

MSHA/NIOSH Diesel Technology Workshop

# Diesel Emission Control Technology

Washington DC, January 23<sup>rd</sup>, 2019, Paul Sparenberg

# Paul Sparenberg

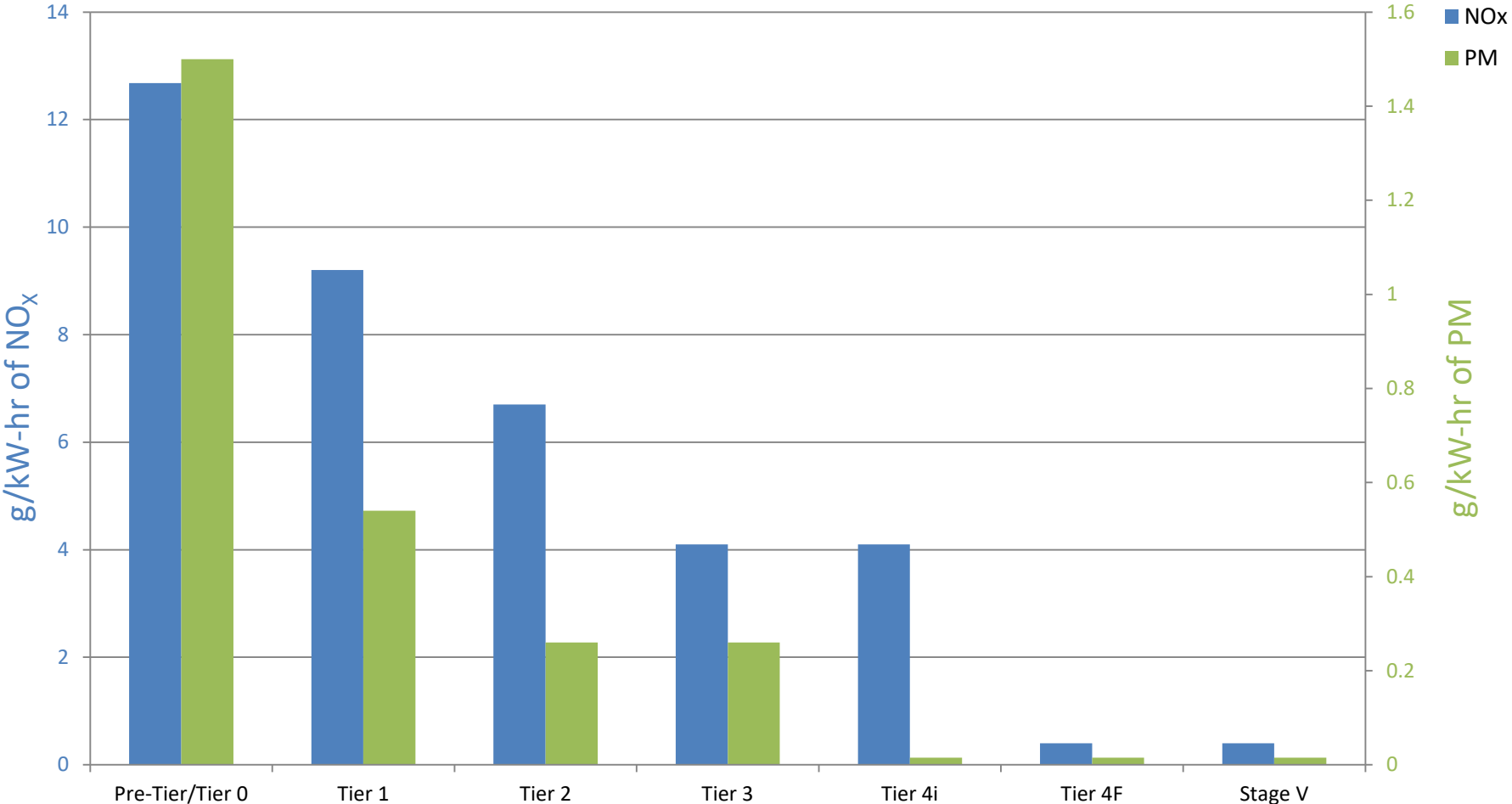
- University of Illinois at Urbana-Champaign
  - Technical Systems Management
- AGCO Corporation: *6 years*
  - Marketing & Sales
- MTU America, Inc.: *7+ years (Current)*
  - Sr. Sales Manager, Construction & Agriculture
- Associations: MDEC, AEM, AED



# Diesel Emissions Over Time



# Diesel Emissions Over Time











Data from [https://www.arb.ca.gov/msei/ordiesel/ordas\\_ef\\_fcf\\_2017.pdf](https://www.arb.ca.gov/msei/ordiesel/ordas_ef_fcf_2017.pdf)



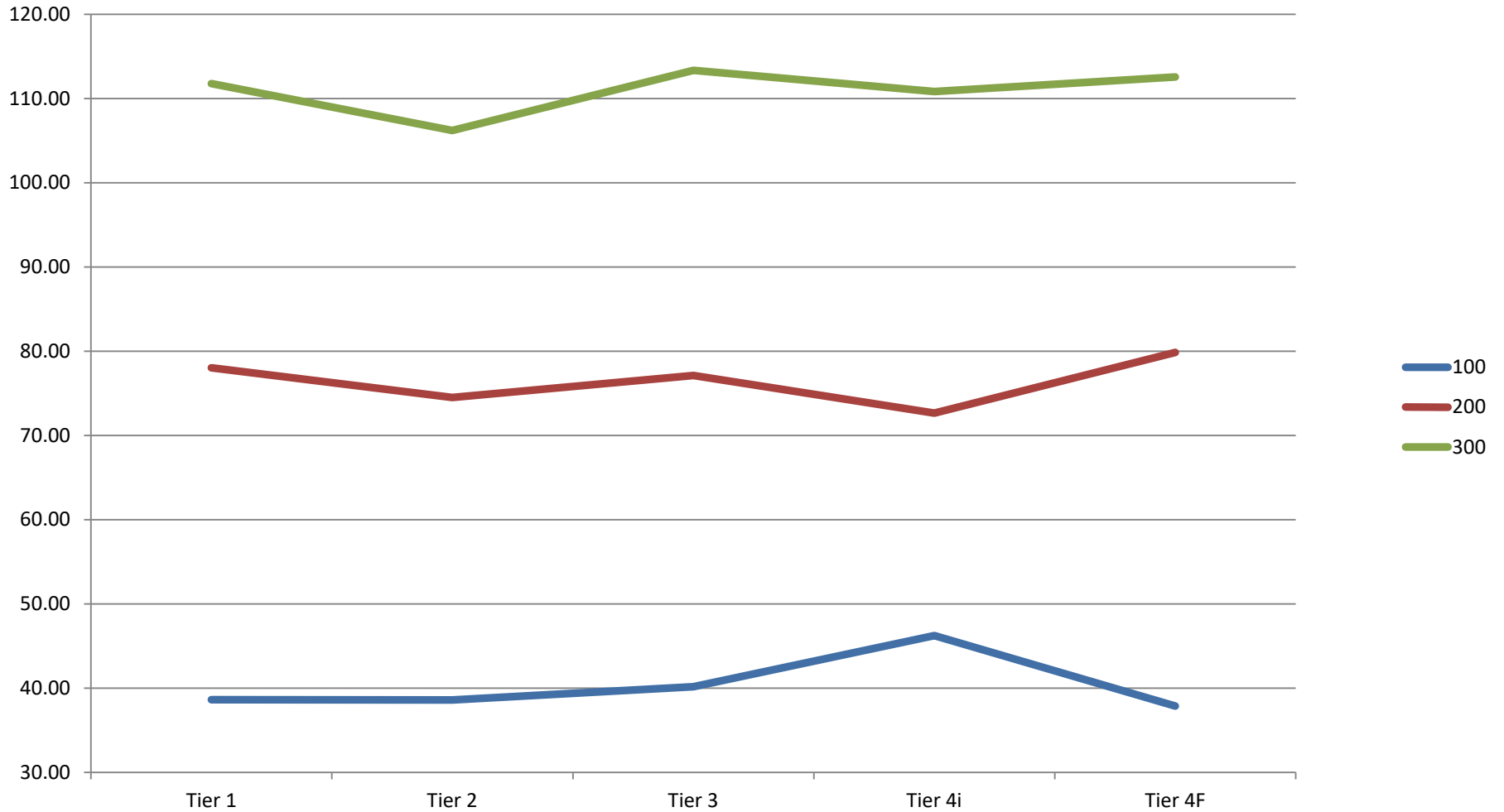
# Diesel Emission Control Technology

- In just over 20 years, on-engine advancements have...
  - reduced NO<sub>x</sub> by 97%
  - reduced PM by 99%

Acquisition Cost		Engine Efficiency	
Complexity		Maintenance Intervals	
Space Claim		Health & Safety	
Operating Cost		Operational Data	

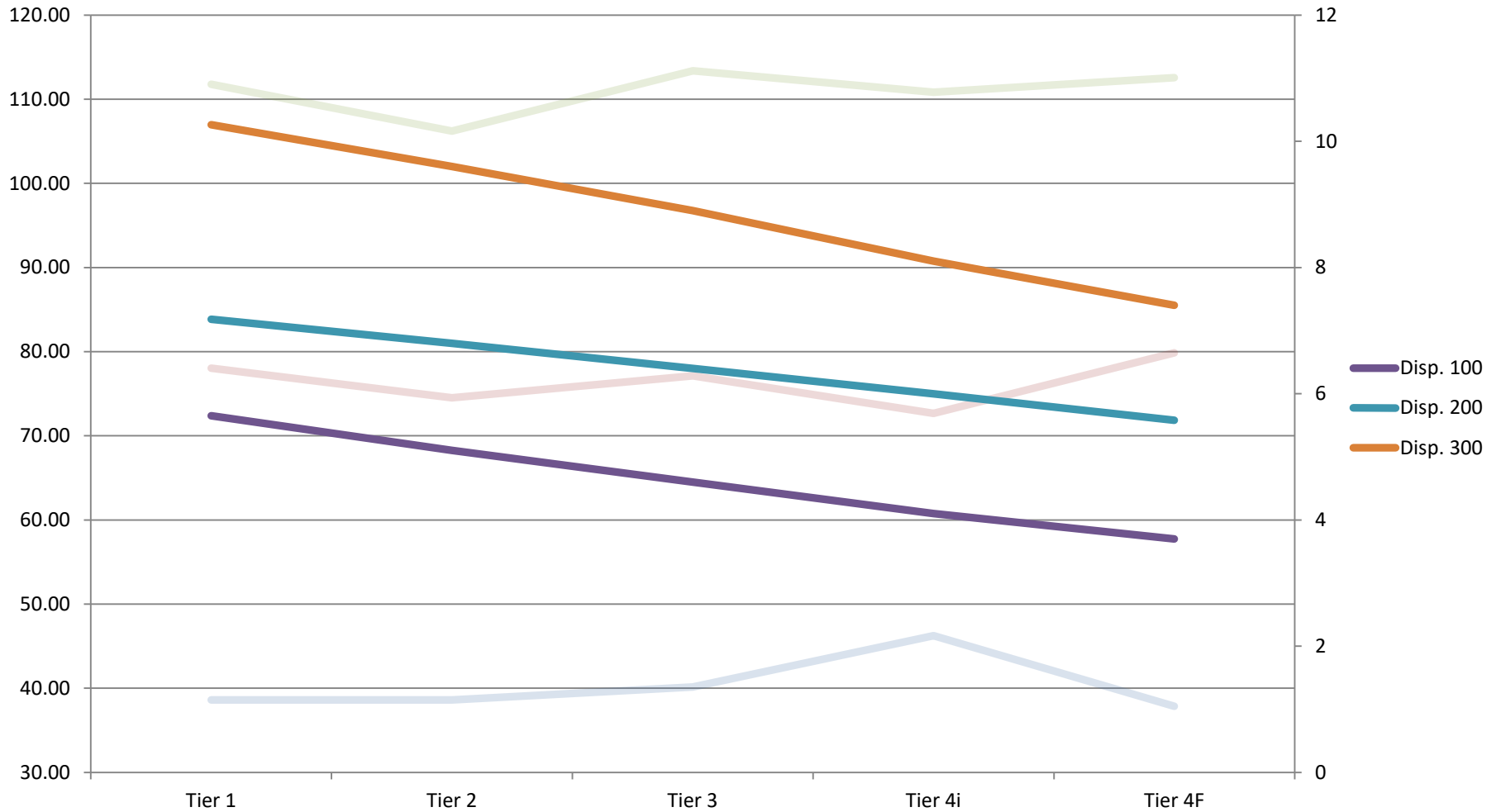
# Diesel Engine Efficiency – Fuel Economy

\*in lbs./hr., data per CARB



# Diesel Engine Efficiency – Engine Displacement (L)

\*data per CARB



# Diesel Engine Efficiency – Drivers

- Combustion advancements
  - Higher quality fuels and oils
  - Piston and component designs
  - More precise fuel injections
  - More precise air management
  
- End user benefits
  - More power and torque... less engine
  - Lower engine RPM
  - High degree of emission control in cylinder





# Maintenance Intervals

- Service intervals are getting longer
  - MTU/Mercedes-Benz @ 225 HP
  - Heaviest grade oil & application group
    - Tier 2 = 500 hrs.
    - Tier 4/Stage V = 1000 hrs.















- Bottom line effect of reducing oil change costs by 50%???
- How does this impact machine and personnel utilization???

## Other Benefits for Workers

- Less Noise
  - Less fatigue, distraction, strain on voice, etc.
- Less Vibration
  - Less pain, motion sickness, nerve issues, etc.
- Creates employees who are...
  - Happier, healthier, more alert, safer etc.
  - More loyal, increases retention, reduces training costs
  - Take pride in what they do and where they work



# The Cost of Tier 4 Engines

Acquisition Cost		Engine Efficiency	
Complexity		Maintenance Intervals	
Space Claim		Health & Safety	
Operating Cost		Operational Data	
		Less Displacement	
		Longer Component Life	
		Less Noise & Vibration	
		Increased Safety	

# Thank you!

