

USING ON-ROAD HEAVY-DUTY EMISSIONS MEASUREMENT SYSTEM FOR A HEAVY-DUTY VEHICLE INSPECTION AND MAINTENANCE PROGRAM

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HEAVY-DUTY VEHICLE INSPECTION AND MAINTENANCE PROGRAM

Motivation

Investigate a Heavy-Duty Diesel Vehicle (HDDV) Inspection and Maintenance (I/M) Program for the Dallas-Fort Worth (DFW) Region

Characterize Nitrogen Oxides (NO_x) Emissions from HDDVs Utilizing On-Road Heavy-Duty Measurement System (OHMS)

Investigate Other Technologies to Integrate with OHMS

Assess Data, Validity, and Implications for HDDV I/M or Screening Programs

Incorporate Efforts into Emissions Enforcement and Technology Developments

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Project Overview

Phase 2 Study Follow-Up to 2012 Phase 1 Study

Main Objectives for Phase 2 Study

**Identify and Test Refinements of System Design
Investigate Other Technologies to Integrate
Deploy Refined System for Real World Application**

**System Design Refinements and Other Technology Testing
Performed at Texas A&M Campus**

Field Study Deployment Performed at Texas Weigh Station

Partnered with Multiple Agencies

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Testing Technology

Technology Name and Entity Name	Type	Collected for Test Runs at TTI Campus	Average Difference from PEMS*
On-Road Heavy-Duty Emissions Measurement System; University of Denver	Shed Structure Technology Monitoring System	CO, CO2, NO, NO2, NOX Gases	9.2%
MultiGas 2030 FTIR; MKS Instruments	5 Hz Fourier Transform Infrared Spectrometer	CO, CO2, NO, NO2, NOX Gases	14%
SDM 5060**; E TEST Corporation	Remote Sensing Technology	CO2, NO2, NOX Gases	18.96%

*Average difference is computed on a run-by-run basis. **Some runs had NO2 injected leading to higher average NOX readings compared to other tests.

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OHMS Overview

Three Major Components:
Exhaust Collection
Vehicle Monitoring
Emissions Analysis



Photo Source: TTI

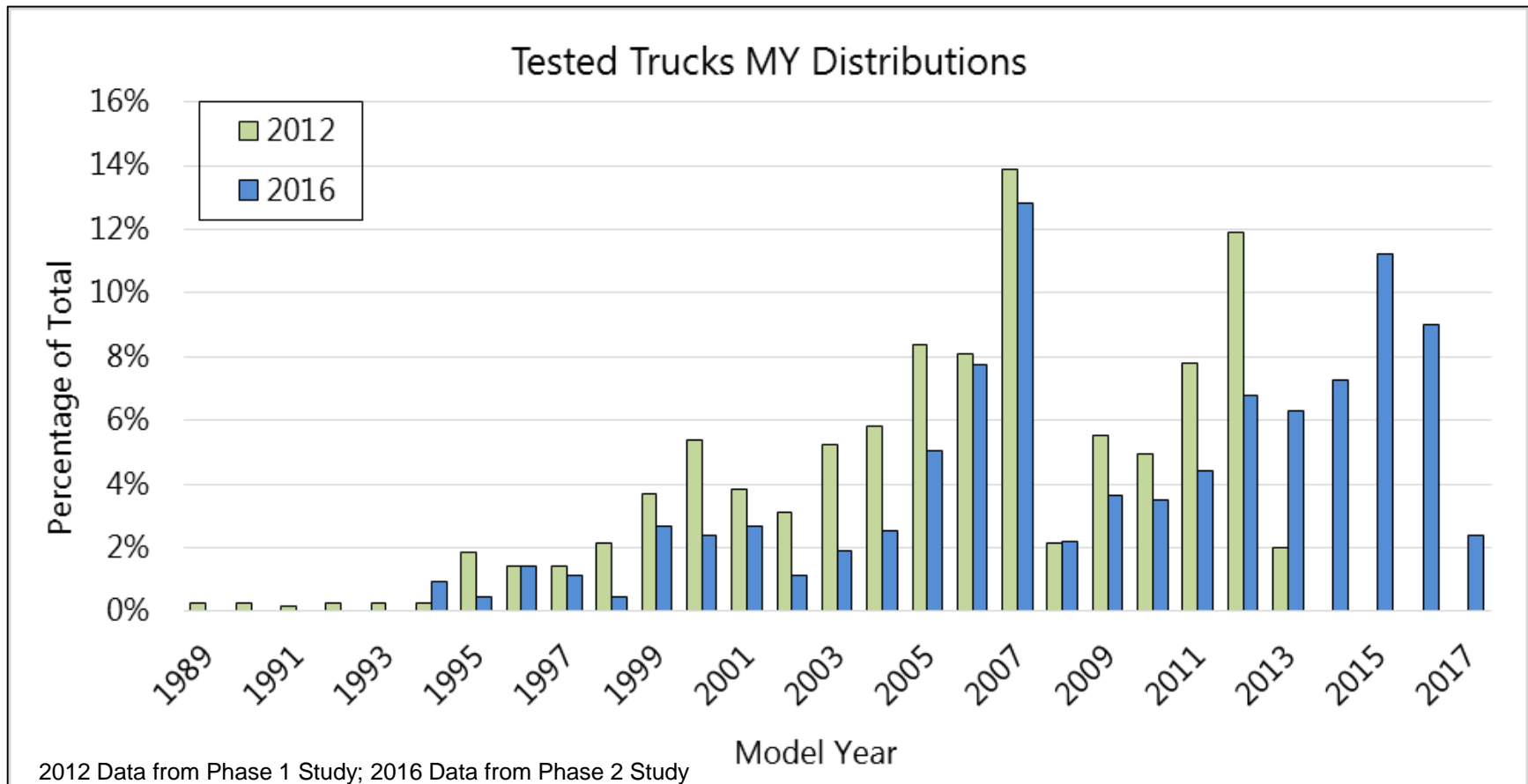
OHMS = On-Road Heavy-Duty Emissions Measurement System

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Field Study Results

Fleet Analysis:

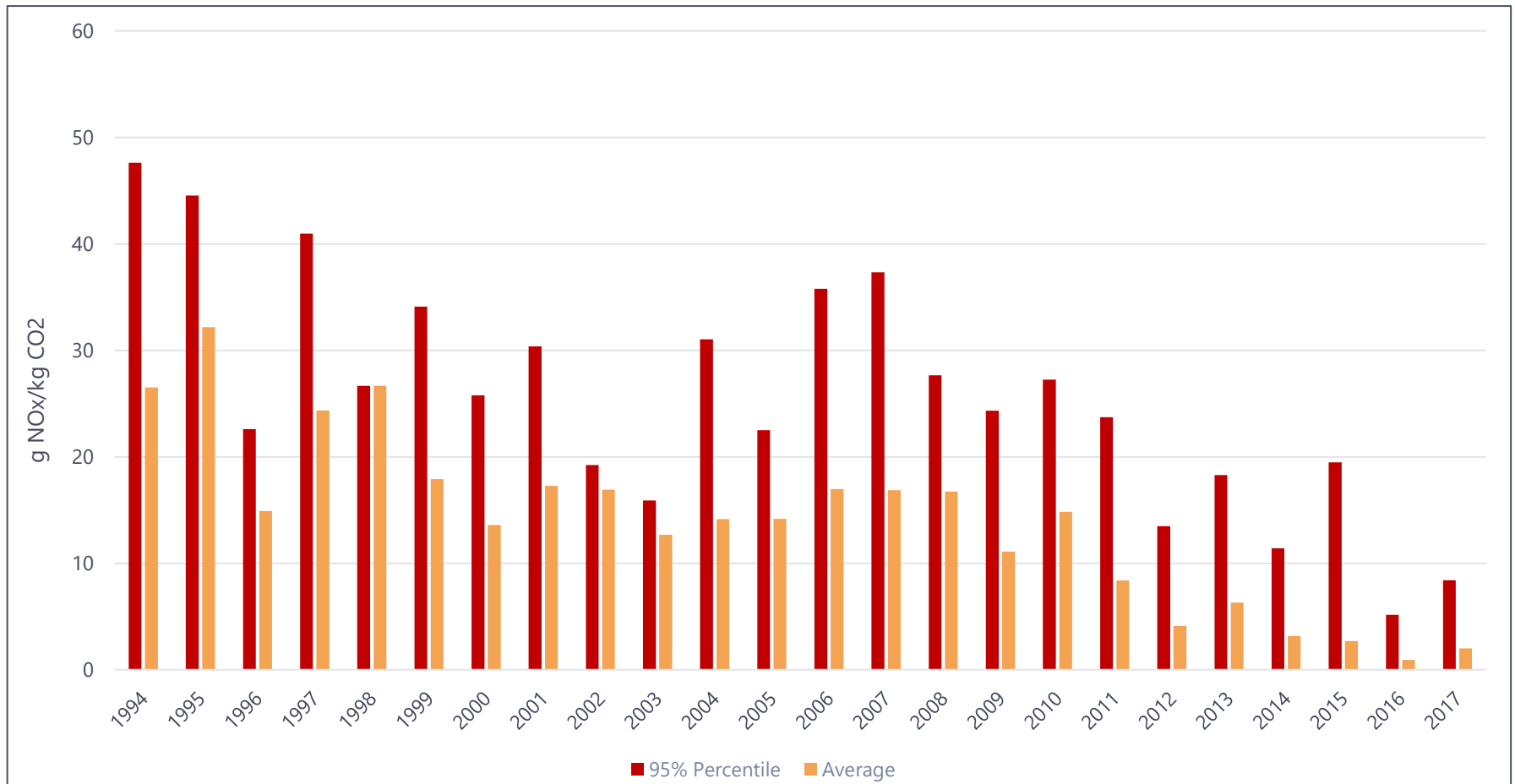
Model Year 2007 Trucks Peaked in 2012 and 2016



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Field Study Results

NOx Results by Truck Model Year



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Potential Emissions Reductions in DFW Area

Classifying High-Emitter (HE) as any Truck Higher than the 95th Percentile Within a Model Year (MY)

7.3% of Vehicles Accounted for **21%** of Total NOx Emissions

Potential Reduction of 5.15 tons/day NOx if HE Replaced with “Average” Vehicle from Same MY

Classifying HE as any Truck Higher than the 95th Percentile of Entire Fleet

Potential Reduction of up to 6.98 tons/day NOx Possible Depending on how the HE is Replaced

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Potential Applications

I/M Programs
Clean Screening of Vehicles

Identifying HE from a Fleet

Enforcement of Emissions
Reduction Devices



Photo Source: Getty Images

Diesel Emissions Control System

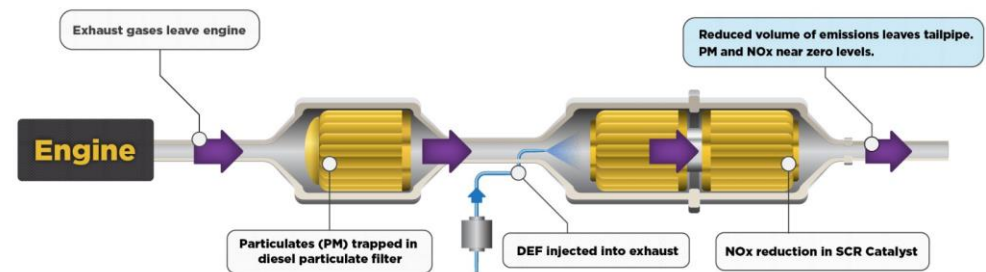


Photo Source: Diesel Technology Forum

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Considerations and Next Steps

Further Research:

Low Exhaust Stack Configurations

Light-Duty Vehicles

Truck Load Weights

Truck Speeds

Implementation Considerations:

Legislative Process

Funding

Deployment Locations and Enforcement

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Efforts Moving Forward

Develop International Stakeholder Working Group

Monitor Ongoing Research

Coordinate Common Technology Needs

Involve Emissions Testing Technology Manufacturers

Develop On-Road Inspections

Start with Visual Verification

Move Toward Integrated Technology

Perform Driver and Fleet Outreach

Promote Funding Opportunities

FOR MORE INFORMATION

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