

Heavy Duty EV Demonstrations for Freight and Mobility Solutions

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**2021 DOE Vehicle Technologies Office
Virtual Annual Merit Review**

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Overview



Timeline:

- Start: October 1st, 2019
- End: December 31st, 2022
- ~50% complete

Partners:

- **Project Lead:** Clean Fuels Ohio
- **Fleet Deployment Partners:** DHL Supply Chain, Two Men and a Truck, Columbus Yellow Cab
- **Technical Partner:** Sawatch Labs
- **OEM Partners:** SEA Electric, W.W. Williams, Orange EV, Lightning eMotors
- **Clean Cities Replicability Partners:** NJ Clean Cities, Twin Cities Clean Cities Coalition, Wisconsin Clean Cities, and Utah Clean Cities

Budget:

- Total Project Funding: \$1,559,011
- DOE Share: \$779,011
- Cost Share: \$780,00
- Budget Period 1: \$927,813
- Budget Period 2: \$412,833
- Budget Period 3: \$218,365

Barriers Addressed:

- Lack of data on medium and heavy-duty EVs
- Low EV deployment in the freight and goods movement sector
- Low levels of EV adoption in other sectors (govt., transit, utility) that rely on Class 4-8 vehicles

Project Objectives



Objectives:

- Deploy medium-/heavy-duty electric vehicles (EVs) by highly visible fleets in key vehicle platforms
- Improve medium-/heavy-duty EV datalogging and reporting capabilities
- Prove the operational and financial case for electric vehicles that will lead to Class 4-8 adoption in various applications
- Address critical gaps in medium and heavy vehicle data and analysis to enhance fleet decision-making and EV adoption

VTOTI Goals:

- **National Security:** promotes transportation electrification and reduces dependence on foreign fuels
- **Economic Growth:** demonstrating the feasibility of all-electric medium and heavy-duty vehicles will boost market confidence and demand
- **Affordability for Business/Consumers:** aiming to document the return on investment and potential reduced costs for these vehicles
- **Reliability/Resiliency:** medium-/heavy-duty EVs promote greater fuel and transportation diversity

Impact:

- Demonstrate the successful deployment of medium and heavy-duty EVs
- Compile data on medium and heavy-duty EVs and analyze performance
- Improved datalogging and reporting capabilities for medium-/heavy-duty EVs
- Provide replication guidance for increased adoption in other sectors with Class 4-8 fleets

Project Approach



Budget Period 1: Data Collection, Committee Formation and Demonstration Plan

- Develop data collection and analysis plan
- Convene Project Advisory Committee (PAC)
- Develop Fleet Demonstration Deployment Plan
- Create design, engineering plans
- Create specifications for EV and EVSE
- Deploy EVs and EVSE

Budget Period 2: Demonstration, Analysis and Tool Creation

- Identify data gaps for Med-/Heavy-Duty Telematics Improvements
- Gather necessary data on all relevant telematics factors
- OEMS gather and analyze data on EV deployments to date
- OEM data and analysis informs EV analysis models
- Gather analysis model data
- Begin development of models

Budget Period 3: Presentation of Findings and Dissemination

- Clean Cities Partners identify and engage key prospect fleets
- Clean Cities Partners connect key prospect fleets to resources
- Create outline and completion plan for replication resources
- Disseminate final replication resources and tools

Milestones



Budget Period 1			
Milestone	Type	Description	Progress
Data collection and analysis plan developed to inform demonstration fleet deployment plan.	Technical	Develop data collection and analysis plan to inform Project and begin collection of fleet partner and OEM data.	Achieved
Project Advisory Committee (PAC) convened and supported	Technical	Convene, integrate and operate PAC	Achieved
Fleet deployment plan developed	Technical	Utilize initial data gathering and preliminary analysis on demo partner fleets to develop Demonstration Fleet deployment plan	Achieved
Engineering plans for fleet deployment designed	Technical	Create design and engineering plans for fleet deployment demonstrations	Achieved
Specifications for EV/EVSE completed, purchased and deployed	Technical	Create specifications for EV/EVSE and deploy them at demonstration locations	Achieved
Demonstration EVs and EVSE operational	Go/No Go	Demonstration EVs and EVSE operational at fleet locations	Achieved

Milestones



Budget Period 2

Milestone	Type	Description	Progress
Data gaps and design improvement needs identified and compiled	Technical	Identify data gaps and design improvements that are needed	In Progress
Med-Heavy Duty Telematics (Data Analysis) Improvements are made	Technical	Ensure Med-Heavy Duty Telematics (Data Analysis) Improvements	In Progress
EV deployment data is compiled	Technical	Identify deployment data to inform EV analysis models	In Progress
MD-HD EV analysis model data development begun	Technical	Analysis model data needs identified; development planned and development begun	In Progress
EV analysis models created	Go/No Go	Med-heavy duty EV analysis models created	In Progress

Project Accomplishments and Progress (1/2)



Successful Medium-/Heavy-Duty EV Deployments from Ohio Fleets

❖ Class 8 EV Yard Hostler (Complete: Deployed & In-Service)

- ❖ Fleet Partner: DHL Supply Chain
- ❖ OEM Partner: Orange EV
- ❖ DHL received the delivery of their Class 8 EV Yard Hostler from Orange EV in January 2021 and has finalized steps for EVSE installation for charging.



❖ Class 6 Local Delivery EV Truck (Complete: Deployed & In-Service)

- ❖ Fleet Partner: Two Men and a Truck
- ❖ OEM Partner: SEA Electric, W.W. Williams
- ❖ Two Men and A Truck received the delivery of their upfitted Class 6 Local Delivery EV system truck unit by SEA Electric and W.W. Williams conversion of the Freightliner M2 to dedicated electric and installation of EVSE charging during mid-May 2021.



❖ Class 4 EV Local Transit Van (Complete: Deployed & In-Service)

- ❖ Fleet Partner: Columbus Yellow Cab
- ❖ OEM Partner: Lightning eMotors, Bus Service Inc.
- ❖ Columbus Yellow Cab received the delivery of their Class 4 upfitted EV Local Transit Van from Lightning Systems and Bus Services conversion of the Ford Transit Shuttle Van to dedicated electric and installation for EVSE charging during the first week of May 2021.

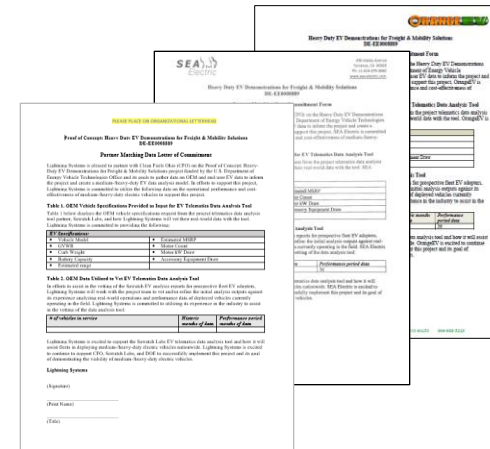


Project Accomplishments and Progress (2/2)



Fleet Deployment, Engineering, Specifications, and Data Collection Plans Completed

- ❖ Developed a **Data Collection & Analysis Plan** to inform a demonstration fleet deployment plan
- ❖ Developed a **fleet deployment plan**
- ❖ Convened and received input from a **Project Advisory Committee (PAC)**
- ❖ Designed **engineering plans** for the deployment of three medium-/heavy-duty EVs
- ❖ Completed **specifications for EV/EVSE** and purchased/deployed vehicles and charging equipment
- ❖ Received **signed letters of commitment** for OEM and fleet data/input/experience for medium-/heavy-duty EV analysis tool



These metrics estimate what the usage numbers would be if the miles driven by your 2012 INTERNATIONAL MA025 had been driven in a 2021 Peterbilt 220EV 200 Mile.

VMT	GHG Reduction	Operational Cost Difference*	TCO* (Lifetime)	TCO** (%)
26,970	68%	More than -\$21,000	-\$12,000-15,000	-6%

Sawatch Labs' medium-/heavy-duty EV suitability analysis table

Letters from OEMs to Provide Fleet Data for medium-/heavy-duty EV modeling tool

Organization	Point of Contact	Relevance
Mid-Ohio Regional Planning Commission (MORPC)	Dina Lopez	Strategic Projects Manager responsible for freight and transportation policy that supports freight at MORPC, the metropolitan planning organization for central Ohio
Sawatch Labs	Mary Till	Director of Business Development, project technical lead whose mission is to use data to inform and accelerate the adoption of EVs and charging infrastructure through their ezEV analytics platform
AEP Ohio	Julie Volpe-Walker	Energy Efficiency Program Manager at major national utility
North American Council for Freight Efficiency (NACFE)	Dave Schaller	Industry Engagement Director at NACFE, works to drive the development and adoption of efficient, environmentally beneficial, and cost-effective technologies in freight industry
DHL Supply Chain	Emily Davis	Fleet Demonstration Partner; DHL Supply Chain is the world's largest contract logistics provider.
Two Men and a Truck	Christian Irens	Fleet Demonstration Partner; the fastest growing franchised moving company in the US
SEA Electric	David Brosky	OEM project partner, provider of electric powered-system technology for delivery and distribution fleets
OrangeEV	Don Jalbert	OEM project partner, provider of 100% electric Class 8 trucks
Adomani Electric	Doug Lollar	Director of Sales, provider of zero-emission Class 3-5 electric vans, trucks, and drivetrain systems
Utah Clean Cities	Tammie Bostick	Clean Cities project replication partner, DOE Clean Cities coalition for the State of Utah
New Jersey Clean Cities	Chuck Feinberg	Clean Cities project replication partner, DOE Clean Cities coalition for the State of New Jersey

Project Advisory Committee members

Collaboration and Coordination Among Project Team



Technical Lead: Data analysis, telematics analytics leader, operational and cost modeling, medium-/heavy-duty EV telematics tool development

Fleet Demonstration Partners: Deployment and demonstration of medium-/heavy-duty EVs in various applications (freight, local moving/delivery, transit/mobility)

OEM Partners: Technology and solution providers for fleet demonstration providers looking to deploy and demonstrate medium-/heavy-duty EVs

Clean Cities Coalitions Partners: Replication of tools and analysis to demonstrate the feasibility and financial viability of scaling medium-/heavy-duty EVs into fleets



Overall Market Impact



Achievements to date:

- Data Collection and Analysis Plan
- Developed a Fleet Deployment Plan
- Convened Project Advisory Committee
- Designed engineering plans for fleet deployment
- Completed specifications for and purchased/deployed EVs and EVSE

This project directly addresses the viability of medium-/heavy-duty EVs in highly visible fleets in freight, local delivery, and transit applications by:

- Proving the operational and financial effectiveness of medium-/heavy-duty EVs and showcase return on investment
- Utilizing commercially available EVs, EVSE, facilities, and app-platforms to ensure seamless technology deployment
- Leverages real-world deployment and direct demonstration of medium-/heavy-duty EVs

Upcoming:

- Rest of Budget Period 2
 - Medium-/Heavy-Duty EV Telematics Improvements
 - OEM and End-User Data Informing Project
 - Developing the medium-/heavy-duty EV analysis model
- Budget Period 3
 - Key Prospect Fleets Engaged and Analyzed
 - Replication Resources and Tools Assembled
 - Disseminate Replication Resources for Scale
- Key remaining challenges
 - Delay in data collection to inform EV analysis model
 - Need for supplemental information for models

Summary



Objectives

- Deploy medium-/heavy-duty electric vehicles (EVs) by highly visible fleets in key vehicle platforms
- Prove the operational and financial case for electric vehicles that will lead to Class 4-8 adoption in various applications
- Address critical gaps in medium and heavy vehicle data and analysis to enhance fleet decision-making and EV adoption

Approach

- Data Collection, Committee Formation and Demonstration Plan
- Demonstration, Analysis and Tool Creation
- Presentation of Findings and Dissemination

Accomplishments

- Data Collection and Analysis Plan
- Developed a Fleet Deployment Plan
- Convened Project Advisory Committee
- Designed engineering plans for fleet deployment
- Completed specifications and purchased/deployed EVs and EVSE

Up Next

- Identify medium-/heavy-duty EV telematics improvements
- Gather OEM and End-User Data to inform project
- Develop the medium-/heavy-duty EV analysis model
- Assemble and disseminate replication resources and tools

Technical Back-Up Slides

