

Light, Heavy-Duty, and Nonroad Vehicle Efficiency: Technical and Policy Options for Further Improvements



Coralie Cooper

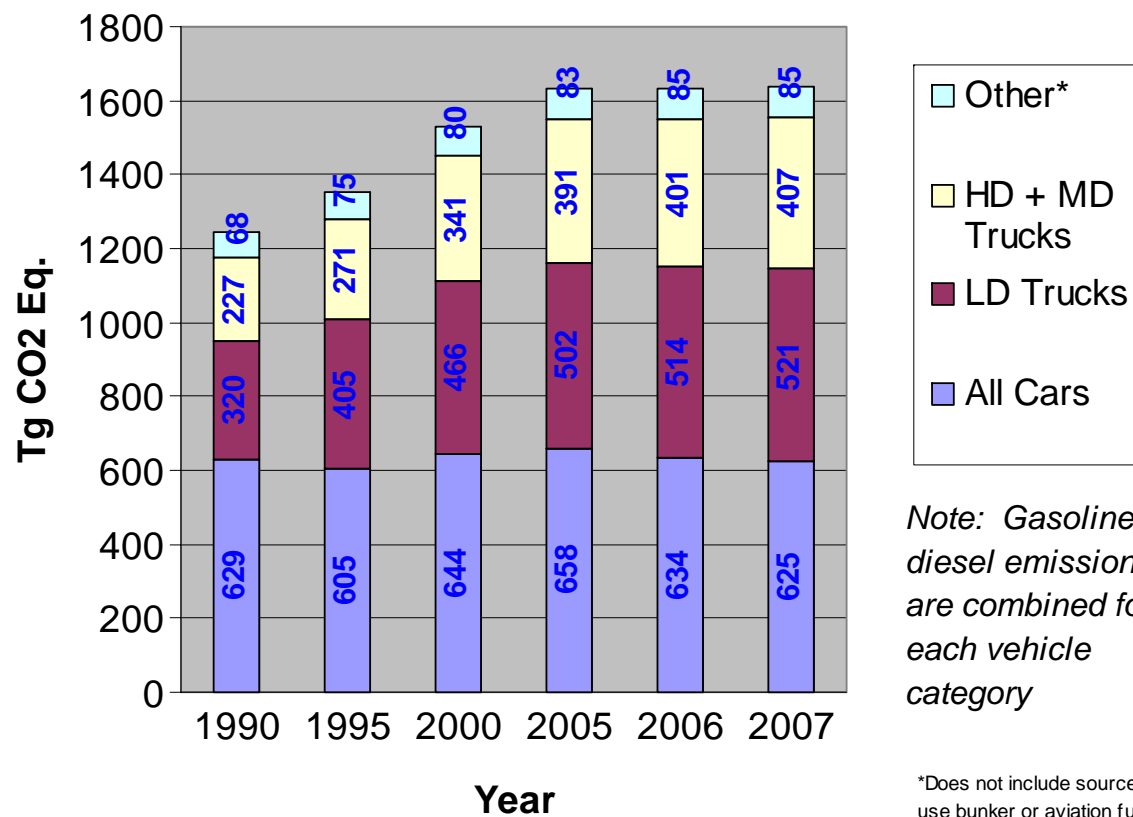
Transportation Program Manager

Public Meeting on Transportation Vehicle Efficiency
Massachusetts Executive Office of Energy and
Environmental Affairs
July 14, 2009

Overview

- Inventory Background
- Current Measures
- Potential Additional Policies and Technical Background
- Conclusions

U.S. Transportation Related GHG Emissions

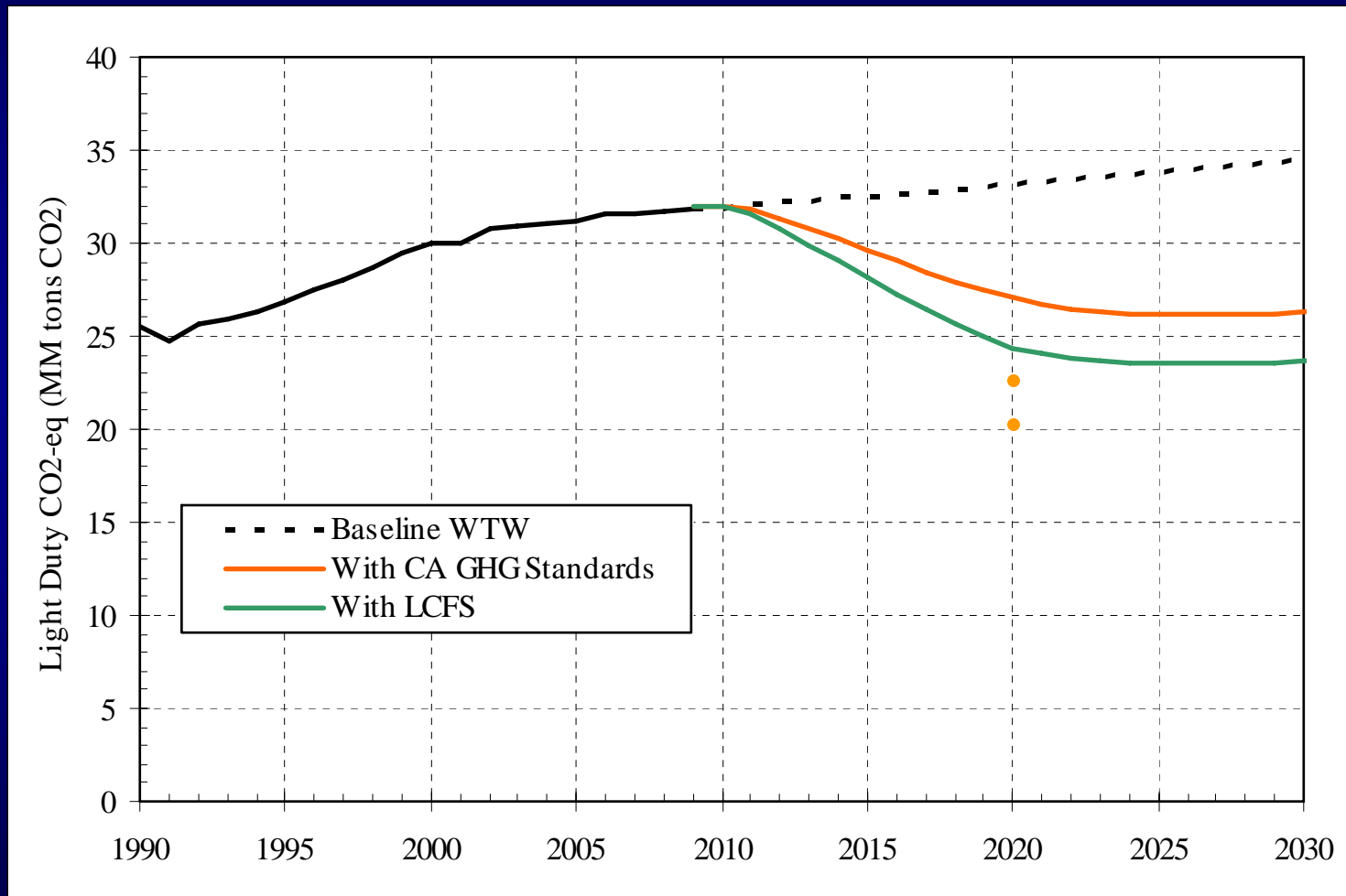


Source: EPA's 2009 US GHG Inventory

Note: Gasoline and diesel emissions are combined for each vehicle category

*Does not include sources that use bunker or aviation fuels

MA Passenger Car GHG Emissions 1990-2030



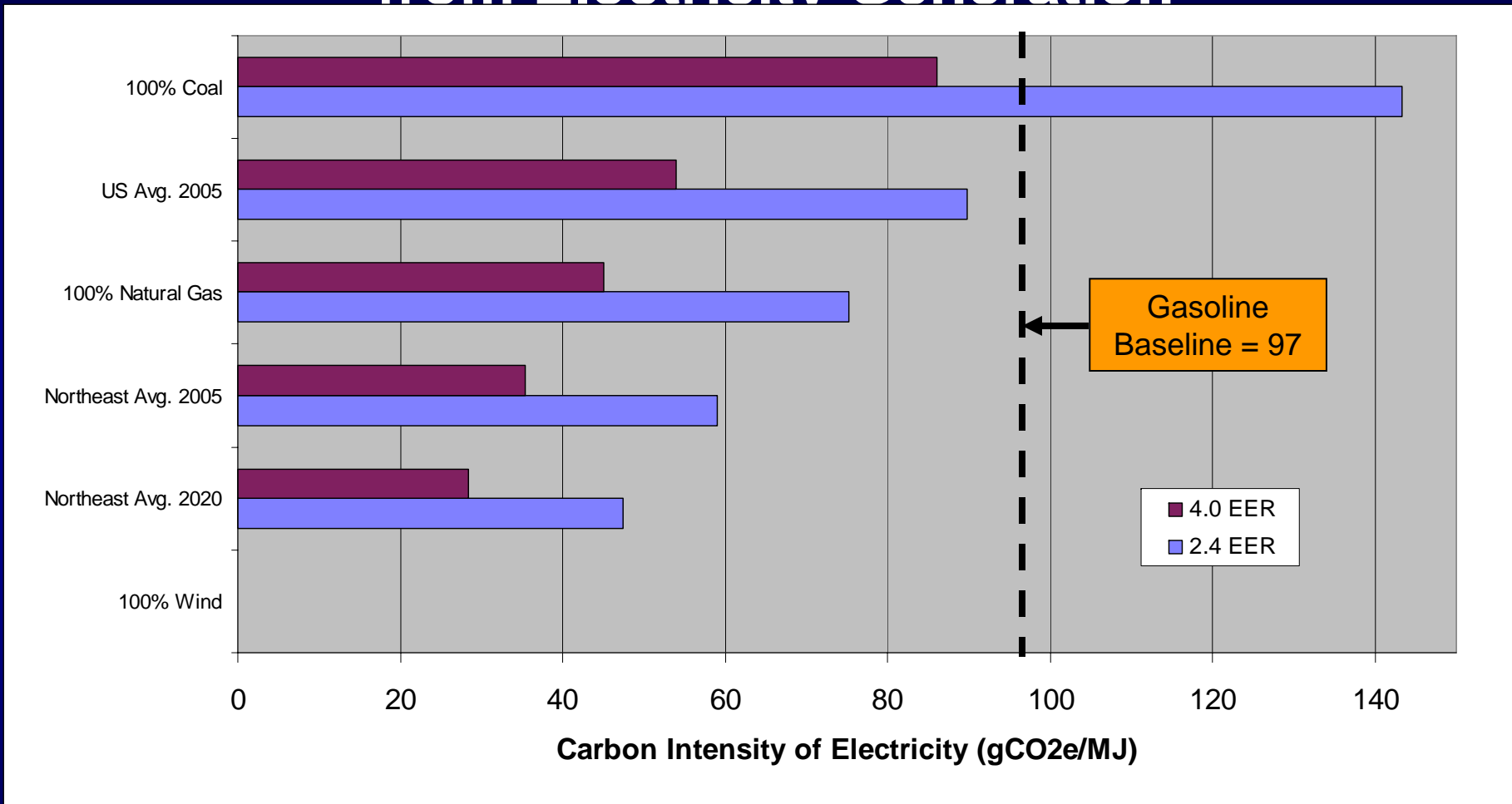
Passenger Car Programs to Consider

- CARB Pavley II – will require automobile manufacturers to further reduce vehicle tailpipe GHG emissions (reductions TBD)
- CARB Zero Emission Vehicle program changes – will require automobile manufacturers to make available for sale a greater percentage of advanced vehicles such as fuel cell and electric vehicles (reductions TBD)
- California Air Resources Board (CARB) tire pressure program – requires automotive maintenance industry in CA to check tire pressure (~.12 MMT in MA)

Other Initiatives to Consider

- Executive Order #388 established requirements for the purchase of ZEVs in state owned fleets. This rule could be amended to include higher percentages as vehicles become available
- Incentives for purchase/operation of advanced technology vehicles
 - State tax credits for vehicle purchase
 - SOV advanced technology cars in HOV lanes
 - Electric or plug-in hybrid infrastructure

Effect of Grid Resource Mix on GHG Emissions from Electricity Generation

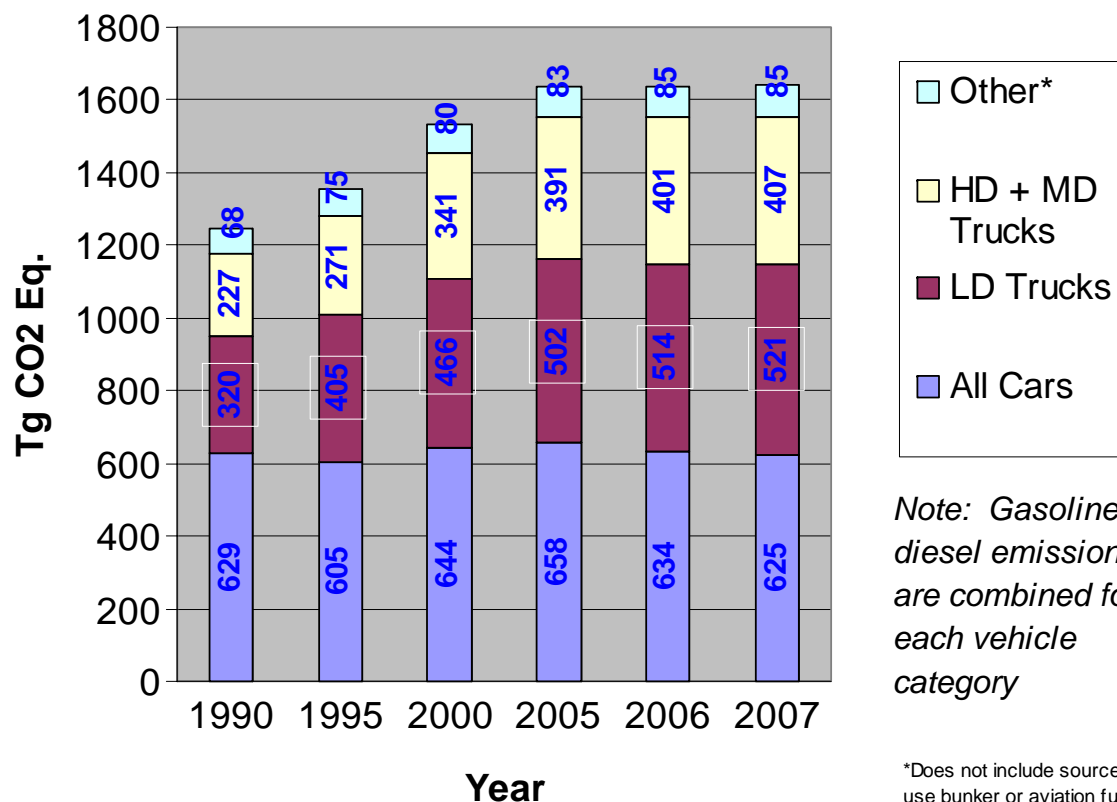


US & CA technology shares based on GREET default; Northeast technology shares based on MARKAL

	Oil	NG	Coal	Nuke	Bio	Other
US Avg	3%	19%	51%	19%	1%	8%
CA Avg	1%	41%	15%	19%	2%	23%
NE 2005	10%	31%	16%	31%	0%	12%
NE 2020	4%	41%	8%	18%	2%	27%

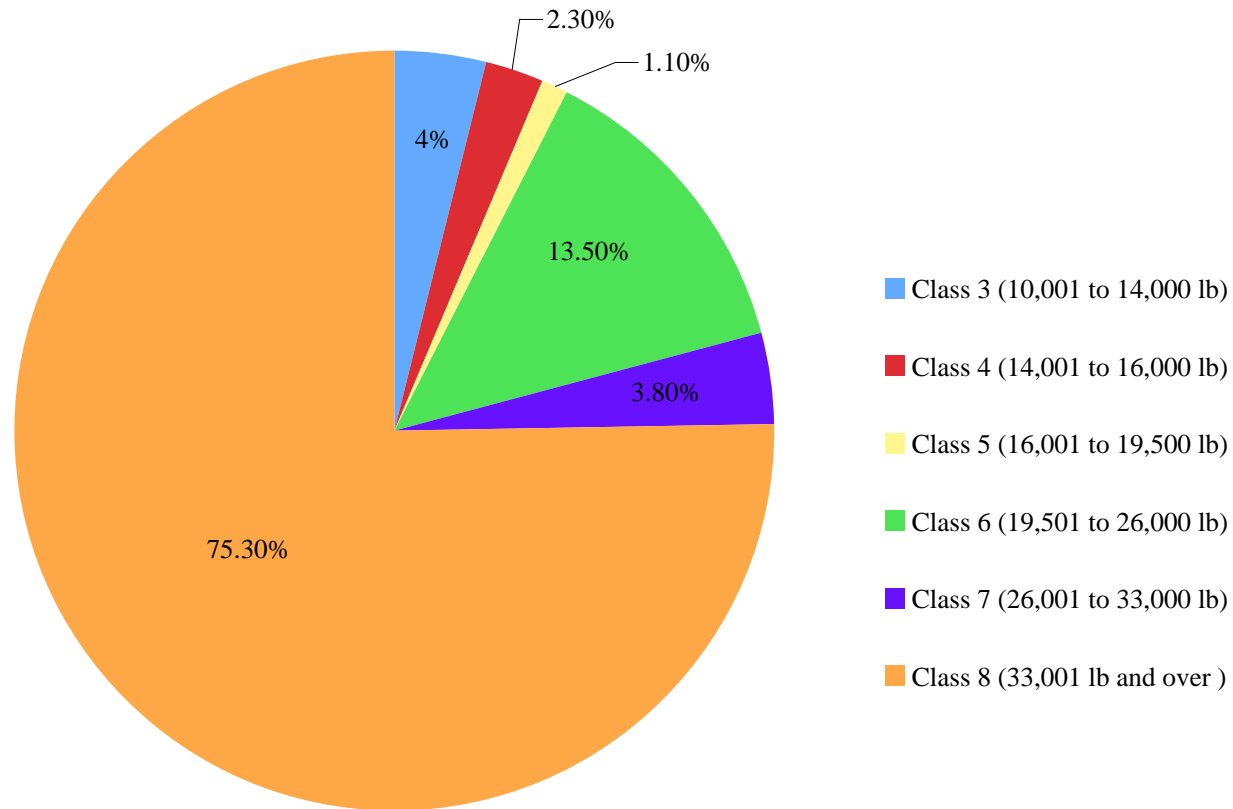


U.S. Transportation Related GHG Emissions

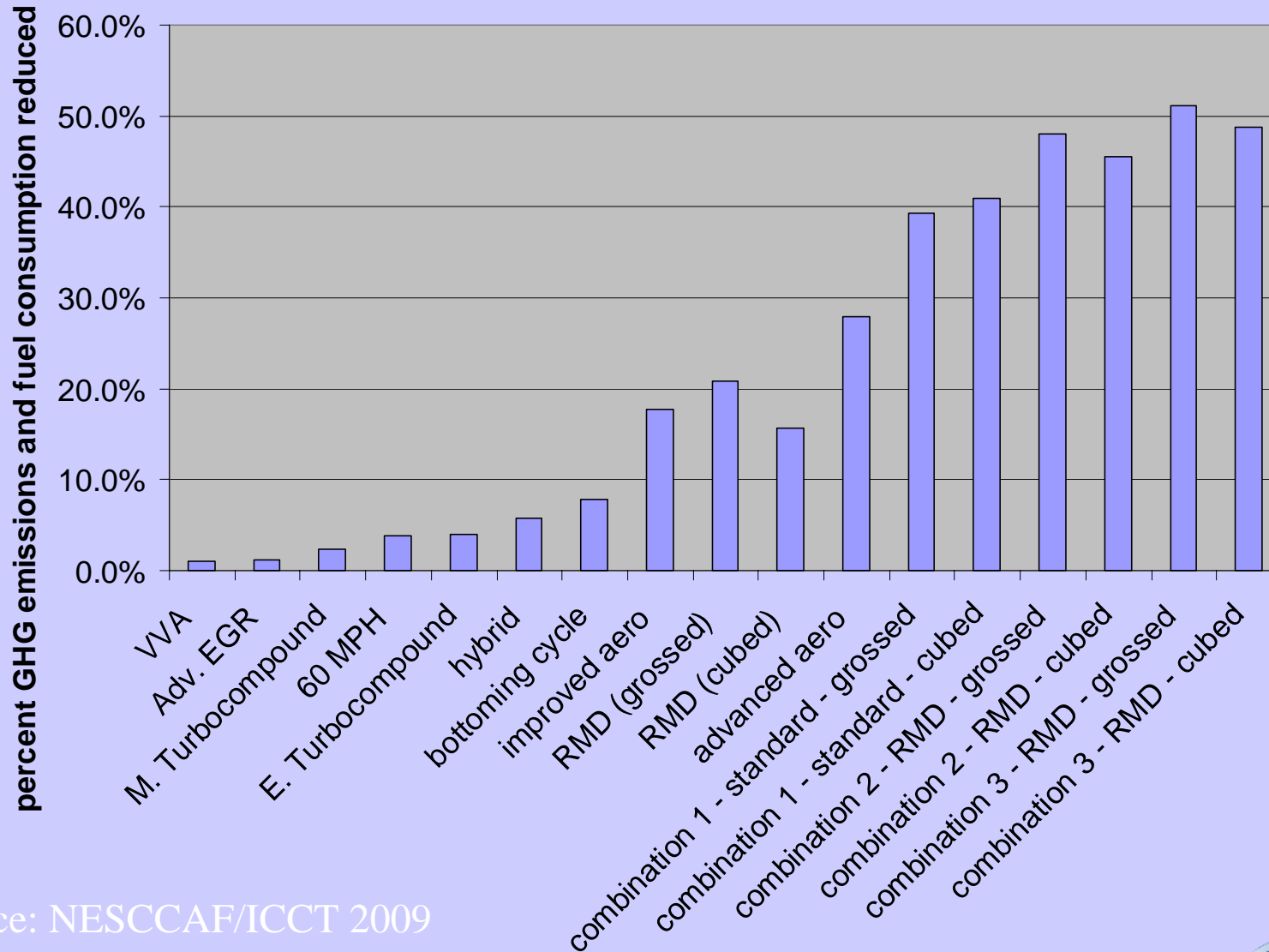


Source: EPA's 2009 US GHG Inventory

Fuel Consumption by Medium and Heavy-Duty Vehicles

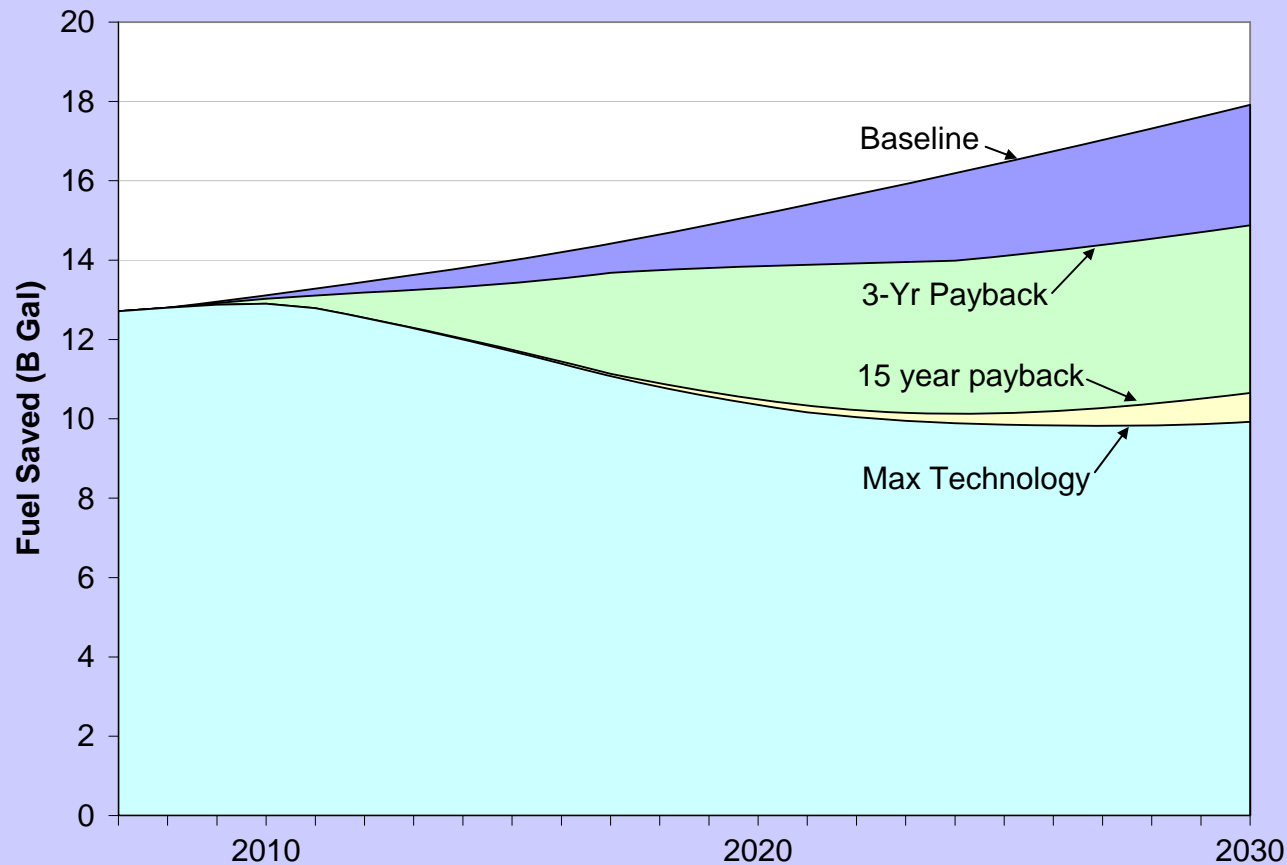


Technologies to Reduce Heavy-Duty Truck GHG Emissions



Source: NESCCAF/ICCT 2009

Potential GHG Reductions in the U.S. Heavy-Duty Long Haul Fleet



Source: NESCCAF/ICCT 2009

Summary of CARB Freight Measures

- SmartWay – requires installation of aerodynamic drag and tire improvements on trucks operating on California highways (~.23 MMT in MA)
- Other CARB “T-6” measures:
 - Drayage truck rule
 - Cargo handling equipment idling rule
 - Harbor craft rule
 - TRU cold storage
 - Vessel speed reduction
 - (~.65 MMT in MA if all T-6 rules adopted)
- Hybrid trucks – requires purchase of hybrid trucks by fleets such as garbage trucks, utility trucks, delivery trucks (~.13 MMT in MA)

Technical Conclusions

- Significant further reductions in GHGs technically possible for both passenger cars and heavy trucks
- For passenger cars this will require continued emphasis on incremental approaches such as better tire inflation and improved air conditioning
- It will also require the introduction of significant numbers of advanced technology vehicles such as hybrid electric, plug in hybrids, all-electric, fuel cell, and other advanced vehicles powered by cleaner fuels
- For heavy-duty vehicles, greater emphasis on commercialized technologies such as improved aerodynamics and improved tires is needed
- Development and commercialization of advanced technologies for trucks such as advanced engine technologies and hybridization for certain applications is also necessary
- Nonroad machine reductions possible with many of the same technologies used for heavy-duty trucks, but the industry has further to go with regard to commercialization of technologies

Policy Conclusions

- Continuation of existing policies – such as CA LEV, ZEV, and Pavley needed
- Adoption of Low Carbon Fuel Standard needed to ensure cleaner fuels are available
- Implementation of Renewable Portfolio Standard and Regional Greenhouse Gas Initiative necessary to lower the GHG emissions resulting from electricity generation
- Adoption of additional measure to provide incremental improvements in passenger car GHGs – CARB's programs provide potential templates
- Incentives needed to promote advanced technology passenger cars and light trucks – such as tax incentives and non-monetary incentives
- Regulations to ensure that heavy-truck GHG emissions decline are needed – CARB programs provide possible templates