



NGV  UP-TIME 



NGV U.P.-T.I.M.E. Analysis

Updated Performance Tracking
Integrating Maintenance Expenses

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

VEHICLE TECHNOLOGIES OFFICE



Clean Fuels Ohio

ENERGETICS

A Division of Akimeka, LLC



NGV UP-TIME



Project Overview



NGV UP-TIME: *Updated Performance Tracking Integrating Maintenance Expenses*

Led by Clean Fuels Ohio, this project will provide fleets, natural gas vehicle (NGV) industry stakeholders, and other end-users relevant, real-world information through a proven, multi-data set analysis approach detailing NGV maintenance costs to improve total cost of ownership calculations and to determine the maintenance cost differences between NGV technology generations (current state-of-the-art) and current advanced clean diesel engines (post-2010 and post-2017) for relevant medium- and heavy-duty freight and goods movement application.



NGV UP-TIME



Clean Fuels Ohio **Project Prime**

About Clean Fuels Ohio

Clean Fuels Ohio is a U.S. Department of Energy Clean Cities affiliated non-profit organization founded in 2002 dedicated to promoting the use of cleaner, domestic fuels and efficient vehicles to improve the transportation's sector economic and environmental performance. Our mission is to improve air quality and health, reduce environmental pollution, strengthen Ohio's economy, and enhance our nation's energy security. Learn more at www.cleanfuelsohio.org.

Educate & Advise



Leverage Funding

**Improve Air Quality &
Energy Security**



Recognize Leaders



NGV  UP-TIME 



ENERGETICS

A Division of Akimeka, LLC

Project Data Analysis Lead



About Energetics

Energetics, a division of Akimeka, LLC, is a full-service technology and management consulting firm with nearly 40 years of experience in energy-related fuels, assisting government and industry clients in developing new solutions to energy problems. The Energetics Sustainable Transportation Solutions division includes over 20 engineers and scientists with extensive experience in energy efficiency, alternative fuels, vehicle electrification, smart mobility, and other advanced powertrain technologies.



NGV *UP-TIME*



Project Background

There is little publicly available data that clearly compares the relative maintenance costs of NGVs and diesel trucks using modern exhaust after-treatment systems to validate claims of NGVs' lower TCO and their potential to improve energy security and cost-effectiveness nationwide.



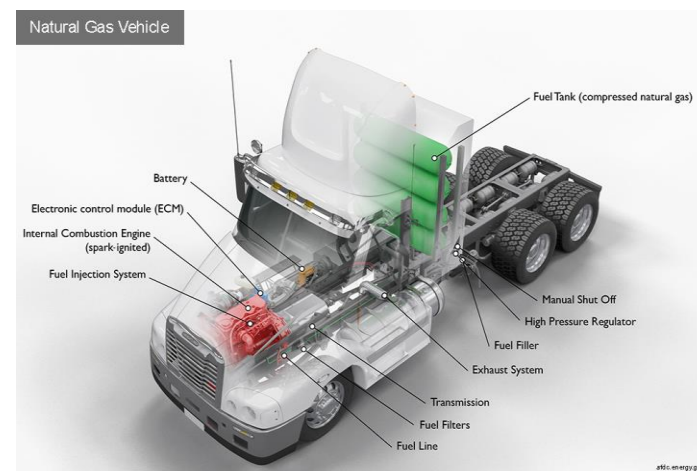


NGV UP-TIME



Project Objectives

- Gather Robust Data Set on NGV & Diesel operations in freight & goods movement fleets.
- Quantify the difference in maintenance (and operational) cost between diesel and natural gas freight and goods movement vehicles.
- Identify and quantify technology and process improvements between older and newer generation natural gas vehicles (NGVs).
- Assess individual NGV fleets to identify opportunities to enhance operations using legacy and newly-generated NGV and diesel fleet data.





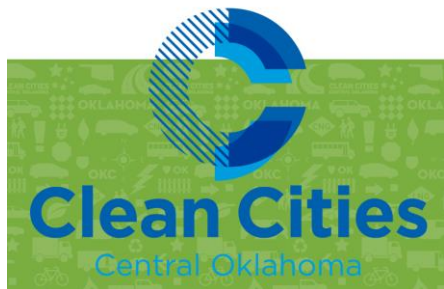
NGV UP-TIME



Clean Cities Partners



Dallas-Fort Worth
CLEAN CITIES



TULSA AREA
CLEAN CITIES



Committed Fleet Data Partners



Technical Support



NATIONAL RENEWABLE ENERGY LABORATORY





Vehicle Operations & Maintenance Data

The project will include data from at least 1,041 total vehicles accumulated across at least 383 vehicle months.

Vehicles to be included within the data set will have accumulated a minimum of 200 miles and 2 calendar months of data.

Type of Data	Vehicle Maintenance Data Specifics
Vehicle Data	<ul style="list-style-type: none">• Vehicle End-Use Application• Number• Year/Make/Model• Vehicle Type• Current Mileage
Repair Data	<ul style="list-style-type: none">• Repair Order Number• Open Date/Time• Close Date/Time• Days in Service• Length of Repair Order
Repair Costs	<ul style="list-style-type: none">• Parts• Labor• Vendor• Repair Total





NGV UP-TIME



Data Gathering

Committed Historic Vehicle Maintenance and Fuel Data Valuation		
Fleet Data Commitments	# of Vehicles	Data (Months)
Smith Dairy	40	36
JRAYL	130	60
Paper Transport	700	48
Time Transport	60	12
Superior Beverage Group	36	6
FST Logistics	75	5
Total	1041	167

Committed Performance Period Vehicle Maintenance and Fuel Data Valuation		
Fleet Data Commitments	# of Vehicles	Data (Months)
Smith Dairy	40	36
JRAYL	130	36
Paper Transport	700	36
Time Transport	60	36
Superior Beverage Group	36	36
FST Logistics	75	36
Total	1041	216
Amount claimed as performance period project match		

Total Value	1041	383
Total Cost Share	1041	

NGV UP-TIME

Thursday, March 5th, 2020 from 9 – 10 AM
Indiana Convention Center, Room 206
100 S Capitol Avenue, Indianapolis, IN 46225

Project Launch and Information Session at the 2020 NTEA Work Truck Show

Clean Fuels Ohio and Energetics are collaborating on NGV UP-TIME: *Updated Performance Tracking Integrating Maintenance Expenses*, a U.S. DOE-funded project gathering data on the differences in maintenance and operational costs between diesel and natural gas vehicles (NGVs) in the medium- and heavy-duty freight and goods movement sector. Led by Clean Fuels Ohio, the project brings together Energetics, several Clean Cities coalitions across the U.S., and NGV fleets to collect real-world use data to inform analysis, total-cost-of-ownership, and future research.

Join the NGV UP-TIME Informational Session to learn about this critical data collection project and hear about the perks of sharing data with the project team.

Registration Link: <http://bit.ly/ngv-uptime-session>

AGENDA:

9:00 am: Welcome, Introductions, and Project Overview
Andrew Conley, Clean Fuels Ohio

9:15 am: Overview of Project Partners & Opportunities
Russell Owens, Energetics

9:30 am: Questions and Networking

10:00 am: Dismiss



This project is supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the Vehicle Technologies Office Award Number DE-EE0008798.



Join Fellow Fleet
Leaders!

Share NGV
Operations Data

Receive Tailored
Fleet Performance
Reports

Learn About the
Planned National
Study on NGV and
Diesel Maintenance
Costs

Work Together to
Advance the
NGV Industry!



Use hashtag
#NGV_UPTIME on
social media



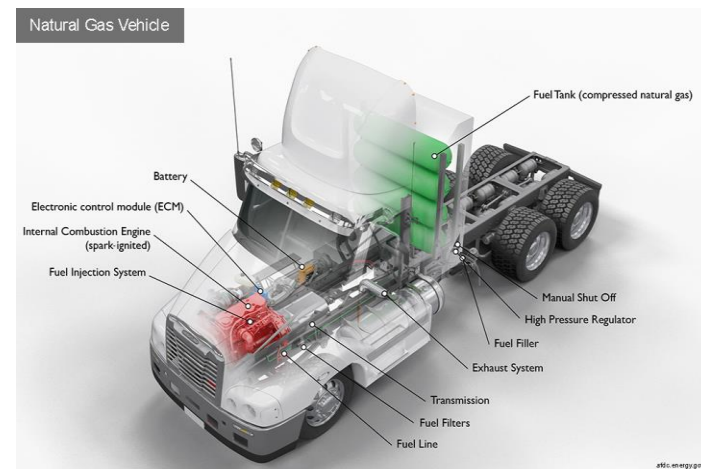
NGV UP-TIME



Project Data Goals

The project will include raw data collection from historical and current vehicle use:

- Data cleaning
- Analysis
- Compilation
- Summary
- Dissemination
- Visualization creation
- Reporting
- Review with national laboratories
- Data set structuring and integration for transfer
- Transfer to the DOE in support of project objectives





Project Goals

1. Individualized Fleet Maintenance Analysis Report
2. Full Report on National NGV vs Diesel Maintenance & Operational Costs
3. Capture and disseminate project results (i.e., impacts of different technology solutions, best practices used by project partner fleets for reducing maintenance costs, etc.)
4. Integrate project data in to the Dept of Energy's FleetDNA/LiveWire data initiatives to improve future natural gas and gaseous fuel vehicle data analyses projects.





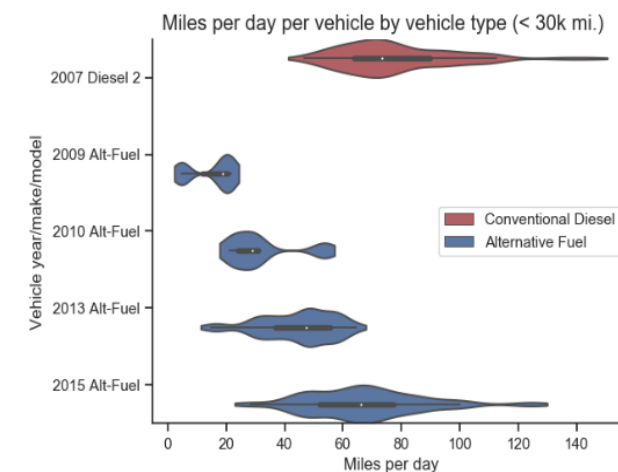
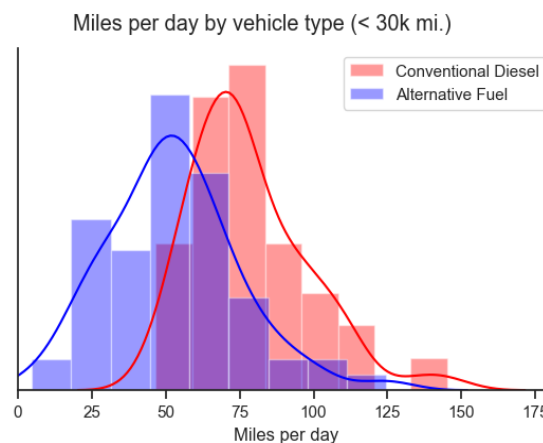
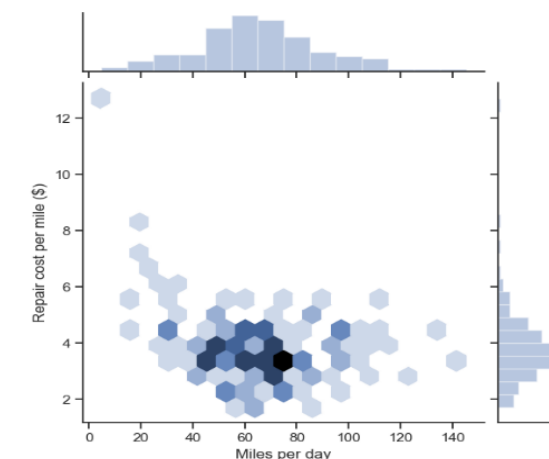
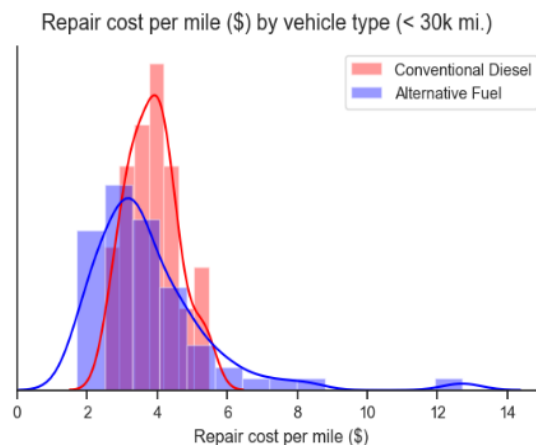
Fleet & National Maintenance Analysis Reports

Final outputs may include tables and graphics similar to the following:

**The sample tables and graphics below were produced as examples and do not represent conclusions for any given fleet or technology.*

Vehicle Component & Conventional		Pre-2015 Alt-Fuel	2015 Alt-Fuel
Fuel	1.32	0.89	0.89
Tires	1.07	1.55	1.28
Brakes	0.3	0.04	0.07
Engine	0.13	0.07	0.02
Cooling	0.06	0.01	0
Other	0	0.01	0
PM	0.14	0.25	0.13
Body	1.21	1.21	0.31
HVAC	0.03	0.01	0.01
Suspension	0.02	0.01	0.01
Instruments	0.02	0.01	0.01
DEF	0	0.04	0.01
Overall	5.18	5.13	3.68

- Miles driven per day by vehicle type
- Repair cost per mile (\$) by vehicle type
- Repair orders per 100 mi by vehicle type
- Average repair order length (days) by vehicle type





Project Timeline

Project Year 1 (2020)

- Develop Data Cleaning, Transfer Systems
- Develop Data Analysis Plan & Architecture
- Facilitate Project Advisory Committee meetings
- Secure Data Provision Agreements
- Monitor Timely, Secure Data Transfers

Project Year 2 (2021)

- Cont. Timely Data Transfers
- Collect Supplemental Data
- Clean, Repair, Decode, and Combine all Data
- Begin Analysis and Reporting
- Project Advisory Committee meetings

Project Year 3 (2022)

- Finalize & distribute fleet specific reports
- Finalize & distribute Full Report
- Transfer Final Data Set to US DOE





Project Team Roles and Responsibilities

Project Team Organization	Primary Role	Work to be Performed
Clean Fuels Ohio	<ul style="list-style-type: none"> Overall Project Manager Oversight, Quality Control Budgeting and Reporting Dissemination of Lessons Learned to Stakeholders 	<ul style="list-style-type: none"> Lead project management including partner coordination Lead project impacts and lessons learned report development and dissemination Final project closeout reporting to US DOE
Energetics	<ul style="list-style-type: none"> Subcontractor Technical Lead 	<ul style="list-style-type: none"> Develop a data gathering, analysis, visualization, and reporting approach Concatenate, clean, and process dataset; Analyze data; Draft final Report
National Renewable Energy Laboratory	<ul style="list-style-type: none"> Subcontractor Technical Support 	<ul style="list-style-type: none"> Advise on data gathering, analysis, visualization, and reporting approach Advise on Dataset integration with existing US DOE funded projects
Central Oklahoma Clean Cities	<ul style="list-style-type: none"> Subcontractor Implementation Partner 	<ul style="list-style-type: none"> Facilitate and gather data from NGV fleets; Dissemination of results to stakeholders
Tulsa Area Clean Cities	<ul style="list-style-type: none"> Subcontractor Implementation Partner 	<ul style="list-style-type: none"> Facilitate and gather data from NGV fleets; Dissemination of results to stakeholders
Dallas-Fort Worth Clean Cities	<ul style="list-style-type: none"> Subcontractor Implementation Partner 	<ul style="list-style-type: none"> Facilitate and gather data from NGV fleets; Dissemination of results to stakeholders
Wisconsin Clean Cities	<ul style="list-style-type: none"> Subcontractor Implementation Partner 	<ul style="list-style-type: none"> Facilitate and gather data from NGV fleets; Dissemination of results to stakeholders
Chicago Area Clean Cities	<ul style="list-style-type: none"> Subcontractor Implementation Partner 	<ul style="list-style-type: none"> Facilitate and gather data from NGV fleets; Dissemination of results to stakeholders
National Truck Equipment Association	<ul style="list-style-type: none"> Project Advisory Committee Member 	<ul style="list-style-type: none"> Strategic guidance and regular feedback, Dissemination of results to diverse audience
Green Truck Association	<ul style="list-style-type: none"> Project Advisory Committee Member 	<ul style="list-style-type: none"> Strategic guidance and regular feedback, Dissemination of results to diverse audience



Project Team Contacts



Clean Fuels Ohio

Andrew Conley, Consulting Services Director

Andrew@CleanFuelsOhio.org

Timothy Cho, Projects Manager

Tim@CleanFuelsOhio.org

Megan Stein, Chief Operating Officer

Megan@CleanFuelsOhio.org

ENERGETICS

A Division of Akimeka, LLC

Russell Owens, PE, PMP

Technical Team Lead, Sustainable Transportation

Rowens@Energetics.com