

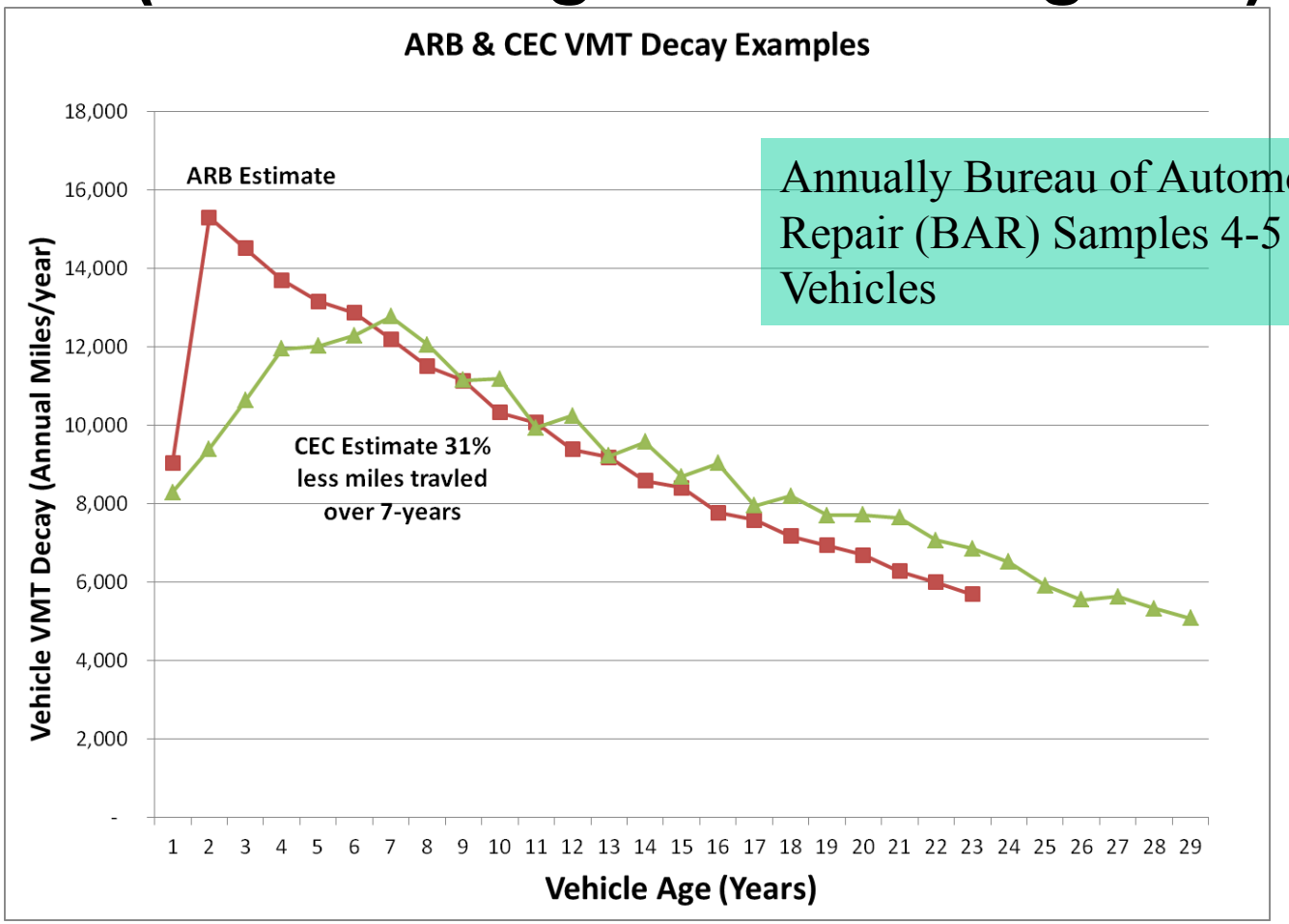
State's Common Assumptions

1. Vehicle Survival Rate (DMV)
2. Vehicle Annual Mileage and Decay (BAR – Smog Check)
3. Displaced Gasoline Vehicle Fuel Economy (EPA/DMV)
4. Gasoline GHG/gallon over time (ARB Vision)
5. Electric Vehicle Energy Efficiency (EPA/DMV)
6. PEV Location / Utility Service Territory (DMV/Utility Service ZIP-Codes)

Vehicle Survival Estimated by CARB, (CA DMV Registration Based)

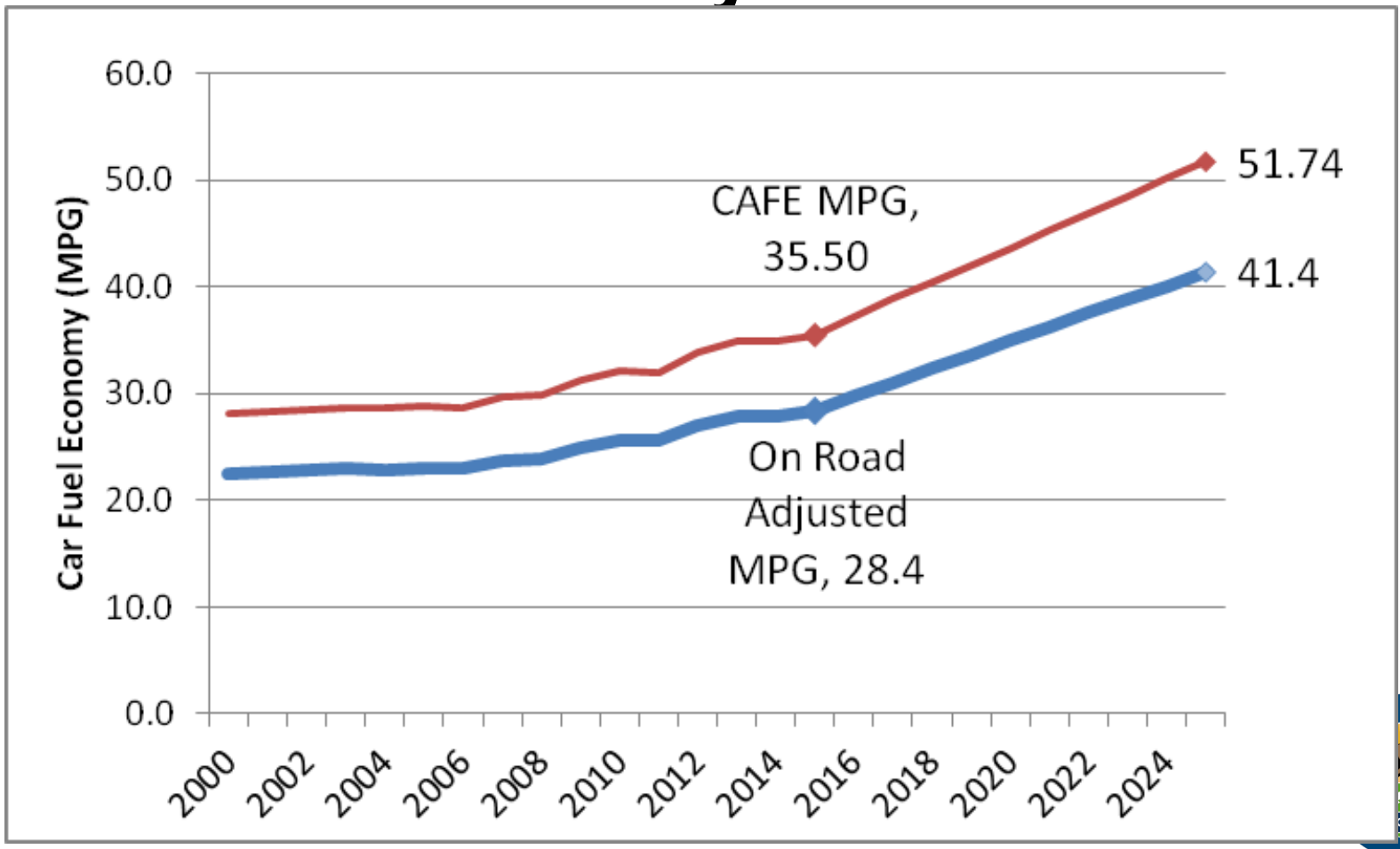


Vehicle Miles Traveled Per Year (BAR Smog Check Program)

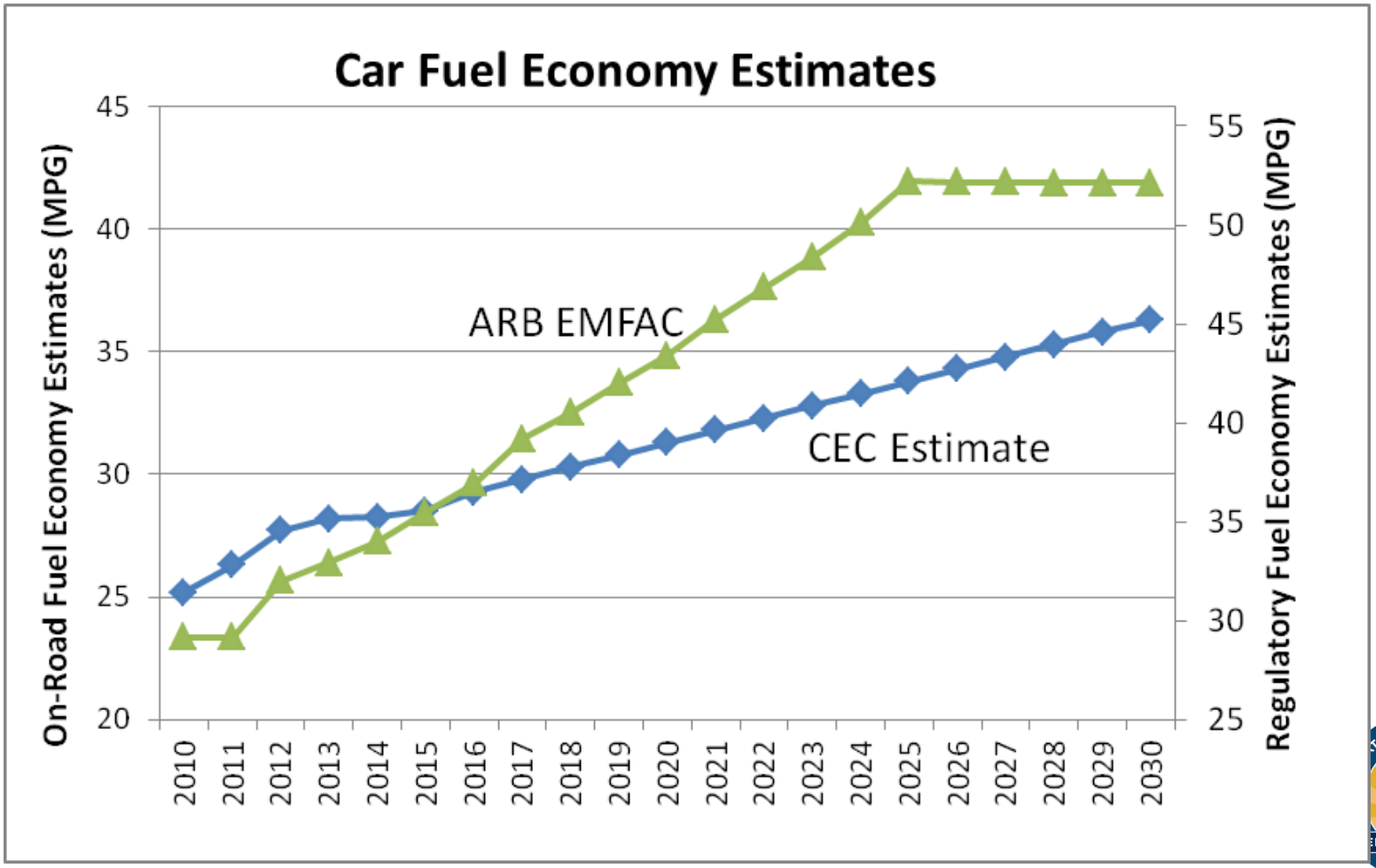


Annually Bureau of Automotive Repair (BAR) Samples 4-5 Million Vehicles

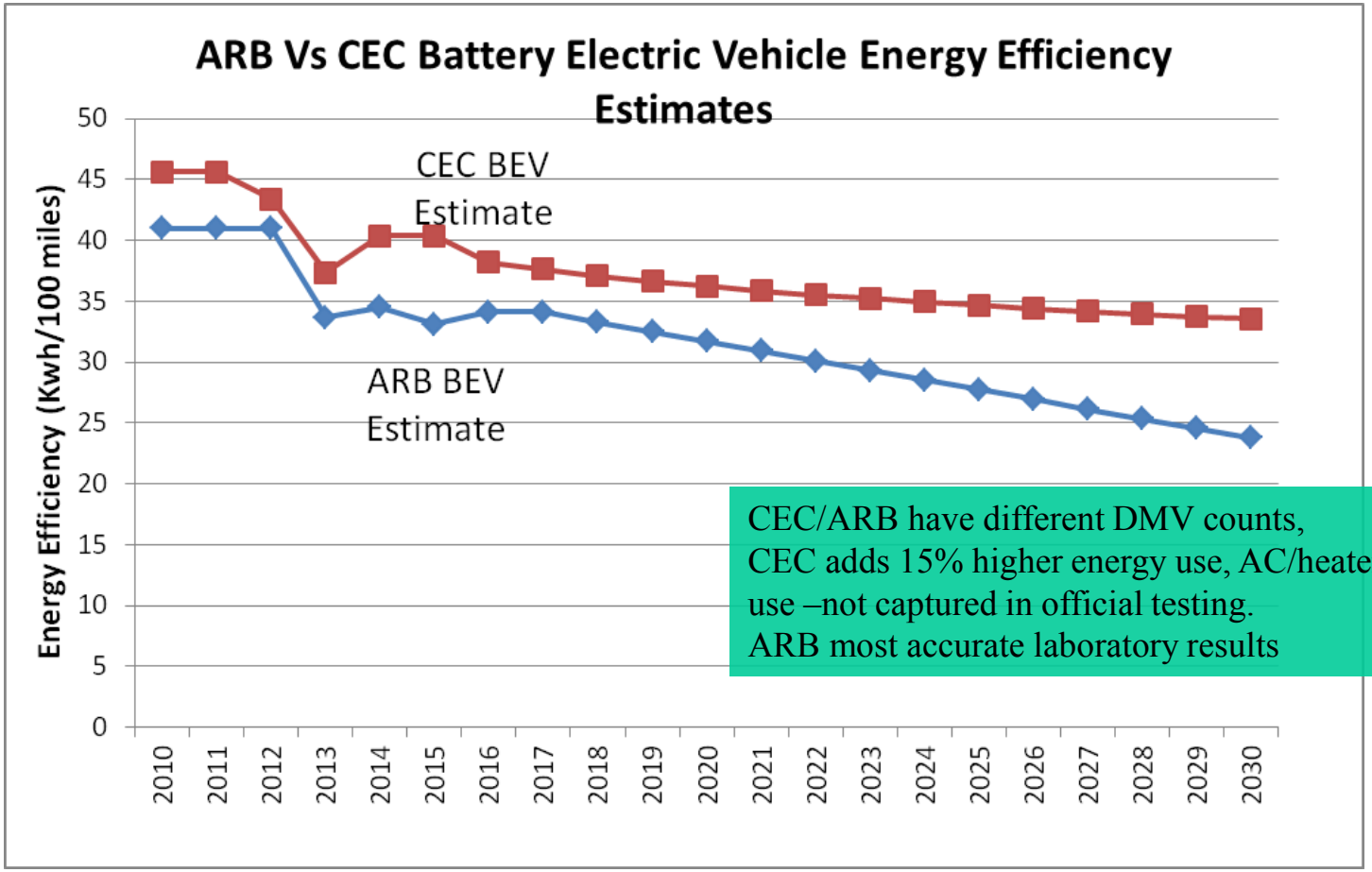
Analysis Uses On-Road Adjusted Fuel Economy Values



Range of Fuel Economy Projections

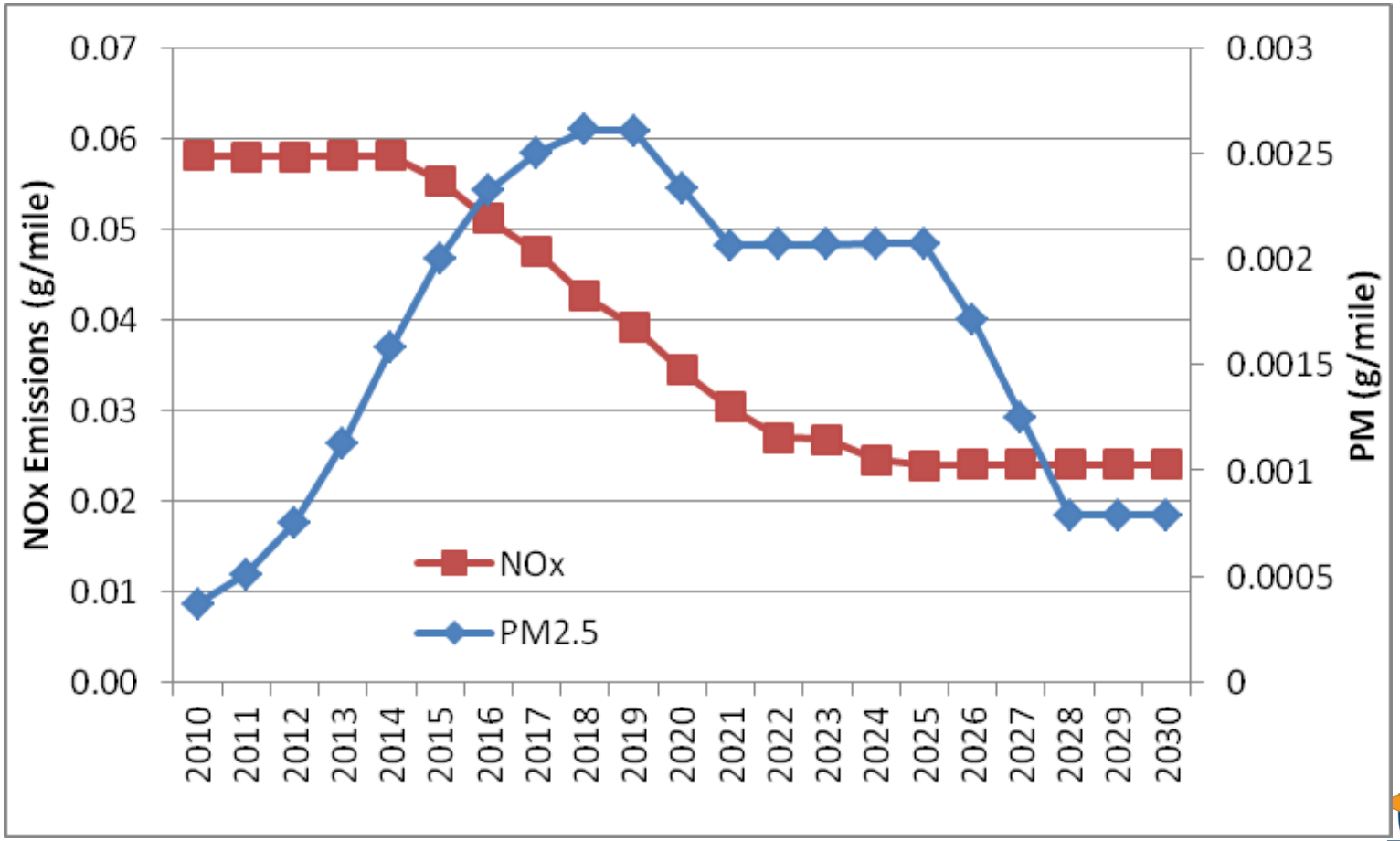


PEV Energy Efficiency Estimates

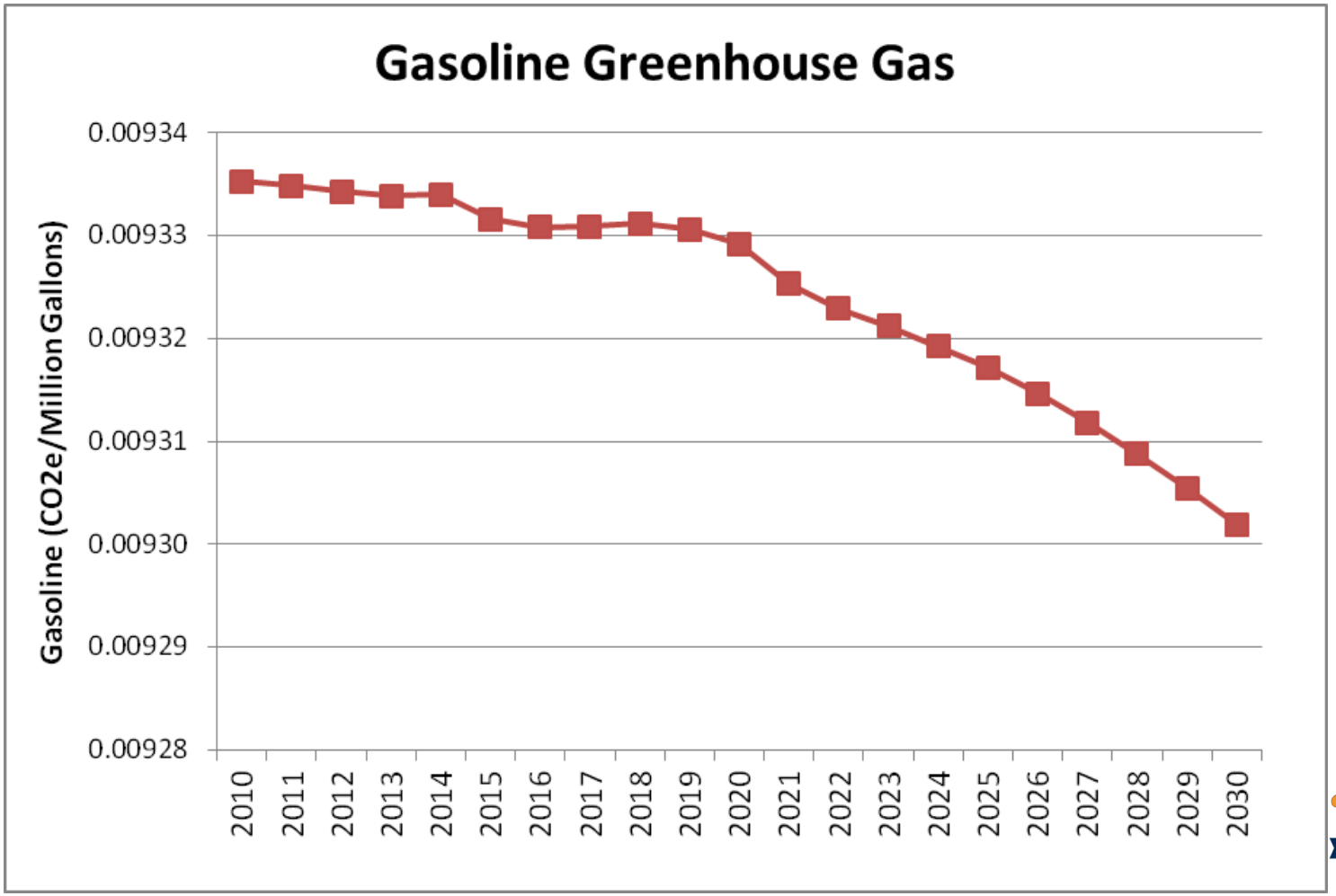


CEC/ARB have different DMV counts, CEC adds 15% higher energy use, AC/heater use –not captured in official testing. ARB most accurate laboratory results

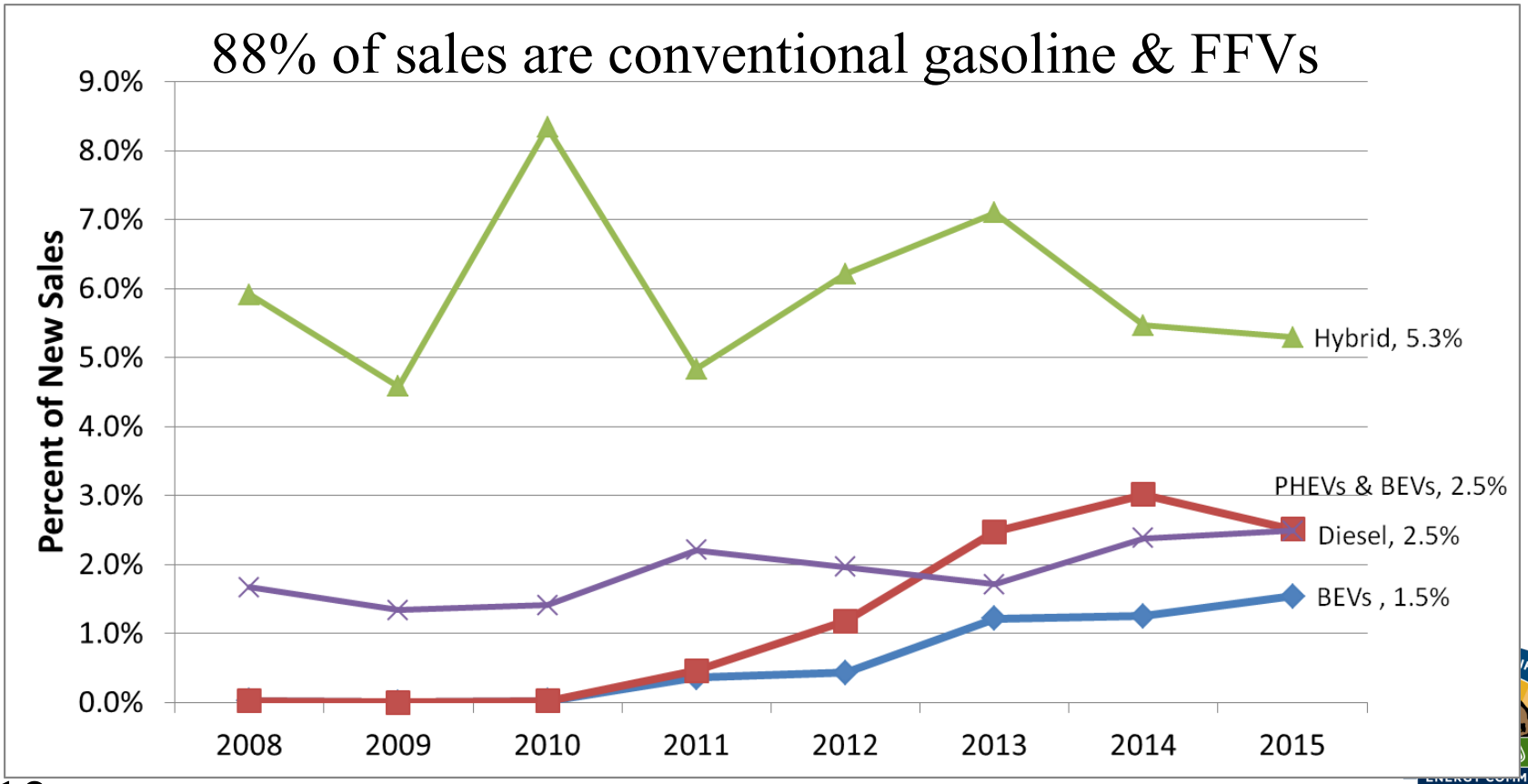
Vehicle Emissions – ARB Vision



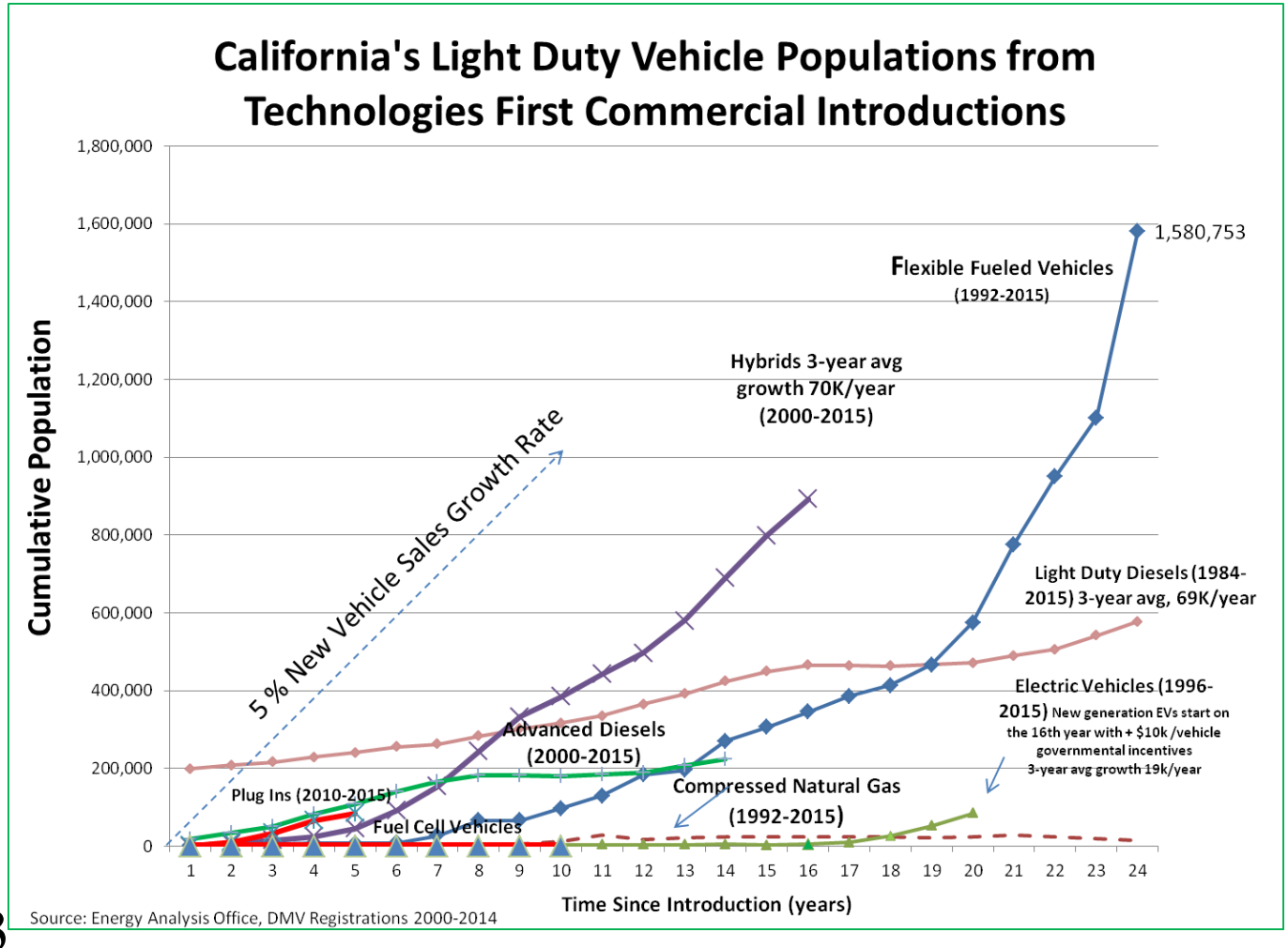
Gasoline GHG Emission - ARB Vision



FYI: BEV and PHEVs Market Share of New Vehicle Sales



FYI: PEVs Total Population Growth



Source: Energy Analysis Office, DMV Registrations 2000-2014

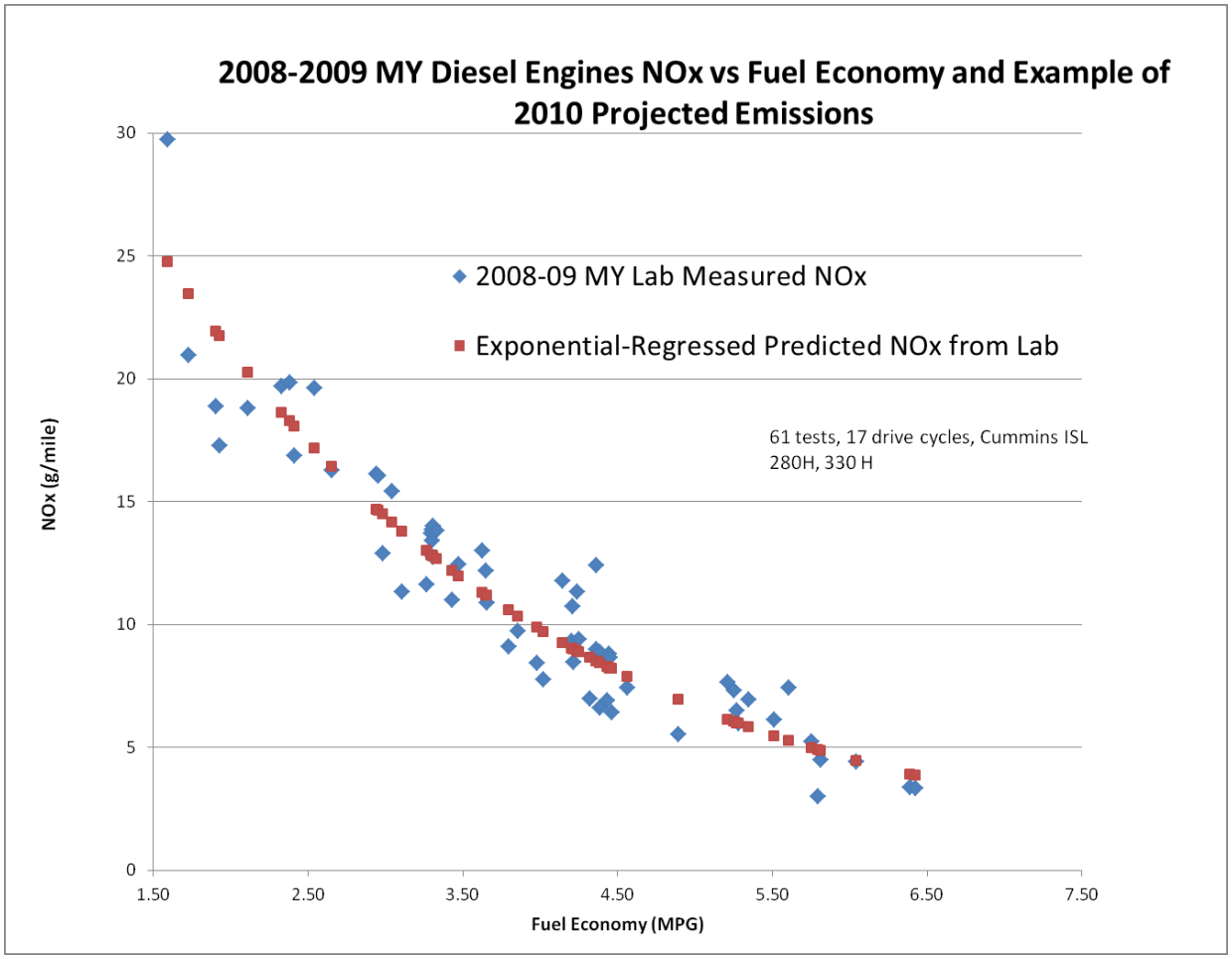
Heavy Duty Electric Vehicles

Work In Progress

Heavy Duty Electric Vehicles Critical Energy Factors – Unresolved

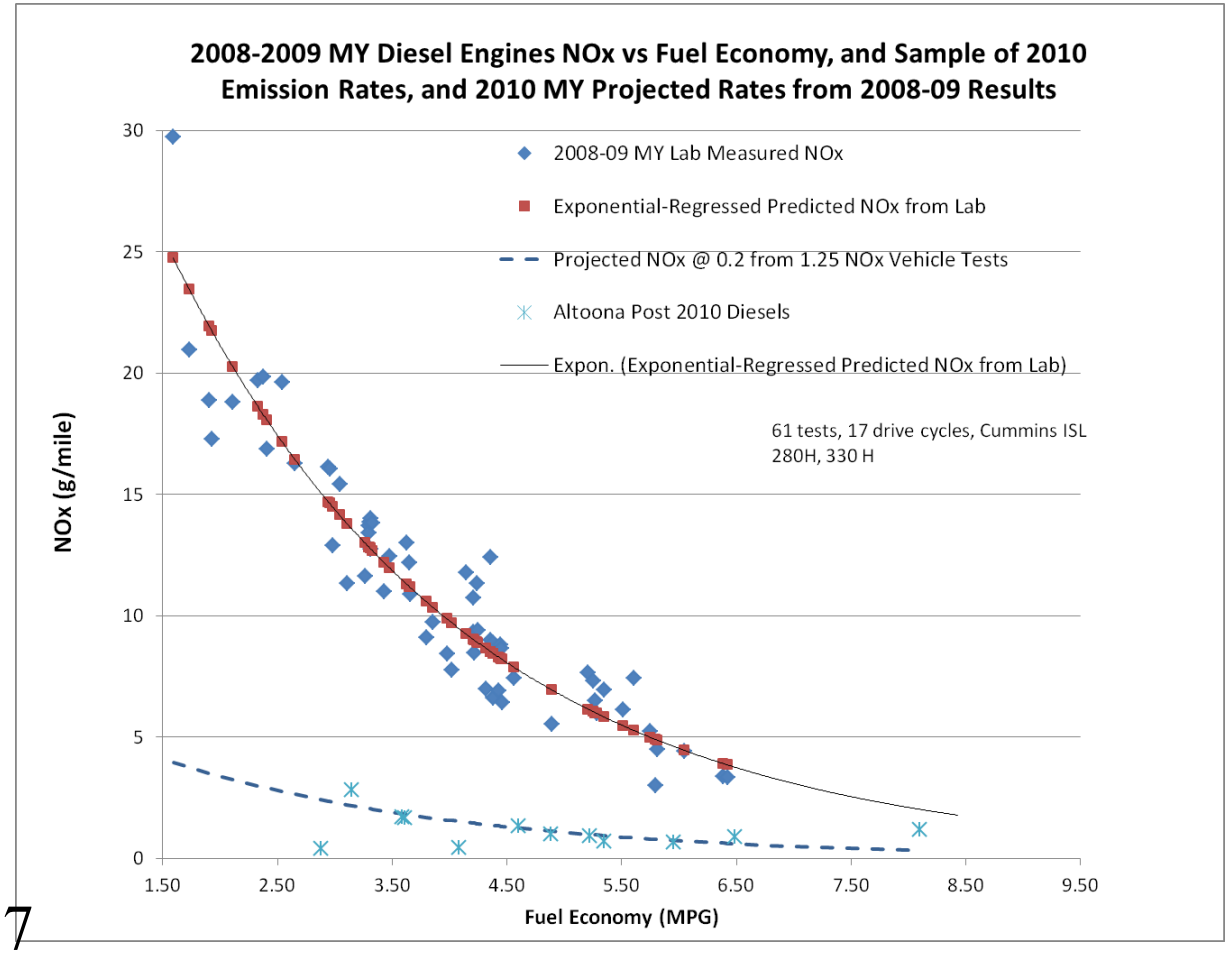
Diesel (MPG)	Electric (MPG)	Electric (Kwh/mi)	EER (TTW)	EER (WTW)
2.0	11.76	3.178	5.88	3.13
3.0	13.04	2.866	4.35	2.32
4.0	14.32	2.609	3.58	1.91
5.0	15.60	2.395	3.12	1.66
6.0	16.88	2.214	2.81	1.50
7.0	18.16	2.058	2.59	1.38
8.0	19.44	1.922	2.43	1.30

NOx Emissions Are Strongly Related to Fuel Economy, Old Technology Example



1.25 g NOx Engines

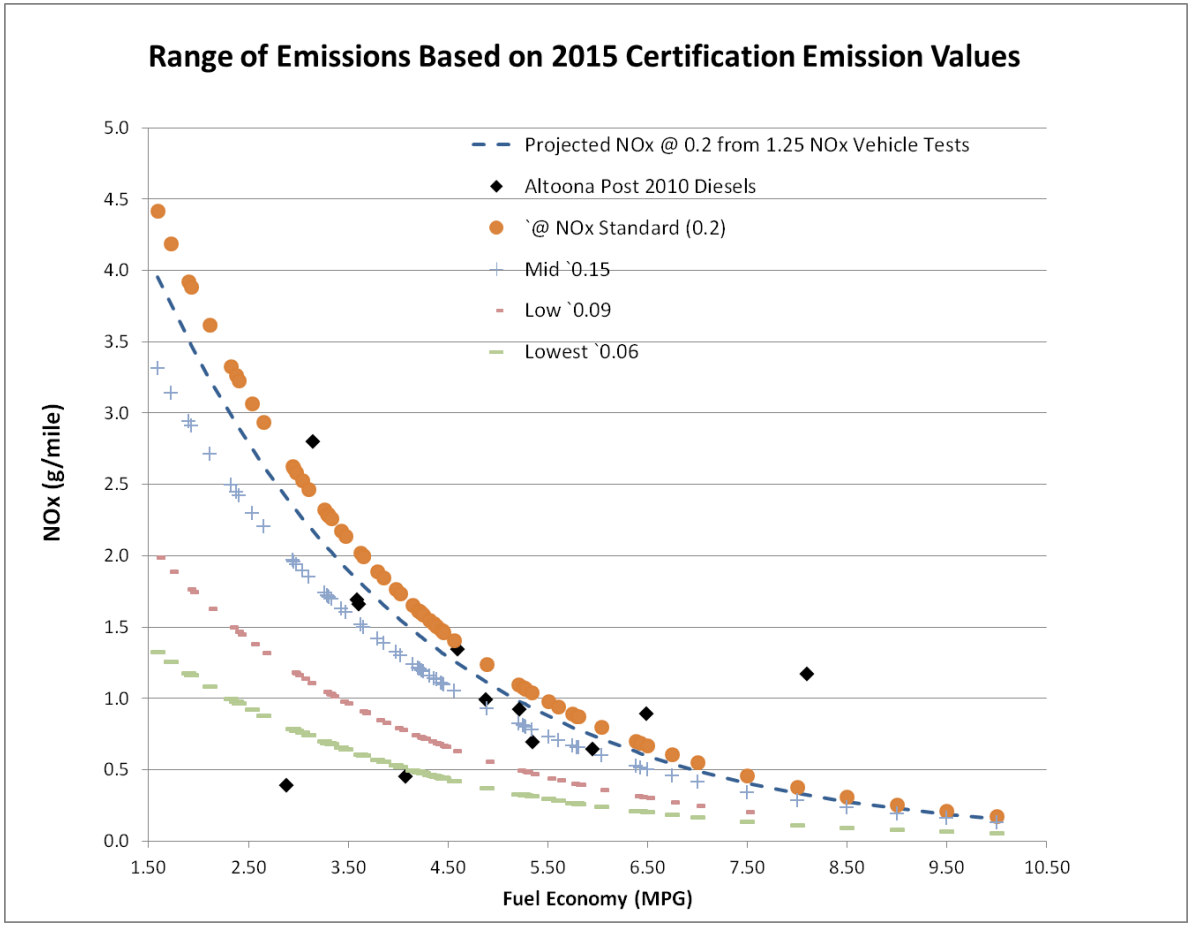
Newer 2010 NOx Rates Were Estimated Three ways



2008-09 diesel NOx standard was1.25 g/bhp-Hr
2010 standard is 0.2 g/bhp-Hr, 84% lower.

1) Projected NOx @ 0.2 uses 84% of the Exponential regressed line.
2) Altoona Chassis test results are plotted and in general agreement with #1.
3) Next Slide

2015+ NOx Emission Rates Used – Unresolved



Recommend Using Low to Lowes Values

The End

Gary Yowell