

MSHA/NIOSH Diesel Technology Workshop

Diesel Emission Control Technology

Washington DC, January 23rd, 2019, Paul Sparenberg

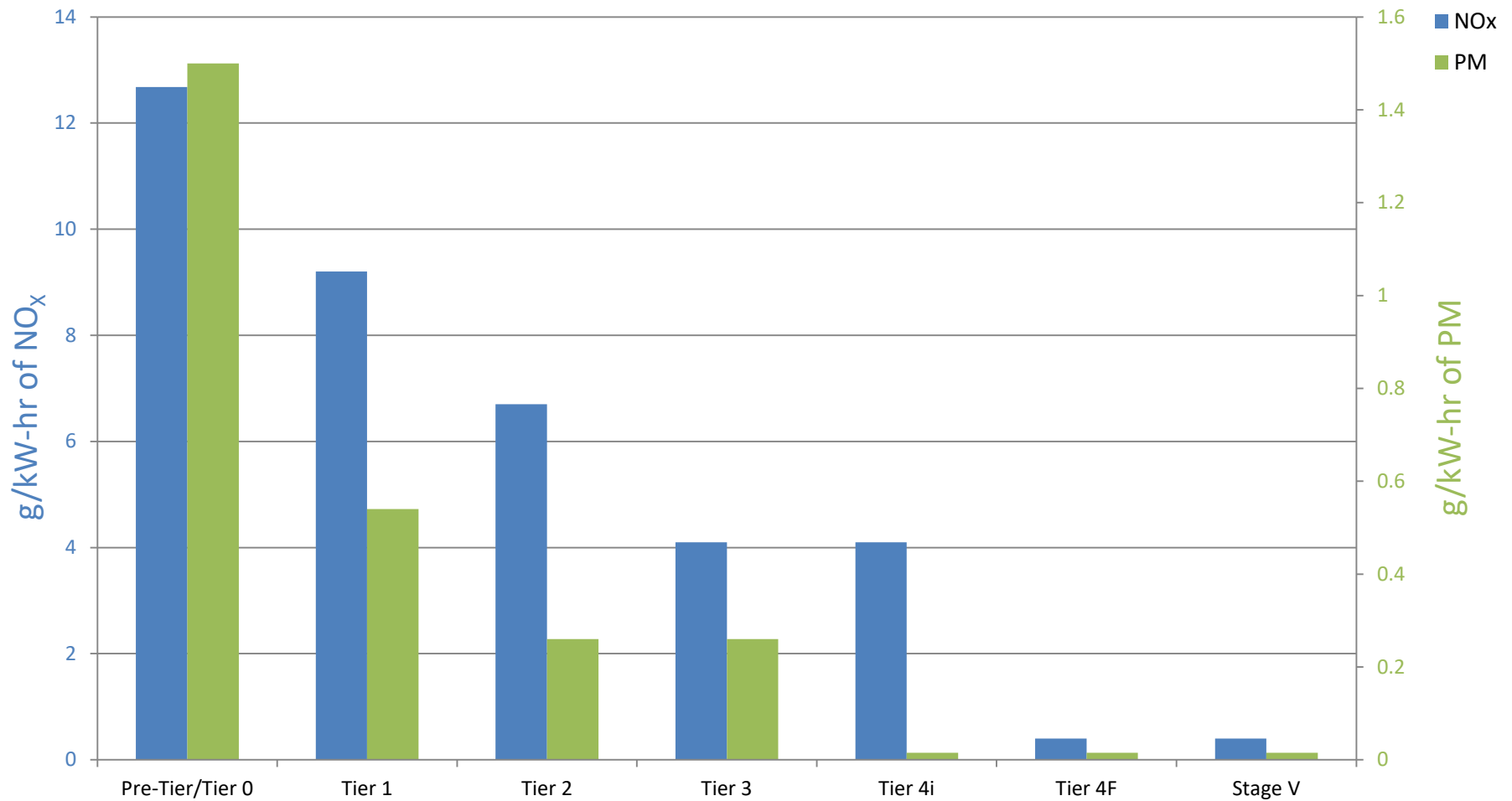
Paul Sparenberg

- 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

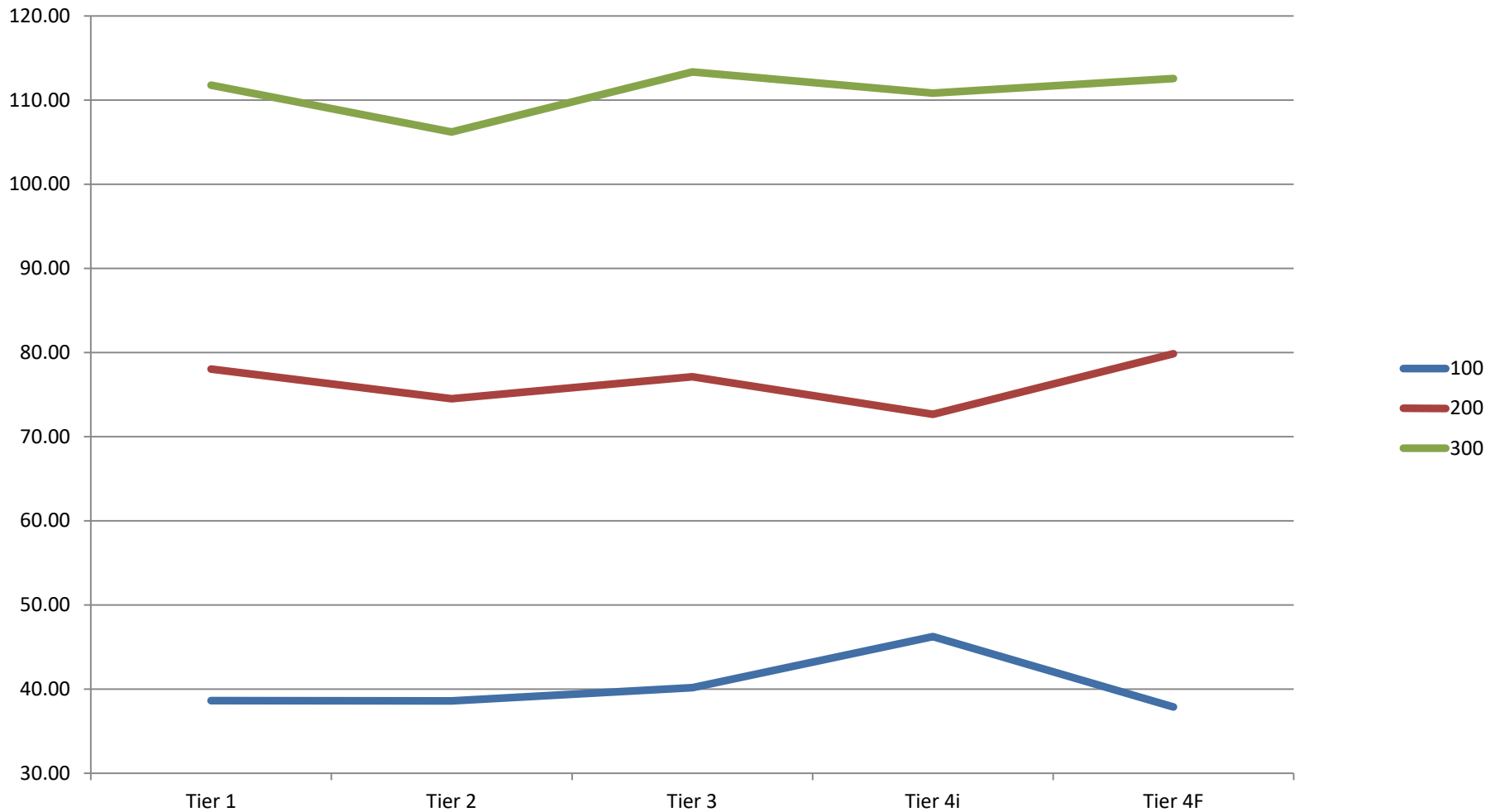
Diesel Emission Control Technology

- In just over 20 years, on-engine advancements have...
 - reduced NO_x by **97%**
 - reduced PM by **99%**

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

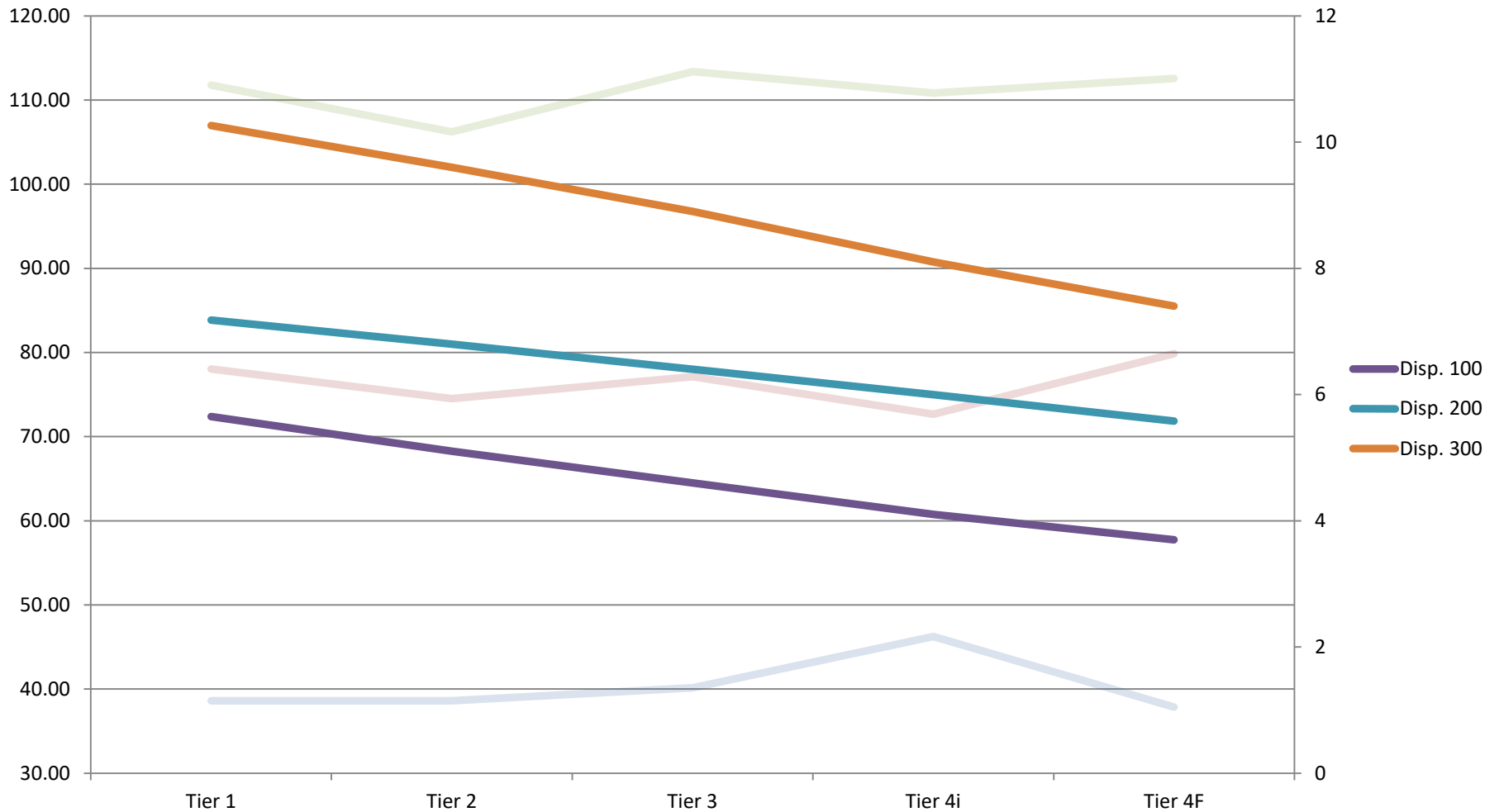
Diesel Engine Efficiency – Fuel Economy

*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!

