



Autonomous Trucks – Freight Opportunities

195 Corridor Coalition
Mike Roeth
June 21, 2016



An effort of the Carbon War Room and the North American Council for Freight Efficiency



Today



Trucking Efficiency
Fleet Fuel Situation
Technologies
Autonomous Trucking
- Platooning
Questions



Trucking Efficiency



Dedicated to doubling the efficiency of North American goods movement

We pursue this goal in two ways:

1. By improving the quality of information flow and
2. By highlighting successful adoption of technologies



US Trucking Fuel Costs



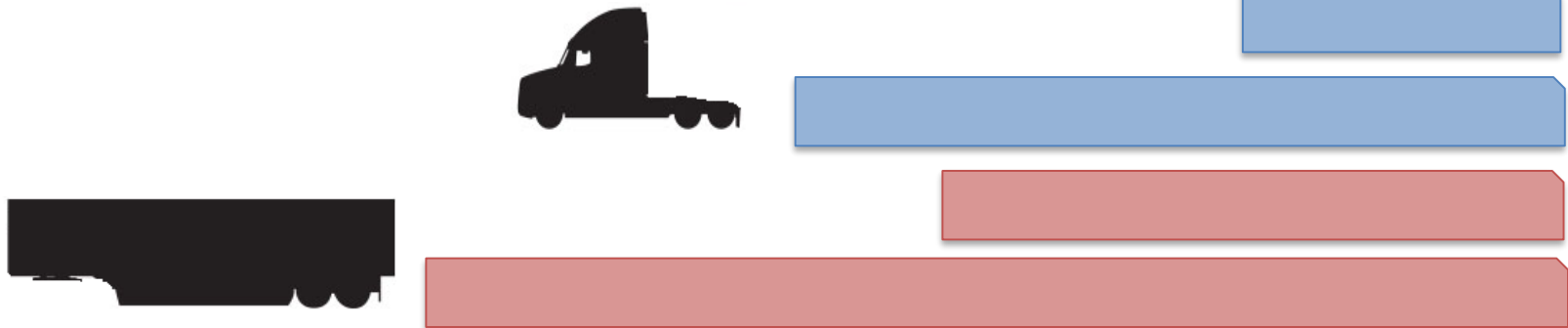
Weekly U.S. No 2 Diesel Retail Prices

DOWNLOAD

Dollars per Gallon



Source: U.S. Energy Information Administration



4th Annual Fleet Fuel Study



Real Fleets.
Real Experience.



Fuel Economy Technologies



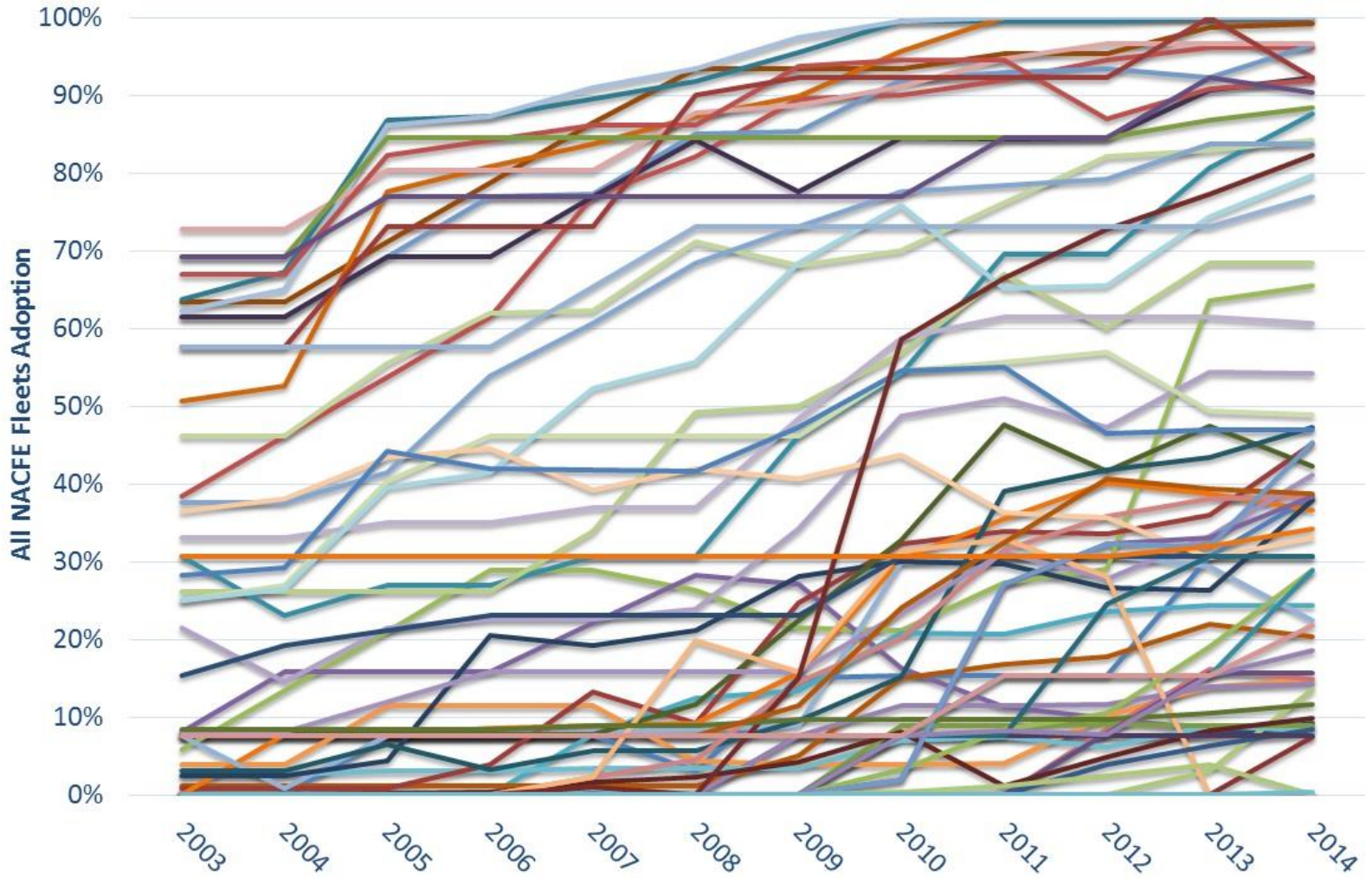
- Which ones are most popular on new trucks?
- Did they keep buying them?
- Are they delivering fuel savings?



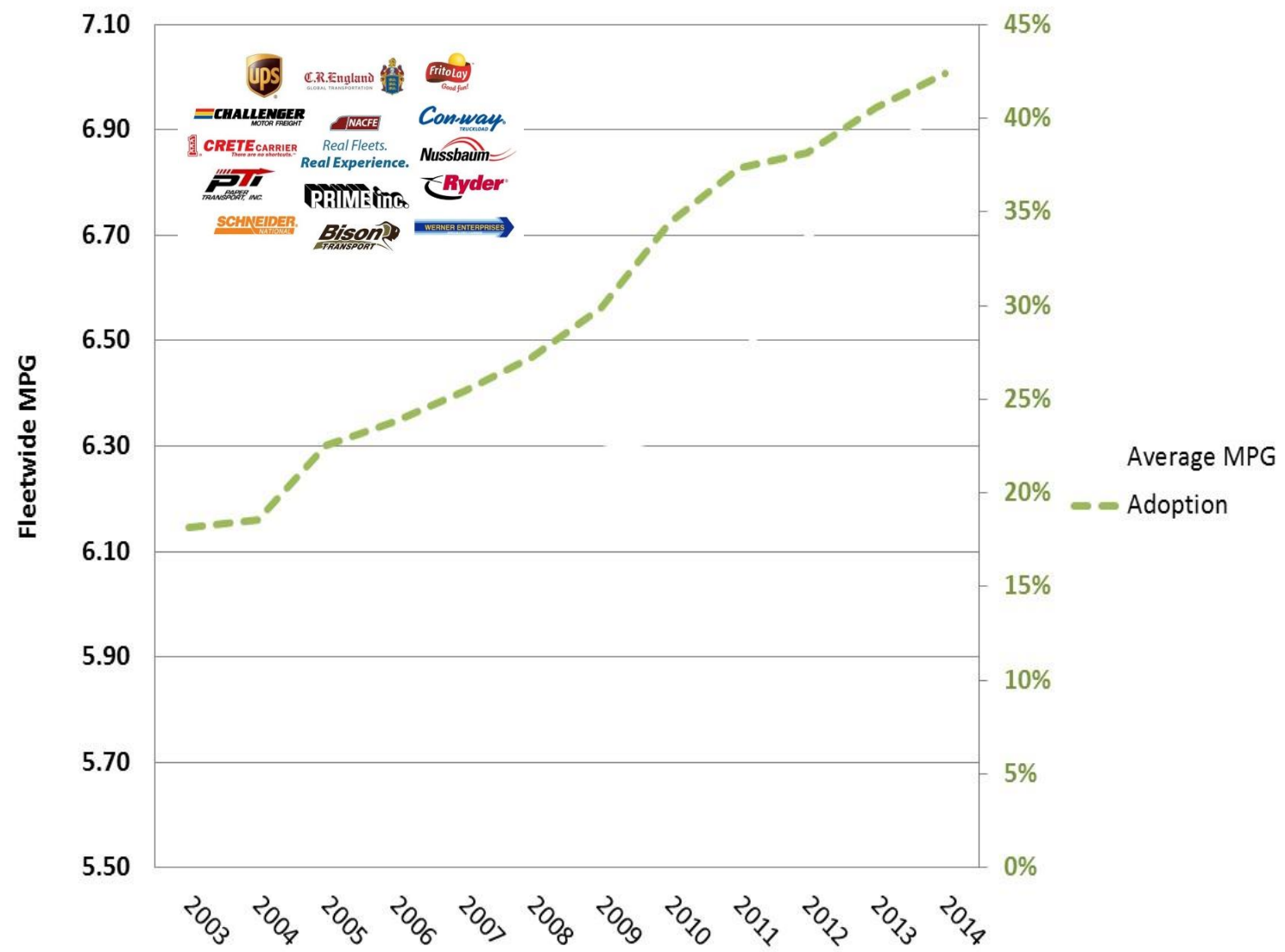
<http://nacfe.org/wp-content/uploads/2015/05/NACFE-2015-Annual-Fleet-Fuel-Study-Report-050115.pdf>



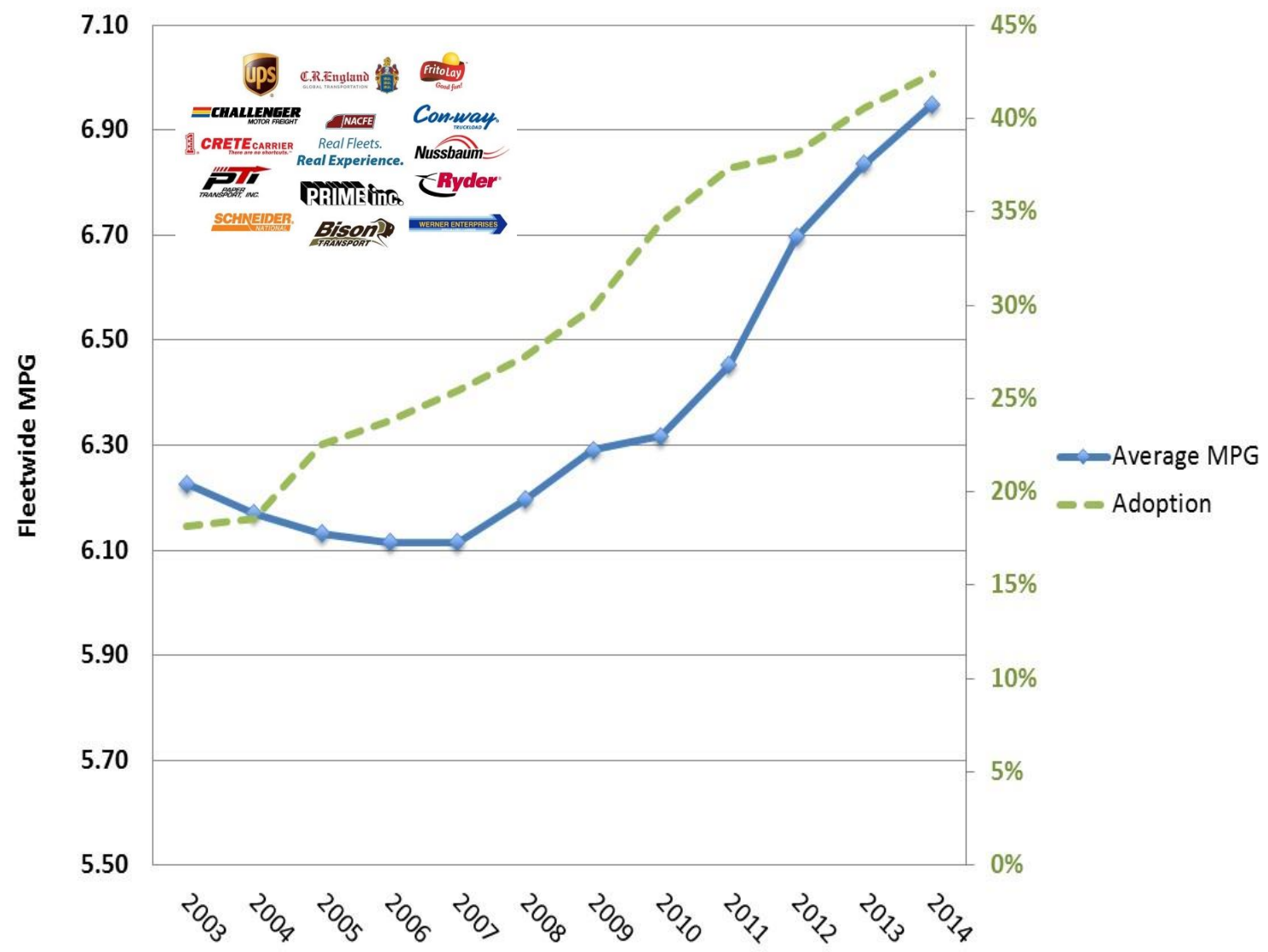
All Technologies



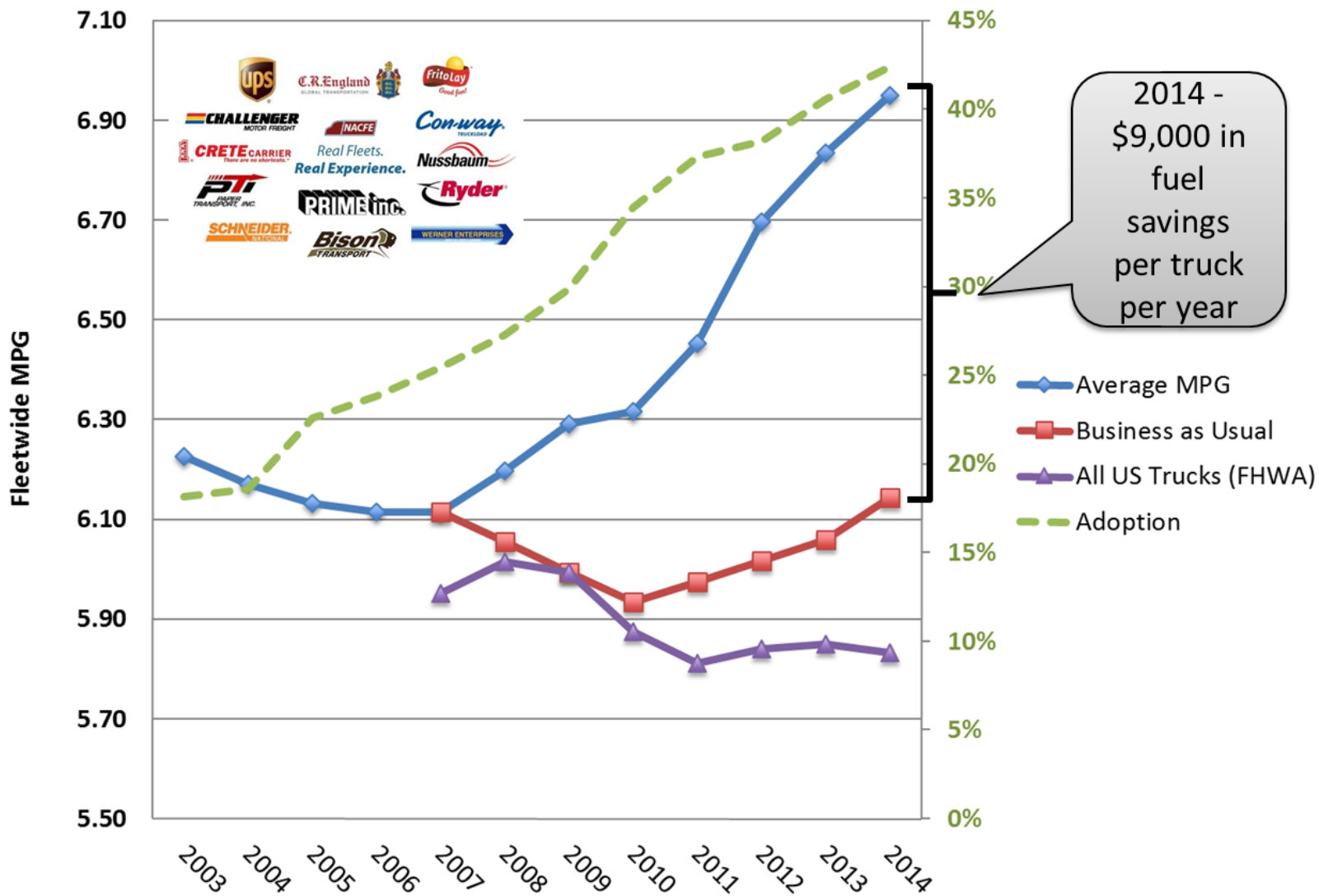
IFTA MPG and Adoption Percent Over Time



IFTA MPG and Adoption Percent Over Time



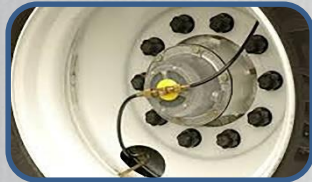
IFTA MPG and Adoption Percent Over Time



Confidence Reports



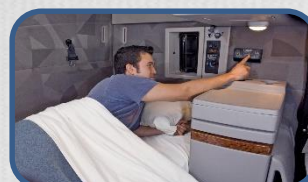
Complete, unbiased review of available technologies for fleet confidence to adopt.



Tire Pressure Systems



6x2 Axles



Idle Reduction



Transmissions



Engine Parameters



LRR Tires



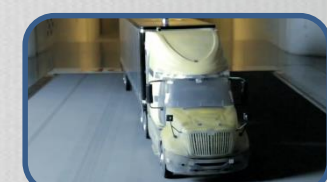
Lightweighting



Downspeeding



Maintenance for FE



Determining Efficiency



Trailer Aerodynamics



Tractor Aerodynamics



Lubricants



Engine Accessories



Platooning

www.truckingefficiency.org



Mfrs + DOE = SuperTruck



<http://energy.gov/articles/infographic-how-supertruck-making-heavy-duty-vehicles-more-efficient>

- 50% More Efficient
- Four Teams
 - Cummins Peterbilt (10.7 mpg)
 - Daimler (12.3 mpg)
 - Volvo
 - Navistar
- Many Technologies
 - Waste Heat Recovery
 - Aerodynamics
 - Hybridization
 - Idle Reduction
 - Tires, wheels, LW8ing, etc.
- SuperTruck II awards in Fall '16



Path to Autonomous Trucking



- Early Adopters
 - Ag, Mining, Defense, Ports
- Evolution rather than Revolution
- Peloton, Daimler “2025”, Freightliner Inspiration, European Platoon Challenge, etc.
- Implications
 - Safety, Efficiency, Driver fatigue/attraction, Congestion
 - Technical, Legal, Social
 - Where is the value?



Path to Autonomous Trucking



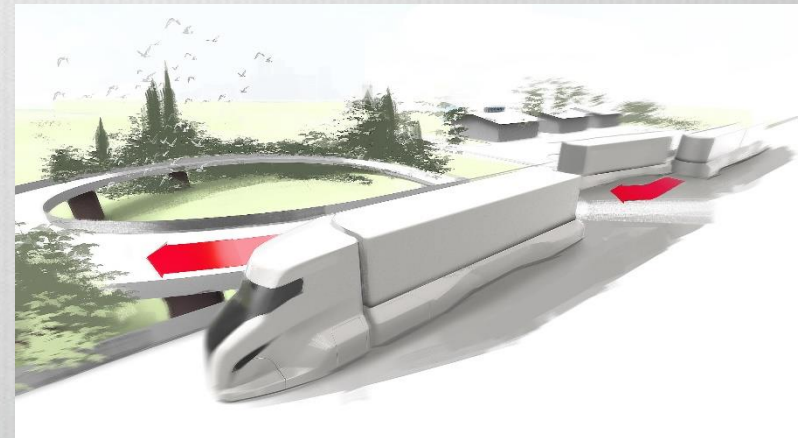
- Levels
 - L0 No automation
 - L1 Assisted
 - L2 Partially Automated
 - L3 Conditional Automation
 - L4 Very High Automation
 - L5 Full Automation “Driver-less”
- Demonstrations



L1: Peloton 2 Truck Platooning (2014)



L3: Daimler Highway Pilot Connect (2016)



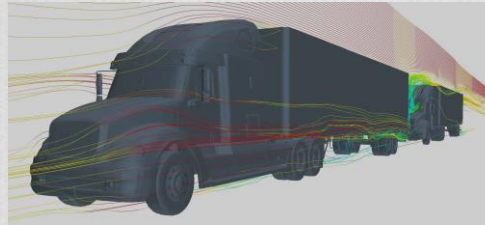
L5: Volvo SlipStream Concept (2015)



Fuel Economy Testing Examples



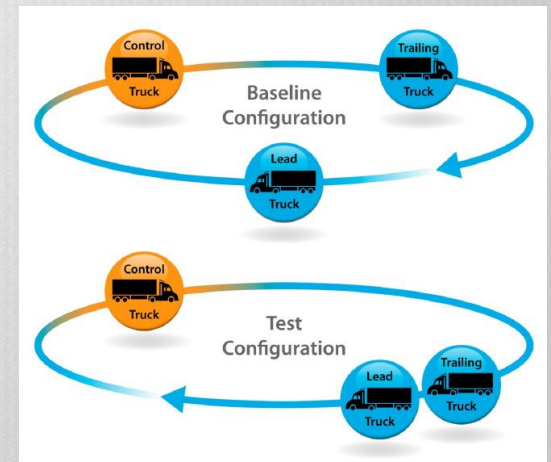
About 9% trailing truck and 4% on lead yielding 6.5% combined average.



<http://nacfe.org/wp-content/uploads/2016/01/Peloton-NACFE-Fuel-Test-Report-120213.pdf>



http://energy.gov/sites/prod/files/2015/07/f24/vss006_salari_2015_o.pdf



<http://www.nrel.gov/docs/fy15osti/62644.pdf>



NACFE Study - Findings To Date



- Valid/proven fuel-saving strategy for fleets
- Bulk of required technology currently available
- Intervals not as close as widely believed
- Minimal stress on drivers
- Will likely begin as inner-fleet option
- Will likely become extra-fleet option quickly
- Will expedite autonomous driving tech



Current Platooning Concerns



- Stress/impact on drivers
- Safety
- Accessibility (How often will it be an option?)
- Will drivers do it?
- Cost
- Calculating fuel savings
- Privacy/security



MPG Timeline



Scaling Current Techs
(~ 9 mpg)



Bringing SuperTruck(s) to
Market (~11 mpg)



Platooning (~12 mpg)



Highly Automated
Driving (~12+ mpg)

2016

2021

2026



Trucking Efficiency



Save Fuel, Less Emissions

- Confidence Reports
- Decision-Making Tools
- Workshops / Industry Events
- Tech Guide at www.truckingefficiency.org
- Helping you profit within GHG
- Thought Leadership
- Collaboration
- [2016 Run on Less Roadshow](#)

