Clean Diesel Technology in Goods Movement: *Talking Freight Webinar*

U.S. Department of Transportation
Federal Highway Administration

May 15, 2019

DIESEL TECHNOLOGY FORUM

Topics Covered Today

- Prevalence of Diesel in Goods Movement
- Existing Clean Diesel Technologies & Benefits
- More to Come from the Near-Zero Emissions Diesel Platform
- Advanced Biofuels Boost Diesel's Sustainability Credentials

DIESEL TECHNOLOGY FORUM

About Us

The Diesel Technology Forum is supported by leaders in advanced diesel engines, vehicles, equipment, components and fuels

- AGCO
- Bosch
- Caterpillar Inc.
- CNH Industrial
- Cummins Inc
- Daimler
- Delphi Automotive
- Deere & Company
- FCA
- General Motors
- Garrett Motíon
- Isuzu Motors
- Johnson Matthey
- Mazda North American Operations
- MTU America
- Neste
- Renewable Energy Group
- Umicore
- Volvo Group
- Yanmar

Allied Members

- National Biodiesel Board
- Western States Petroleum Association

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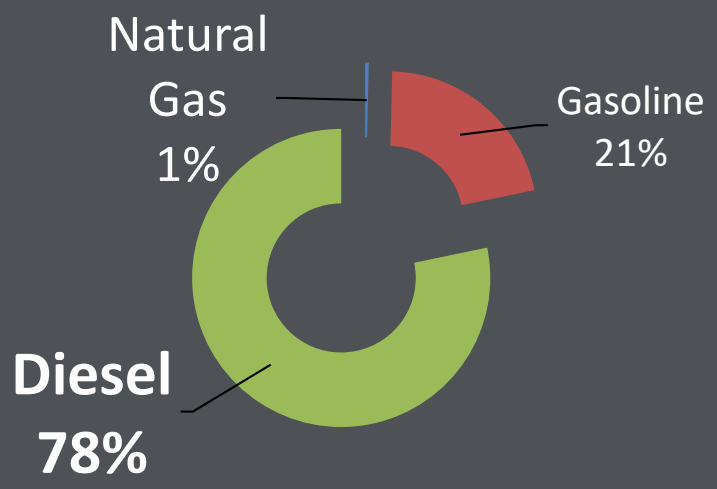
Diesel is the Prime Mover of Freight Transportation

Technology Breakdown in Class 3-8 Trucks



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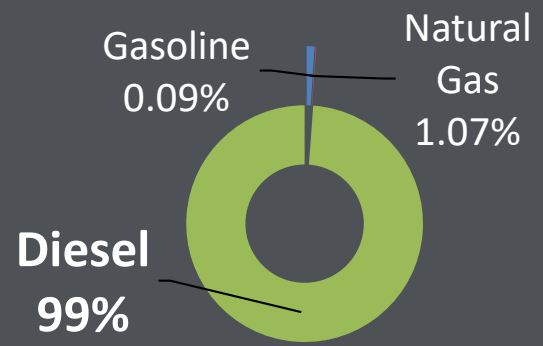

WHY DIESEL?

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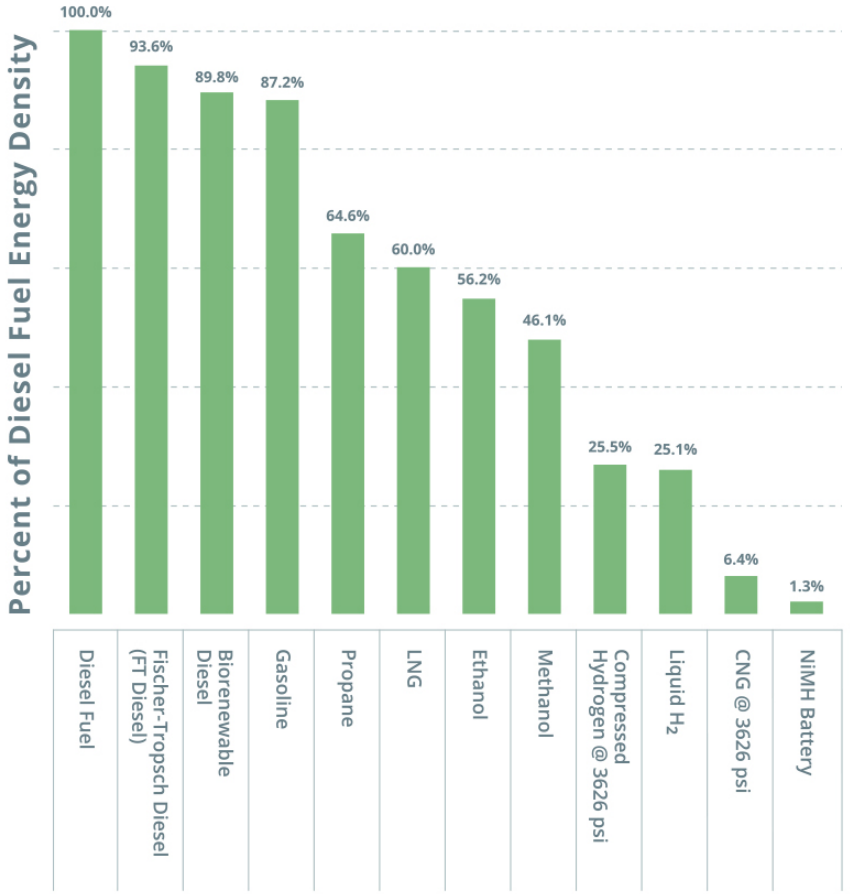
www.dieselforum.org

NO OTHER TRANSPORTATION FUEL COMES CLOSE TO DIESEL

More people and goods can be moved on a gallon of diesel than any other transportation fuel.

Diesel is the **most energy dense** transportation fuel

Source: U.S. Department of Energy



A Long List of Benefits Make Diesel A Prime Technology

Most energy efficient internal combustion engine,

Power density,

Reliability,

Durabilty,
Low cost of ownership,

Resale value,

Remanufacturing opportunity,

Nationwide fuel availability,

Unmatched global service and parts network,

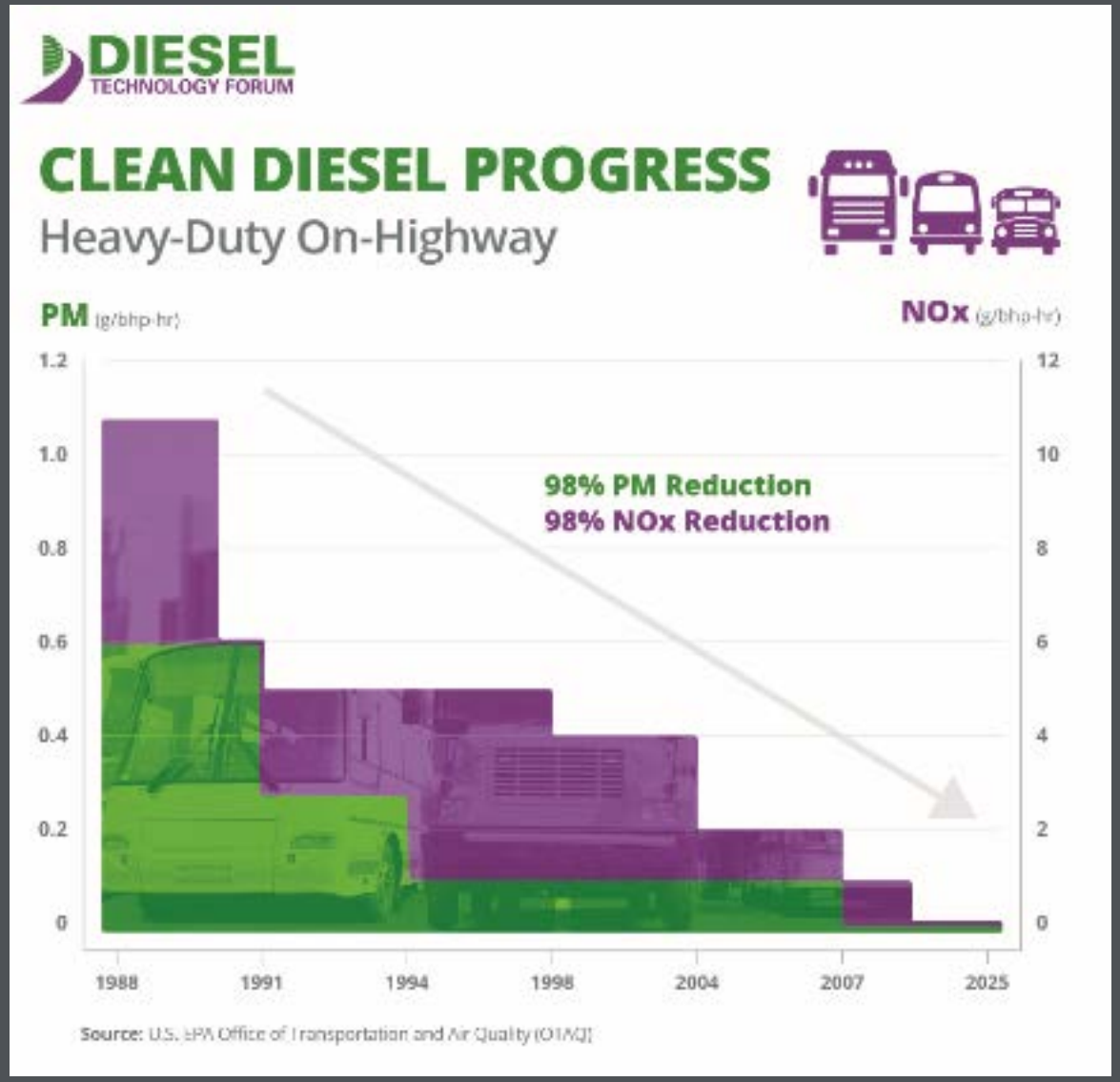
Near zero emissions performance,

Compatability with renewable fuels,

Compatability with hybrid systems,

Proven track record for continuous improvement

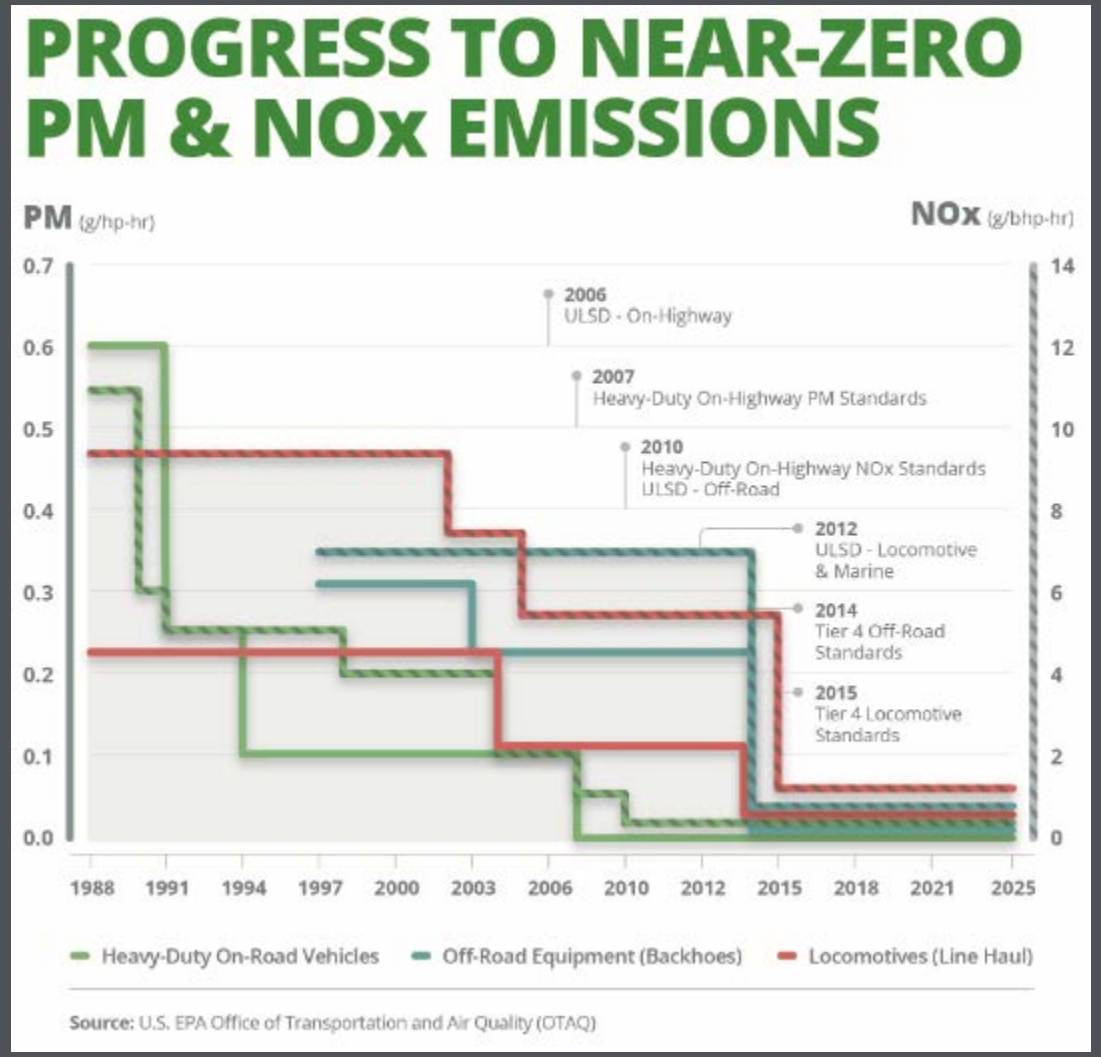
Latest Diesel Advances Reduce Emissions and Save Fuel



Benefits of the Latest Clean Diesel Technologies

- 36% of Commercial Vehicles Come with Technology to Meet the Latest Emissions Milestone
- Saved 26 million tons of NOx emission
  - Equivalent to removing all cars from the road for 4 years
- Eliminated 1.5 million tons of fine particle emissions
  - Equivalent to removing all cars from the road for 13 years

Near Zero Emissions Performance of Goods Movement Equipment



Trucks, Buses, Locomotives, Marine Vessels, and Cargo Handling Equipment are All Part of the Clean Diesel Success Story

GHG & Fuel Economy Benefits Delivered by Diesel

Phase 1: 2014 – 2018

530 million gallons of fuel saved

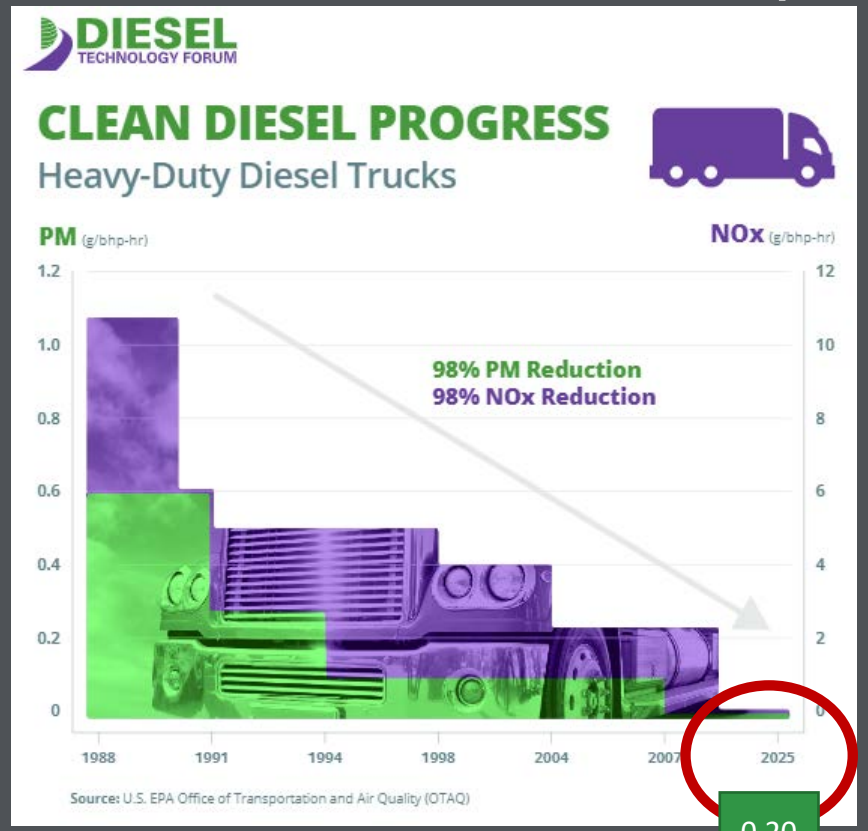
270 million tons of GHG eliminated

Phase 2: 2021 – 2027

2 billion gallons of fuel saved

1 billion tons of GHG eliminated

The Diesel Truck of the Future Will Sip Less Fuel and Be EVEN Cleaner



0.20 to… ?

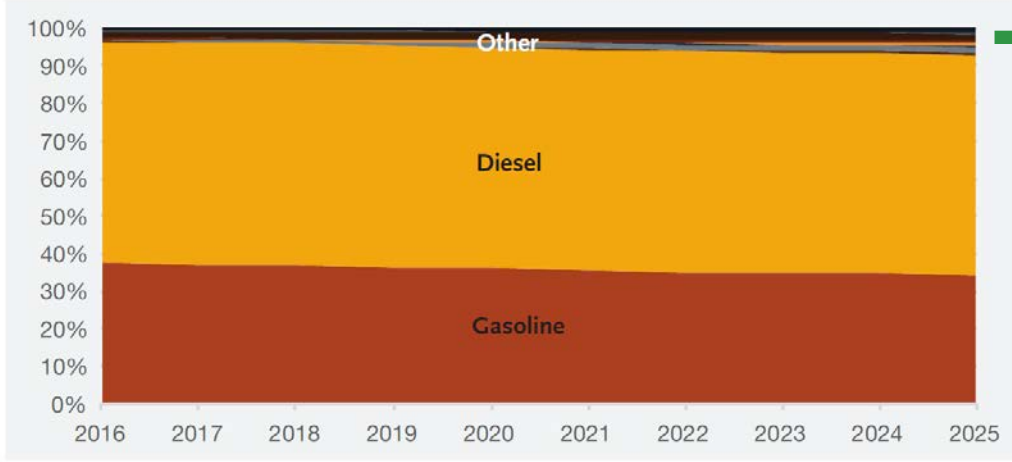
This value will get even closer to zero!!
Both fine particles and NOx Emissions

Cleaner Trucks Initiative ***November 13, 2018***

Truck and engine manufacturers and other stakeholders are hard at work supporting efforts to take near-zero emissions diesel engines closer to zero through a new engine standard for NOx and PM.

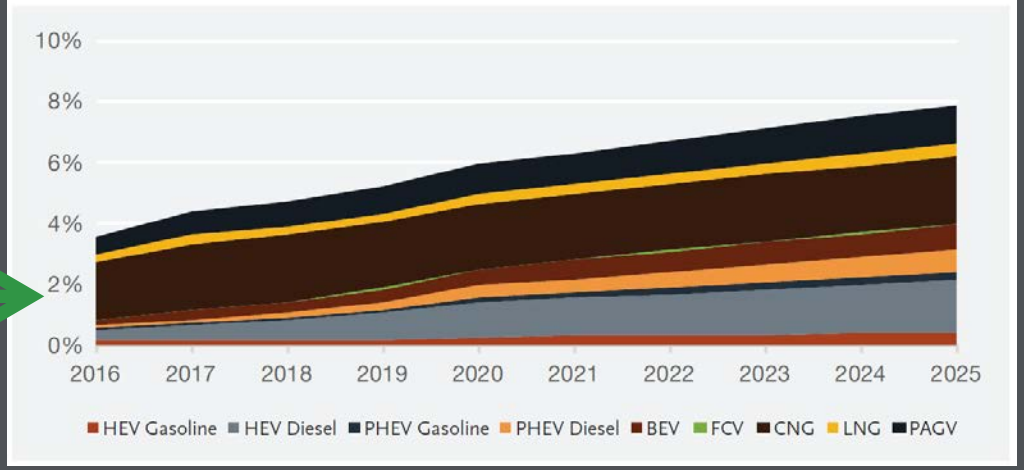
Will Diesel Still be With Us? YES

Figure 19a U.S. Market Share of Commercial Vehicle Sales (Base Scenario)



(Sources: Navigant; Fuels Institute)

Figure 20b U.S. Market Share of Commercial Alternative Powertrain Vehicle Sales (Aggressive Scenario)



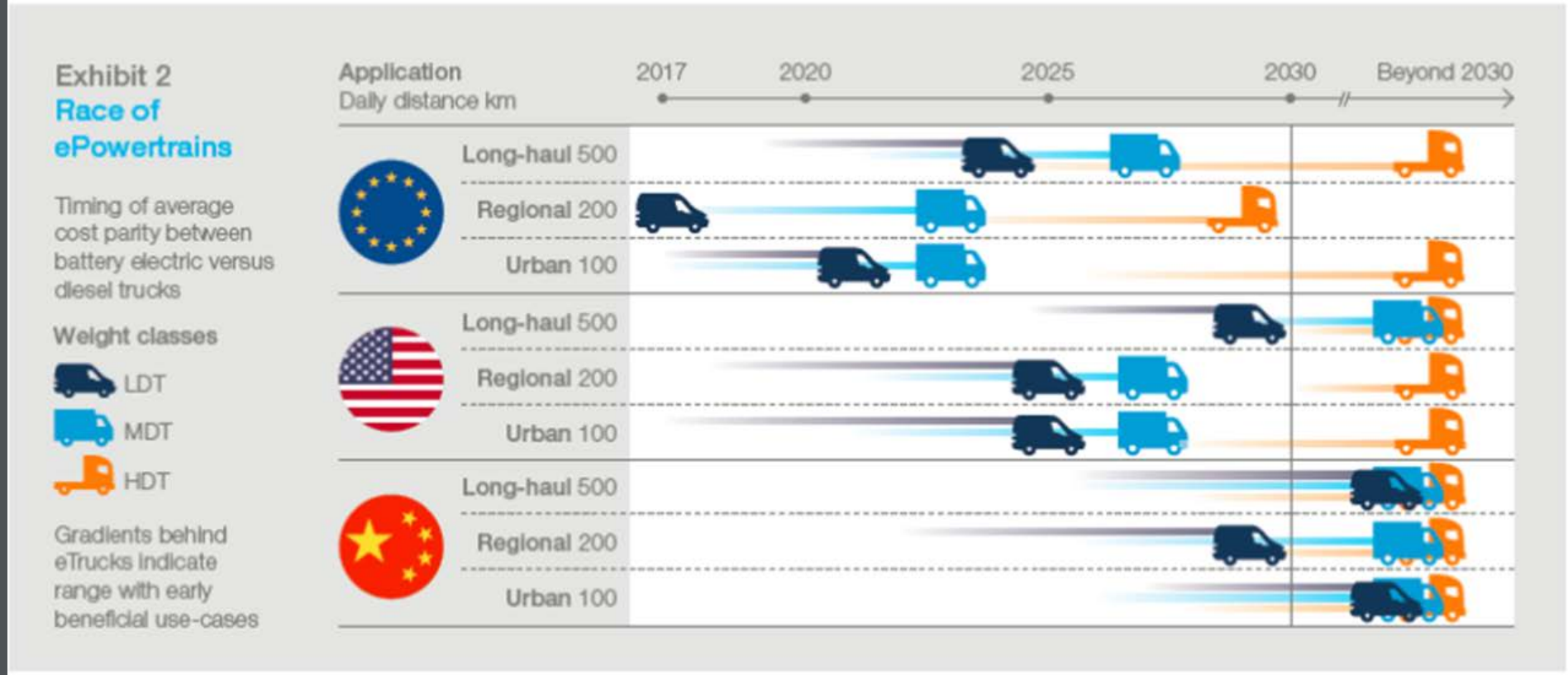
In the near future, truck buyers will have more technology to choose from…but diesel will still be the dominant technology and fuel type.

Fuels Institute

Tomorrow's Vehicles
A Projection of the Medium and Heavy Duty Vehicle Fleet Through 2025

Which Powertrain Will Win the Sustainability Race?

Exhibit 2: Race of ePowertrains



Source: McKinsey Energy Insights, McKinsey Center for Future Mobility

https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/whats-sparking-electric-vehicle-adoption-in-the-truck-industry

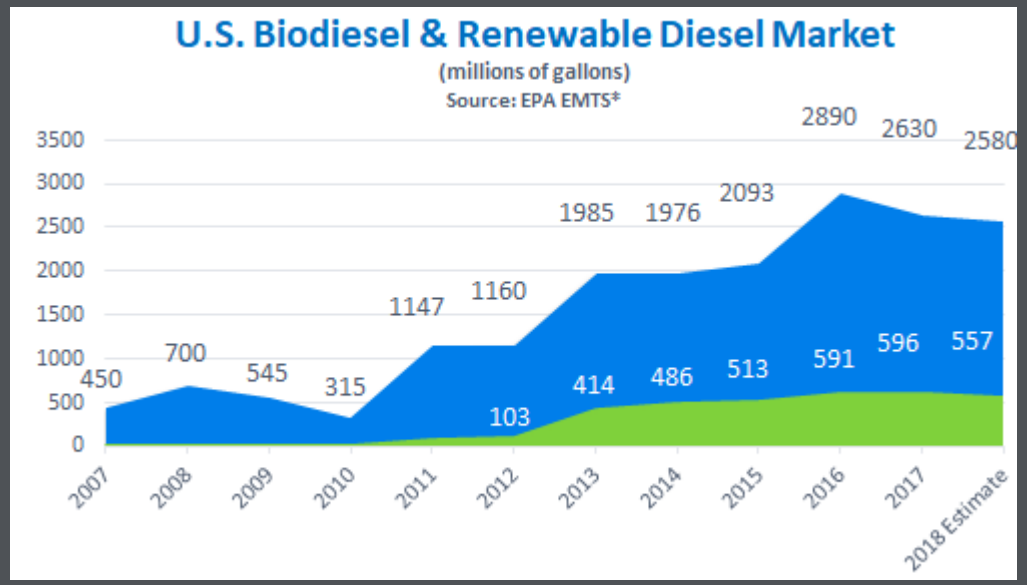
Boosting Diesel's Sustainability Credentials with Biofuels

Advanced Biofuel - means renewable fuel, other than ethanol derived from cornstarch, that has **lifecycle greenhouse gas emissions** that are at least **50 percent less** than baseline lifecycle greenhouse gas emissions.

A clean, domestic, sustainable, renewable fuel for diesel engines made from fats and oils, such as soybean oil and used cooking oil

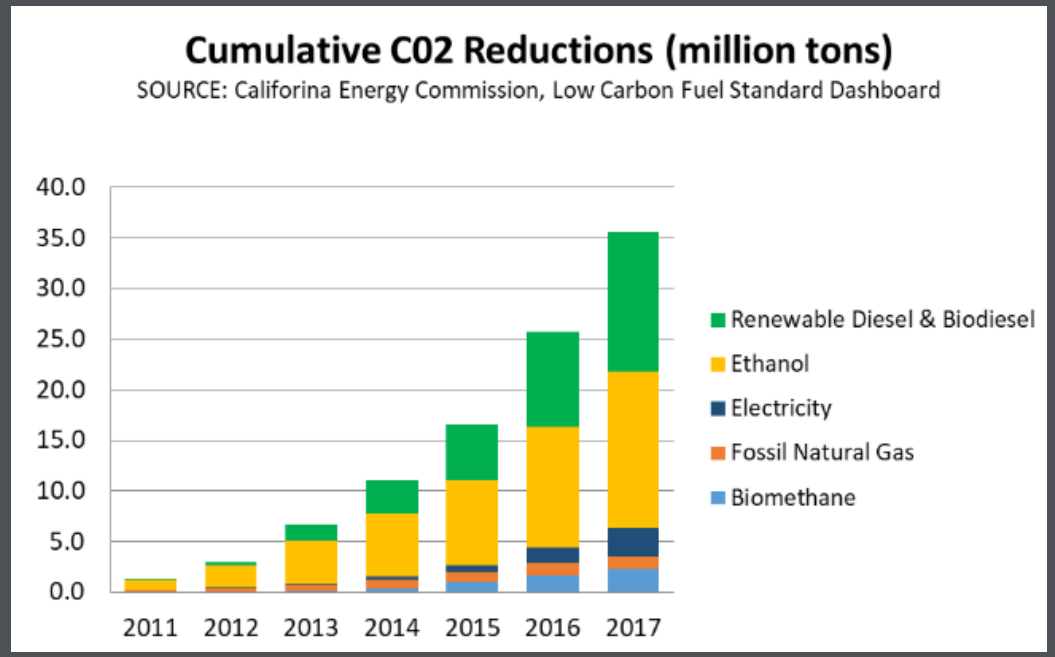
Biodiesel

Renewable Diesel Fuel



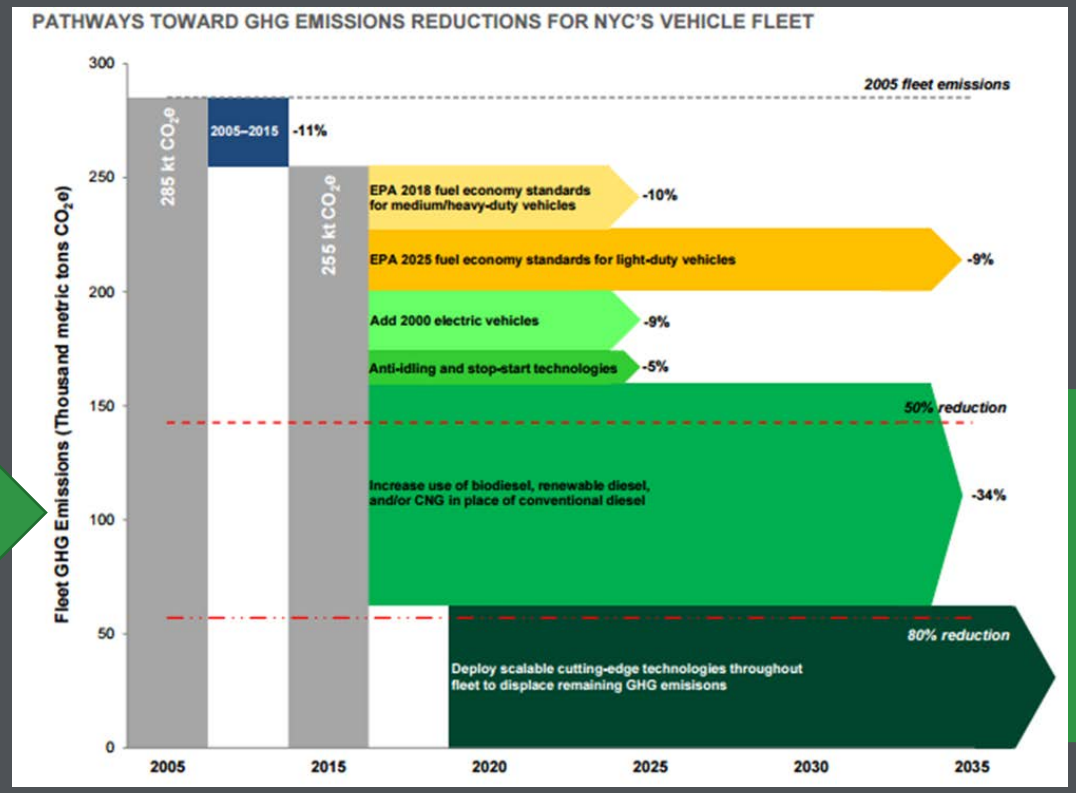
These advanced low carbon fuels are ready today!

Advanced Biofuels + Diesel = Rapid CO2 reductions, broad applicability



You want to reduce emissions immediately? You don't need to go all-electric. You might need to switch to biofuels. Just look what **California** accomplished

Look at all that green! **NYC's** planned use of biodiesel and renewable diesel fuel is expected to generate far more benefits than the incorporation light duty EVs



How Diesel Will Compete in the Future

Expanded Use of Renewable Fuels

Taking Near Zero Emissions Closer to Zero

Continuous Improvement of the Core Technology

Hybridization Where it Makes Sense

Continue to Deliver Unique Combination of Value to Customers

Summing it Up

Diesel is the Prime Technology that Moves Freight

Decades of Innovation in Near-Zero Emissions from the Diesel Platforms is Generating Benefits in Communities Across the Country

The Diesel Platform will Get Cleaner and ṂMore Efficient and Will Be Part of Out Clean and Sustainable Future

Engine and Truck Manufacturers Are Hard at Work Developing Closer-To-Zero Emission Reduction Technologies Alongside Stringent Fuel Economy Rules

Big Benefits Can Come From the Use of Advanced Biofuels Including Biodiesel and Renewable Diesel Fuel

Thank You

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