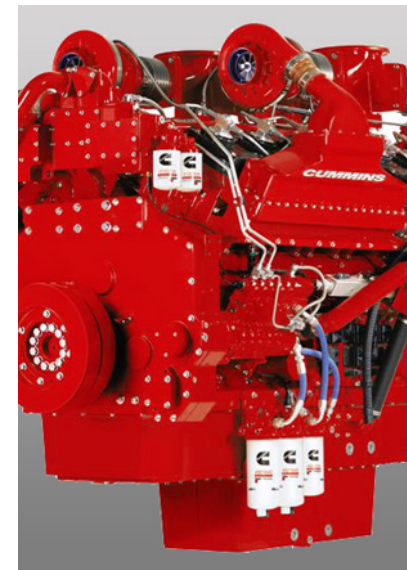
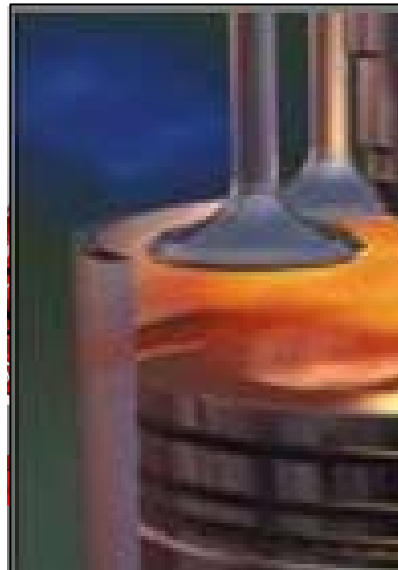
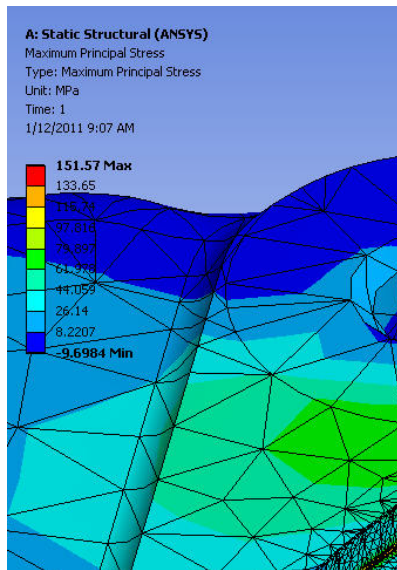


The Next Regulatory Chapter for Commercial Vehicles

Brian Mormino

Director of Energy Policy and Emissions Compliance

3 October 2011



Cummins Inc.

Diversified Global Power Leader – Four Complementary Businesses



Engines



***Power
Generation***



Components



Distribution

- World's largest independent diesel engine manufacturer
- Nearly 900,000 engines in 2010
- Over 60% of sales outside the US
- 40,000+ employees worldwide

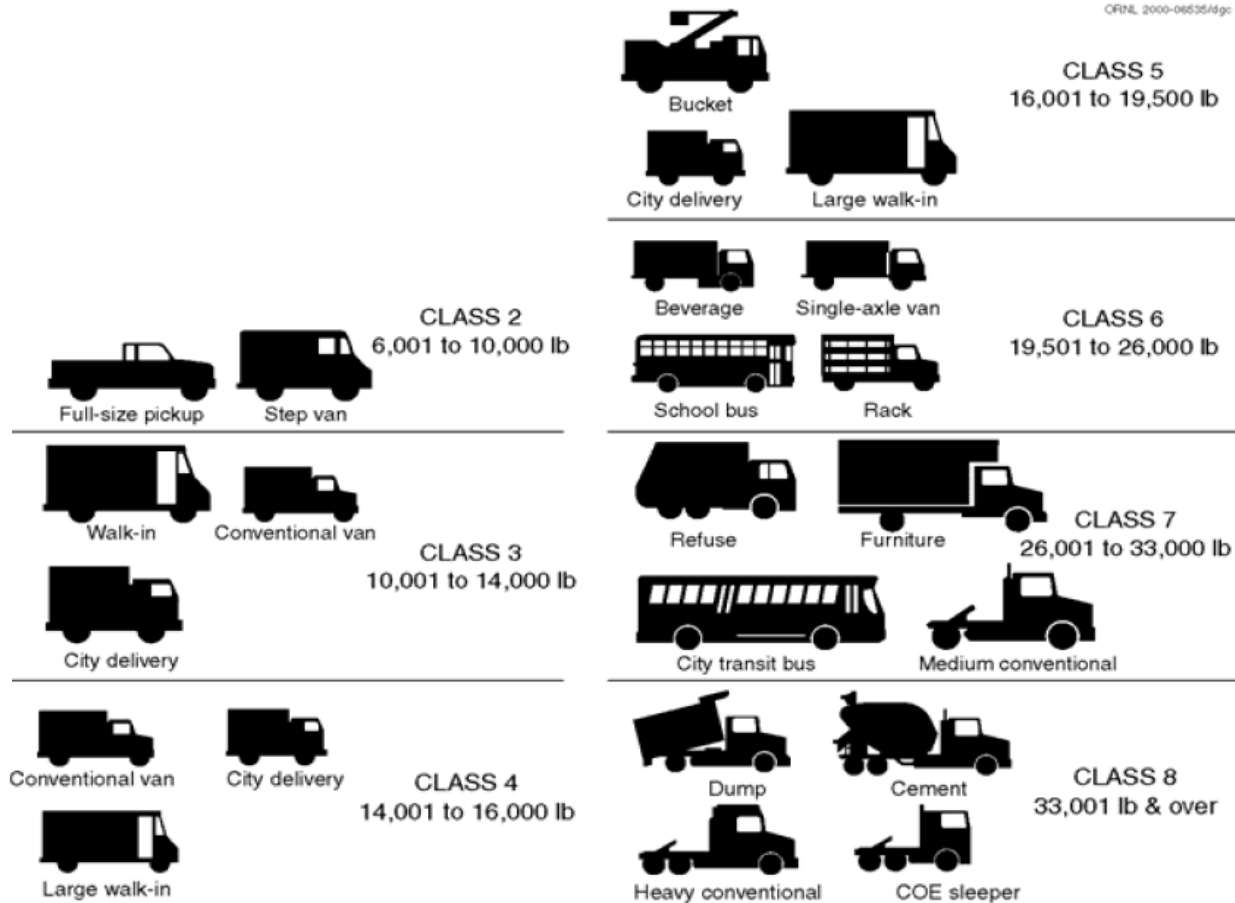


May 8, 2007

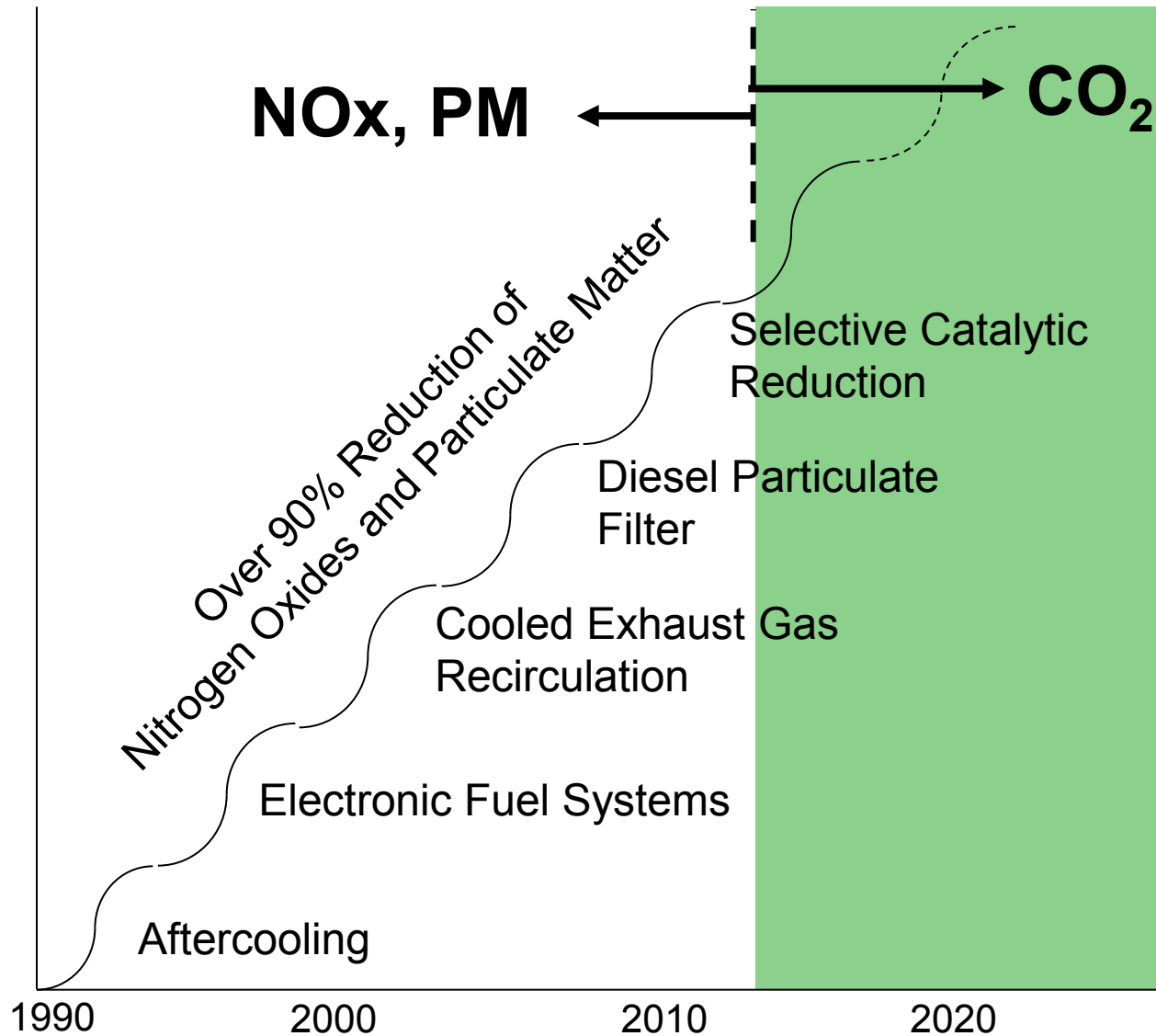


Commercial Vehicle Industry

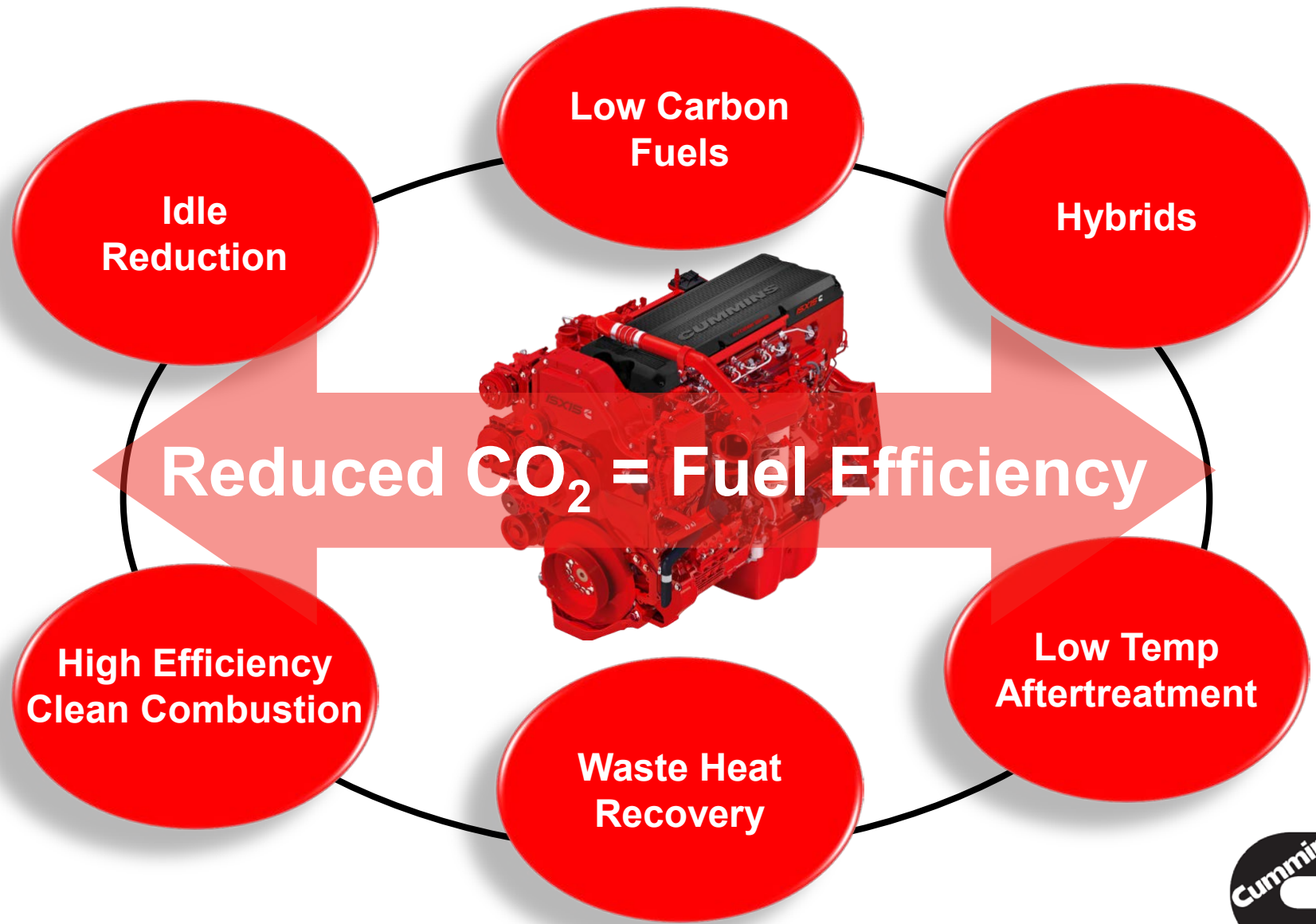
ORNL, 2000-06535/dgc



Technology Evolution



Reducing CO₂ Emissions



White House Announcements

May 21, 2010



Rule proposed October 2010 and finalized August 2011

August 9, 2011



Segmentation

Heavy-duty
Pickups
and Vans



CLASS 5
16,001 to 19,500 lb



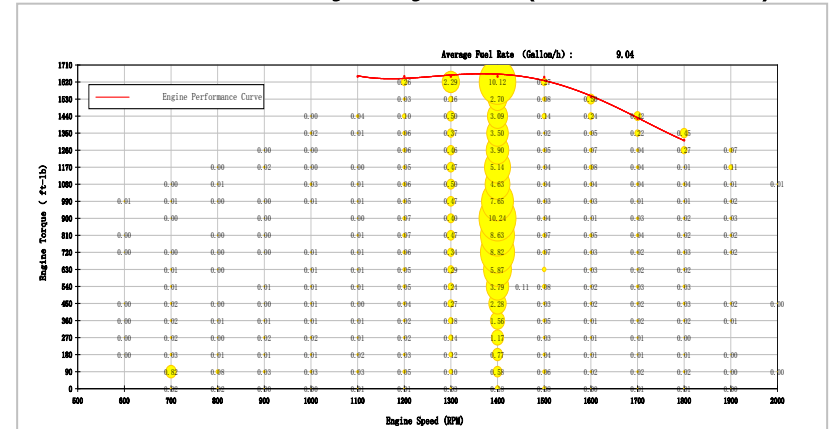
CLASS 7
lb

Combination
Tractors

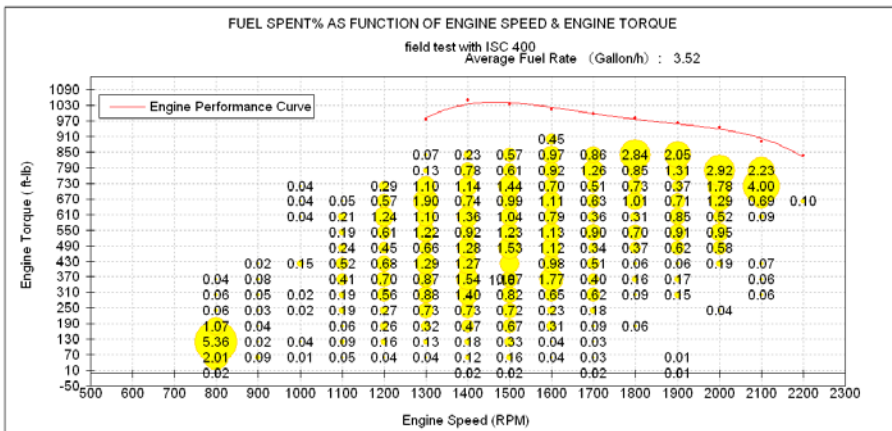


Reuse Existing Engine Protocols

Tractor Duty Cycle (SET Test)



Vocational Duty Cycle (FTP Test)



Diesel Engine Standards

- Separate engine standards
- Utilize existing regulatory provisions to certify the engine as done today for NOx and PM
- Different standards for tractor and vocational engines (HD and MD categories remain)
- Standards
 - CO₂ Limits: range of 3% in 2014 to 9% total in 2017 over 2010 baseline
 - N₂O and CH₄ Limits



ISB6.7



ISC8.3



ISX11.9



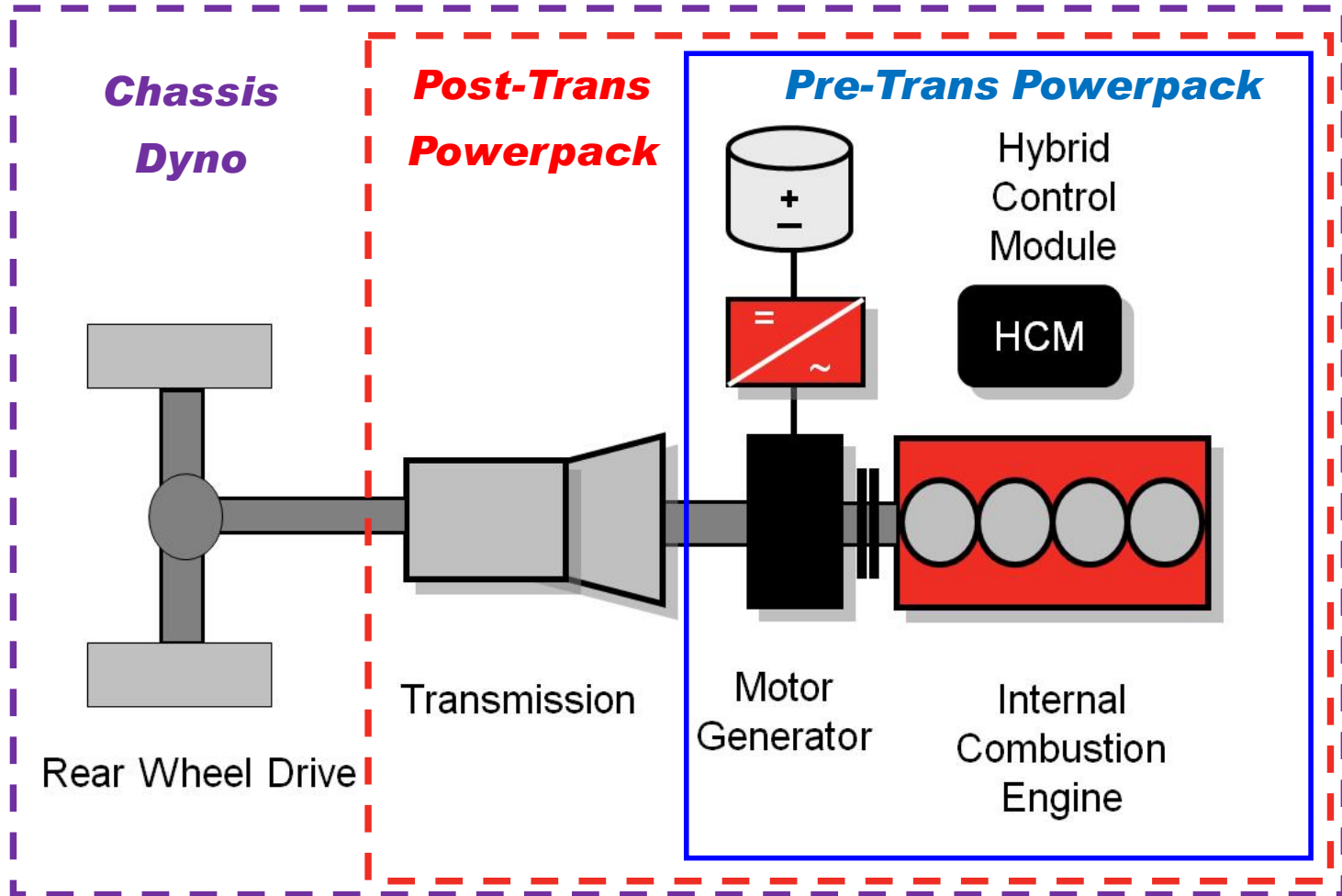
ISL9



ISX15










Hybrids



Vehicle Standards

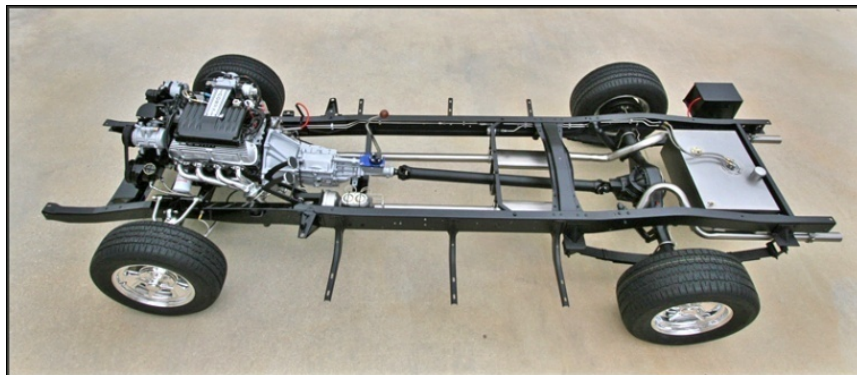
Combination Tractors

	Day Cab		Sleeper Cab
	Class 7	Class 8	Class 8
Low Roof			
Mid Roof	--	--	
High Roof			

Heavy-duty Pickups and Vans



Vocational Vehicles



What does this mean in practice?

Combination Tractors



- The tractor manufacturer will certify the vehicle for aerodynamics, weight reduction, tires, idling and speed limiters

Vocational Vehicles



- The chassis manufacturer will certify the vehicle for tires

Engines



- The engine manufacturer will certify the engine for NO_x, PM and CO₂ (and N₂O and CH₄)



Cummins On-Highway Product Plan

- SCR is foundation for the future
 - Reduces NOx to near zero levels required
 - Enables greater efficiency and meeting the new GHG/FE standards
- Product launch early in 2013
 - Align with new On-Board Diagnostic (OBD) requirements across all engine platforms
 - Comply with GHG/FE regulation
- SuperTruck Program lays groundwork
 - Build on public-private partnerships
 - Improve vehicle freight efficiency by 50%



Summary

- EPA and DOT have developed a sound regulation
 - Numerous stakeholders involved over the last 4 years
 - Regulatory structure builds on existing programs
 - Engine technology development enabled by clarity, certainty
- R&D partnerships and regulations work together
 - First: Near zero emissions standards
 - Next chapter: GHG/FE standards