

7. Technology Integration

To strengthen national security, promote future economic growth, support American energy dominance, and increase transportation energy affordability for Americans, the Vehicle Technologies Office (VTO) funds early-stage, high-risk research. This research will generate knowledge that industry can advance to deploy innovative energy technologies to support affordable, secure, reliable, and efficient transportation systems across America. VTO leverages the unique capabilities and world-class expertise of the National Laboratory system to develop new innovations in electrification, including advanced battery technologies; advanced combustion engines and fuels, including co-optimized systems; advanced materials for lighter-weight vehicle structures and better powertrains; and energy efficient mobility technologies and systems, including automated and connected vehicles as well as innovations in connected infrastructure for significant systems-level energy efficiency improvement. VTO is uniquely positioned to address early-stage challenges due to its strategic research partnerships with industry (e.g., the U.S. DRIVE and 21st Century Truck Partnerships) that leverage relevant technical and market expertise. These partnerships prevent duplication of effort, focus DOE research on the most critical research and development (R&D) barriers, and accelerate progress. The partnerships help VTO focus on research that industry does not have the technical capability to undertake on its own—usually because there is a high degree of scientific or technical uncertainty or it is too far from market realization to merit sufficient industry emphasis and resources. At the same time, VTO works with industry to ensure there are pathways for technology transfer from government to industry so that Federally-supported innovations have an opportunity to make their way into commercial application.

The Technology Integration (TI) subprogram covers a broad technology portfolio that includes alternative fuels (e.g., biofuels, electricity, hydrogen, natural gas, propane) and energy efficient mobility systems. These technologies can strengthen national security through fuel diversity and the use of domestic fuel sources, reduce transportation energy costs for businesses and consumers, and support energy resiliency with affordable alternatives to conventional fuels that may face unusually high demand in emergency situations.

The TI subprogram supports Data and Systems Research activities, which include “living lab” projects—competitively selected, cost-shared projects to validate data, technologies, and systems in the field and inform future research—as well as statutory requirements related to alternative fuels, the annual Fuel Economy Guide, and the State and Alternative Fuel Provider Fleet regulatory program. The subprogram also includes the Advanced Vehicle Competitions activity, which supports science, technology, engineering, and mathematics (STEM) and workforce development interests. The Advanced Vehicle Technology Competitions activity supports a collegiate engineering competition that provides hands-on, real-world experience in advanced vehicle technologies and designs. By engaging university students in advanced technology research and providing specialized training, the Advanced Vehicle Technology Competitions activity helps address workforce development needs for more highly trained engineers and supports national efforts that encourage students to pursue careers in science, technology, engineering, and math.

Project Feedback

In this merit review activity, each reviewer was asked to respond to a series of questions, involving multiple-choice responses, expository responses where text comments were requested, and numeric score responses (*on a scale of 1.0 to 4.0*). In the pages that follow, the reviewer responses to each question for each project will be summarized: the multiple choice and numeric score questions will be presented in graph form for each project, and the expository text responses will be summarized in paragraph form for each question. A table presenting the average numeric score for each question for each project is presented below.

Table 7-1 – Project Feedback

Presentation ID	Presentation Title	Principal Investigator (Organization)	Page Number	Objectives	Approach	Accomplishments	Collaboration	Overall Impact	Weighted Avg.
ti086	Collaborative Approaches to Foster Energy-Efficient Logistics in the Albany - New York City Corridor	Jose Holguin-Veras (Rensselaer Polytechnic Institute)	7-3	3.08	3.33	3.17	3.33	3.17	3.20
ti087	Electric Last-Mile Project	Grant Fisher (Pecan Street Inc.)	7-3	3.17	3.33	3.33	3.17	3.42	3.29
ti088	Making the Business Case for Smart, Shared, and Sustainable Mobility Services	Shannon Walker (City of Seattle Department of Transportation)	7-14	3.42	3.33	3.25	3.42	3.33	3.33
ti089	Accelerating Alternative Fuel Adoption in Mid-America	Kelly Gilbert (Metropolitan Energy Center Inc.)	7-20	3.67	3.50	3.33	3.33	3.33	3.43
ti090	Southeast Alternative Fuel Deployment Partnership	Will Manget (Center for Transportation and the Environment)	7-26	3.58	3.42	3.42	3.50	3.33	3.45
Overall Average				3.38	3.38	3.30	3.35	3.32	3.34

Presentation Number: ti086
Presentation Title: Collaborative Approaches to Foster Energy-Efficient Logistics in the Albany - New York City Corridor
Principal Investigator: Jose Holguin-Veras (Rensselaer Polytechnic Institute)

Presenter
 Jose Holguin-Veras, Rensselaer Polytechnic Institute

Reviewer Sample Size
 A total of six reviewers evaluated this project.

Question 1: Project Objectives—the degree to which the project objectives support the DOE/VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:
 The reviewer said the project objectives clearly support U.S. Department of Energy (DOE) and Vehicle Technologies Office (VTO) objectives by promoting the use of freight through the use of electric vehicles, addressing a number of barriers, and increasing transportation efficiency by encouraging the adoption of energy-efficient logistics initiatives.

Reviewer 2:
 The reviewer stated that this project is directed at addressing supply-chain behavior decision making that could impact energy logistics efficiency. It seeks to align public and private objectives to improve logistics efficiency and reduce cost at the same time. The reviewer said that this is well aligned with DOE goals.

Reviewer 3:
 The reviewer said the project uses global positioning system (GPS) and other tools to move freighted goods efficiently. It seemed to the reviewer that the project is looking for a “Waze-like” tool for freight, which includes trucks, rail, and water. This project is in the initial stages and has the potential to be very successful if used correctly.

Reviewer 4:
 The reviewer commented that freight transport, especially the “final mile” of delivery, is an important and growing energy user and source of greenhouse gas (GHG) emissions. This project targets improvements in the efficiency of freight delivery through improved logistics and substitution of electricity for petroleum. The

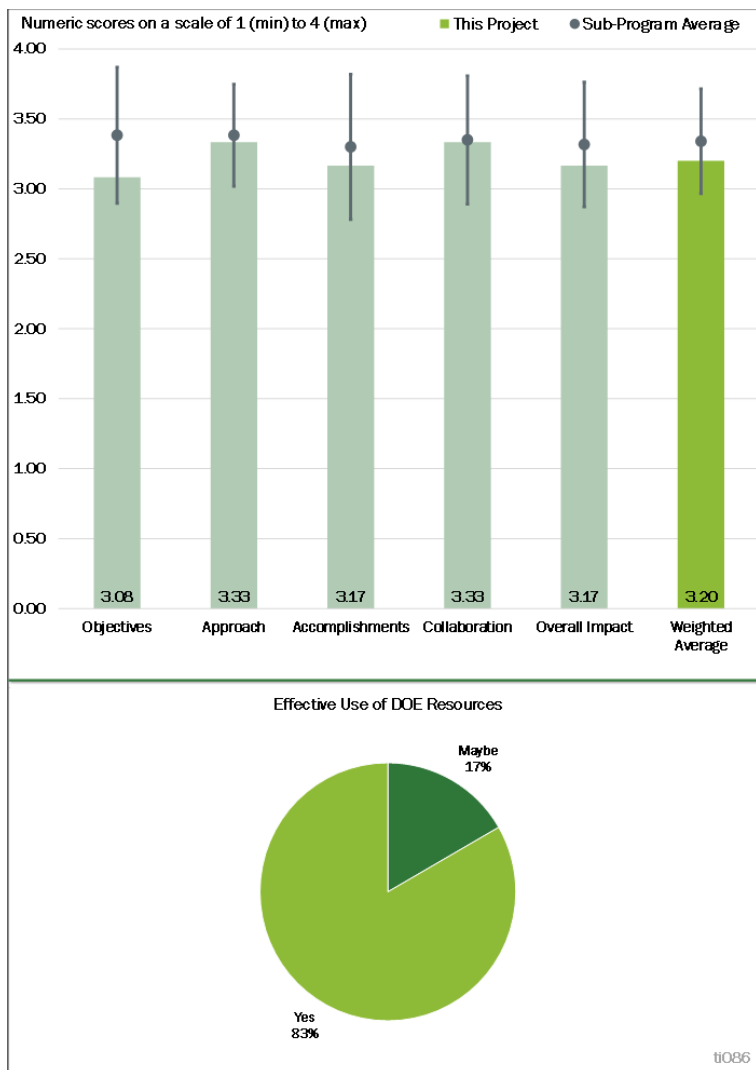


Figure 7-1 – Presentation Number: ti086 Presentation Title: Collaborative Approaches to Foster Energy-Efficient Logistics in the Albany - New York City Corridor Principal Investigator: Jose Holguin-Veras (Rensselaer Polytechnic Institute)

reviewer stated that benefits are demonstrated through sophisticated modeling and used together with research on the motivations of shippers and receivers to persuade the key agents to modify their practices and adopt electric trucks. If successful, this could accelerate the substitution of electricity for petroleum in an especially difficult component of the transportation system.

Reviewer 5:

The reviewer said the project Objective and Overview slides describe the project's specific objectives and barriers, as well as how the project supports the DOE and VTO objectives of increasing transportation efficiency. The project addresses several of VTO's Technology Integration (TI) goals—such as economic growth and affordability for business and consumers—through activities meant to foster the adoption of energy-efficient logistics initiatives. The reviewer stated that the project objectives appear to be generally effective for the planned scope.

Reviewer 6:

The reviewer described the project's overall objective (i.e., to gain insight into how freight shippers, carriers, and receivers can reduce energy use through operational changes) as very good and a project strength. It compliments VTO-TI's advanced technology vehicle and alternative fuels focus areas as an important demand-side, energy-saving strategy.

Conversely, this reviewer highlighted three project weaknesses. The first weakness is mode-shift analysis (determining if, when, and where to shift certain freight from one mode to another), which seemed to be a missing project aspect. The second weakness identified by this reviewer is the unclear depth of economic benefits analysis examining financial benefits (from reduced energy use as well as reduced time and labor spent in traffic congestion). Such analysis is key for determining how to motivate shippers and receivers to adopt energy-efficient logistics measures. The third weakness is the lack of clarity on the degree to which the project characterizes goods movement types between Albany and New York City (NYC).

Question 2: Project Approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives—the degree to which the project is well-designed, feasible, and aligned with other efforts.

Reviewer 1:

The reviewer said the project approach is well designed to achieve goals and objectives. The project is also aligned with other efforts (a NYC project).

Reviewer 2:

The reviewer noted three strengths of the project: the use of low-noise, electric-drive trucks to foster off-hour nighttime freight deliveries (a smart merging of technology-based and demand-side based energy-saving strategies); shifting more freight deliveries to nighttime (saves time and energy for shippers and receivers as well as helps reduce overall corridor and system-wide traffic congestion during daytime hours); and targeting receivers rather than just shippers and carriers (an innovative strategy).

The sole weakness identified by this reviewer was the degree to which the project is collecting the data required for enhancing the model framework and integrating the four modeling tools for assessing freight energy efficiency.

Reviewer 3:

The reviewer noted that the project lead organization (Rensselaer Polytechnic Institute [RPI]) is working with Argonne National Laboratory (ANL) and George Mason University (GMU) with a team of experts in its advisory group. The group's feedback to the feasibility of this study will determine the direction for the next phase of the project and/or resulting tools; for example, determining if there is a benefit to having an app or web tool for the freight community to show them optimal transport paths (length of time and energy use) with dollar savings calculations.

Reviewer 4:

The reviewer stated that the project approach section provides a generally effective methodology to accomplishing the project objectives and supporting the integration of advanced transportation technologies and practices. To foster the adoption of energy-efficient logistics, the project seeks to identify a combination of both demand- and supply-side strategies that complement and reinforce each other. The reviewer remarked that adequate detail is provided on the Approach and Milestone slides with regard to the planned tasks and activities.

Reviewer 5:

The reviewer said the modeling work is clearly state of the art and the modelers are leaders in this field. This aspect of the project deserves an outstanding rating. At this point, it was less clear to the reviewer how shippers, carriers, and especially receivers will be persuaded to adopt more efficient practices. In part, this is because the project has not completed this phase, but it also appeared to the reviewer that there may not be sufficient advantages to the agents involved or sufficient means of persuasion to achieve the project's technology penetration and fuel substitution goals. It is too early to make a judgment and from the information presented, this reviewer could not determine specifically how these goals would be achieved.

Reviewer 6:

The reviewer said this project is very broad in scope and uses many of the state-of-the-art tools at DOE, including Planning and Operations Language for Agent-based Regional Integrated Simulation (POLARIS), stochastic vehicle trip (SVTrip) and Autonomie as well as the state-of-the-art freight demand simulator, Behavioral Micro-Simulation (BMS), developed by RPI. The reviewer noted that the project approach is to identify supply- and demand-side initiatives that, in combination, can achieve improved logistics efficiency at lower cost. The approach is to use experts and a wide group of stakeholder organizations to develop a broad list of initiatives and narrow them down to do deep dive analysis on a few. The project has identified 52 different initiatives that were characterized. The reviewer suggested that it would be helpful if the project team showed the preliminary results of these characterizations. The establishment of an advisory group is good, but it is unclear what feedback they are expected to provide, how that feedback has been or will be obtained, and how it will be used.

Question 3: Project Accomplishments and Progress toward overall project and DOE objectives and goals—the degree to which progress/significant accomplishments have been achieved, measured against performance indicators and demonstrated progress toward project objectives and DOE goals.

Reviewer 1:

The reviewer indicated that an impressive suite of models has been developed that produces realistic delivery tours in the Albany-NYC corridor and enables the modelers to evaluate the kinds of behavioral changes that could lead to greater efficiency and substitution of electricity for petroleum. The reviewer described the plan for completing the project as logical and efficient. Given the point at which this project is being reviewed, the researchers have made outstanding progress.

Reviewer 2:

The reviewer said that generally effective progress has been made toward achieving project goals. RPI has completed the catalog of urban freight initiatives. Additionally, significant progress has been made with the development of algorithms and modeling tools. According to the reviewer, pilot testing of the most beneficial initiatives will be completed in Budget Period 3. No concerns have been identified.

Reviewer 3:

The reviewer noted the project is 40% complete and has provided the foundation to accomplish the goals of the project by December 2020. The reviewer said the characterization of baseline conditions will be an important step to assess the impacts of the energy-efficient logistics (EEL) initiatives and refinement of modeling tools.

Reviewer 4:

The reviewer reported that the project is only 40% complete. It has great potential, but it is too soon to fully evaluate without the results of the pilot.

Reviewer 5:

The reviewer commented that a strength of this project is the cataloging and evaluation of 52 existing urban freight initiatives, which provide a useful resource for other practitioners. The reviewer said that a weakness of the project is the household internet survey examining trends in Seoul, South Korea, which seems incongruent with trends of the Albany-NYC corridor region.

Reviewer 6:

The reviewer noted that the project team is in the process of developing and adapting models, collecting data, conducting interviews with large traffic generators in NYC, and computer-assisted telephone interviewing surveys with receivers and carriers to assess their willingness to change behavior and adopt various policy proposals. The reviewer said that progress for any of these activities would have been nice to see. The test on Living Lab will be used to assess baseline conditions, test energy-efficient initiatives, and address challenges. The reviewer asked whether any of this has occurred yet.

Question 4: Collaboration and Coordination Among Project Team—the degree to which the appropriate team members and partners are involved in the project work and the effectiveness of the collaboration between and among partners.

Reviewer 1:

The reviewer indicated that the key collaborators—RPI, ANL, GMU, and BMS—have accomplished their goals so far and seem to be working very well together. A highly qualified advisory group has been established and appears to be providing valuable guidance and assistance.

Reviewer 2:

The reviewer stated that an effective project team of academia and National Laboratories has been assembled to carry out this project, with an advisory group consisting of private industry and New York public agencies to provide an appropriate mix of expertise among team members. Collaboration and communication among project partners appear to be appropriate for the scope of this project.

Reviewer 3:

The reviewer commented that RPI's advisory group of key partners includes a port authority, fleets, research organizations, a trucking association, a state highway authority, a marine transportation organization, and many more. The feedback and advice from this mix of industries is key to the success of this project.

Reviewer 4:

The reviewer noted that the project involves numerous collaborations and partnerships with state and local government as well as private industry.

Reviewer 5:

The reviewer said that a strength of the project is that it involves a fairly robust advisory group with key public transportation, planning, energy, and port authorities. According to the reviewer, a weakness of the project is that the project's direct private shipping partners are all very large. Smaller and medium-sized carriers and shippers are only engaged indirectly or non-specifically through a trucking association.

Reviewer 6:

The reviewer asserted that the project team members and their expertise are described, but the presentation did not highlight the “how” or the effectiveness of team collaboration and coordination. RPI has been able to establish a broad and important advisory board, which this reviewer praised as impressive. However, the presentation did not provide information on the advisory board's role and process.

Question 5: Overall Impact—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:

The reviewer said the overall impact of this project appears to be significant – the results should promote sustainability and the use of electric vehicles for freight movement and help to improve efficiency.

Reviewer 2:

The reviewer remarked that the project has good potential to contribute to increasing transportation efficiency by evaluating changes in freight demand patterns that reduce energy use, and incorporating energy-efficient technologies and practices into freight logistics. The reviewer commented that the project has developed a policy guidebook that will provide practitioners with actionable information and a practice-ready approach to foster EEL initiatives. The results of the model development and pilot programs, when completed, should further identify the most beneficial policies.

Reviewer 3:

The reviewer noted that the project is more focused on electric technology and efficiency through GPS technology, rather than an array of various alternative fuels. However, for this project this is what makes the most sense and will have the greatest impact. The objective is to use resources wisely and this project shares that vision.

Reviewer 4:

The reviewer said a strength of this project is its potential to fill an important research gap by helping determine the right balance between supply-side and demand-side strategies. The reviewer indicated that the dissemination plan for project results and Policy Guidebook needs to be better defined, which is a project weakness.

Reviewer 5:

The reviewer reported that the research team has developed an appropriate state of the art tool for estimating the benefits of alternative strategies for improving the efficiency of freight delivery operations in the Albany-NYC corridor. The approach and tools appear to be transferrable to other metropolitan areas, with suitable calibration. The reviewer noted that the researchers have a deep understanding this area and the challenges. What remains to be seen is whether there are sufficient levers for persuading shippers, carriers, and receivers to adopt more efficient practices and alternative fuels. As the researchers point out, receivers are not particularly sensitive to transportation costs. Therefore, the reviewer expressed that the desired behavioral changes must offer other kinds of value, yet to be identified and quantified.

Reviewer 6:

The project appeared to the reviewer to be developing organizational structure, models, and data to focus on top priority initiatives. However, the reviewer found that progress to date has not delivered any measurable results. The reviewer looked forward to seeing initial results next year.

Question 6: Use of Resources. Are DOE resources being leveraged and funds being used wisely? Should DOE fund similar projects in the future?

Reviewer 1:

This reviewer suggested that DOE funding should be increasingly leveraged for newer projects of this type, examining synergies between Tech/Ops and freight demand management.

Reviewer 2:

The reviewer said that if this pilot is successful and turns into a tool and a resource that can be used by the freight industry to move goods efficiently, then it will not only save the companies money in freight cost but also will increase energy savings and environmental benefits.

Reviewer 3:

The reviewer noted that there is approximately 50-50 cost sharing, which significantly magnifies the impact of DOE's funds. A highly qualified research team has been assembled (ANL, GMU, RPI) that takes advantage of the special expertise of each member. The research plan has been efficiently and effectively executed thus far, and the plan for the remaining research appeared to the reviewer to be sound and likely to succeed. The reviewer indicated that the area being addressed is important and growing rapidly, and the research is innovative.

Reviewer 4:

The reviewer remarked that the use of DOE funding to identify activities that foster the adoption of energy efficient logistics is a critical strategy and activity to increase transportation system efficiency. The reviewer observed that projects that serve as "living labs" are important to test new ideas, collect data, and inform research on energy efficient transportation technologies and systems.

Reviewer 5:

The reviewer reported that the cost share is high, indicating a solid commitment to the project.

Reviewer 6:

The reviewer said this is a very difficult undertaking—it requires a lot of stakeholder relationship building and interaction, as well as complex analytics. Hopefully, the reviewer commented there will be progress next year that allows the reviewer to determine if this has the potential to be successful and transferrable.

Presentation Number: ti087
Presentation Title: Electric Last-Mile Project
Principal Investigator: Grant Fisher (Pecan Street Inc.)

Presenter
 Grant Fisher, Pecan Street Inc.

Reviewer Sample Size
 A total of six reviewers evaluated this project.

Question 1: Project Objectives—the degree to which the project objectives support the DOE/VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:
 The reviewer commented that the Project Objectives and Overview slides describe the project’s specific objectives and barriers addressed, as well as how the project supports the DOE and VTO objectives of increasing transportation efficiency and increasing fuel diversity through the use of electric vehicles. The reviewer found that the project addresses several of VTO’s Technology Integration goals (e.g., national and energy security, economic growth, and reliability and resiliency) by piloting electric and AV “last mile” shuttles and evaluating technology solutions to transit. Project objectives appeared to the reviewer to be generally effective for the planned scope.

Reviewer 2:
 The reviewer noted that the project seeks to demonstrate the value of a new form of public transit based on information technology, automated vehicles, and electrification that connects the first and last mile of trips to transit. The reviewer affirmed that this is an extremely important concept. Although some have argued that connected and automated vehicles (CAVs) will cause the death of transit, this project has shown the reviewer that is not necessarily true and that automated vehicles (AVs) can complement transit and increase mobility.

Reviewer 3:
 This reviewer observed that the project clearly addresses and supports DOE and VTO objectives and goals. “Last mile” connectivity to transit is an important factor in attracting and increasing ridership, according to the reviewer.

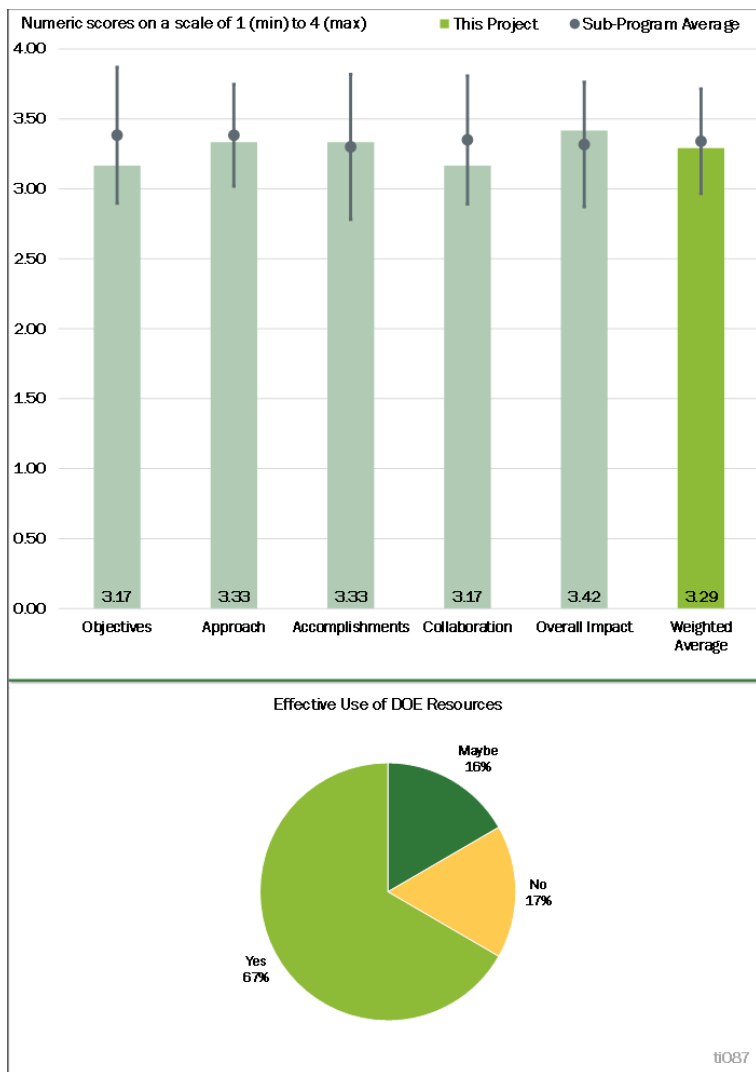


Figure 7-2 – Presentation Number: ti087 Presentation Title: Electric Last-Mile Project Principal Investigator: Grant Fisher (Pecan Street Inc.)

Reviewer 4:

The reviewer said the project objective to improve public transit ridership through the use of electric and autonomous vehicles for first and last mile connectivity supports DOE goals of increasing use of alternative fuels and improving transportation efficiency.

Reviewer 5:

Overall, the reviewer praised the strength of the project's objective to develop and demonstrate an electric ride-hail service as a means for increasing transit access as very supportive to Energy Efficiency and Renewable Energy's (EERE's) objectives of increasing fuel diversity and increasing transportation system efficiency. The reviewer identified two project weaknesses: lack of clarity about whether the project provides any date, information, or insight into how the vehicle charging routine was designed; and lack of clarity regarding whether lessons learned will be provided on how charging infrastructure should be designed for electrified ride-hail services.

Reviewer 6:

The reviewer said this is a good project to increase the use of public transit and reduce the need for personal vehicles in the City of Austin. The reviewer indicated that this project would be more useful if it were flexible and could be used by a variety of other cities. Most major cities already have apps that help users plan their commute. The reviewer noted that this project is also subsidized to offset the cost of the transit.

Question 2: Project Approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives—the degree to which the project is well-designed, feasible, and aligned with other efforts.

Reviewer 1:

The reviewer stated that the researchers created well-designed and meaningful demonstration projects that not only proved their concept but were adopted by the Austin Capital Metro transit agency, confirming the validity of their concept and findings. The demonstration indicated that there was sufficient demand for this kind of service, so the transit agency set up its own service in other parts of the metro area. The reviewer remarked that the pricing experiment, conducted in collaboration with University of Texas (UT) economists, provided useful information about customers' willingness to pay for the service that also aided the transit agency in setting its own prices.

Reviewer 2:

The reviewer indicated that this project approach is well-designed and feasible. The project also integrates advanced transportation technologies and practices; the development and integration of the mobile phone app provides valuable information on rider behavior.

Reviewer 3:

The reviewer commented that the project clearly makes use of advanced vehicle technology solutions to achieve its goals.

Reviewer 4:

Although the core user system is phone app-based, the project also implemented a reasonable solution for seniors (physical kiosk), which this reviewer described as a project strength. Designed shuttle service wait times also seemed reasonable to the reviewer (5 minutes typically, unless there are multiple, simultaneous hails at once [though always under 10 minutes]). A weakness highlighted by the reviewer is that the autonomous vehicle route does not seem to be well thought out yet.

Reviewer 5:

The reviewer liked how this project is promoting an electric shuttle service for a few miles to connect other transit systems. Because this project is only looking at short distance travel, it limits transferability to other locations.

Reviewer 6:

The reviewer said the Project Approach slide provides a satisfactory methodology to accomplishing the project objectives and supporting the integration of advanced transportation technologies and practices. While the presenter did a good job of explaining the project approach, the reviewer commented that there is very little detail provided on the Approach and Milestone slides with regard to the planned tasks and activities.

Question 3: Project Accomplishments and Progress toward overall project and DOE objectives and goals—the degree to which progress/significant accomplishments have been achieved, measured against performance indicators and demonstrated progress toward project objectives and DOE goals.

Reviewer 1:

The reviewer found that excellent progress has been made toward achieving project goals. Three electric vehicle shuttle routes have been deployed and have completed over 10,000 trips. Additionally, the pricing pilot has identified new pricing models and structures for transit. The reviewer noted that the autonomous vehicle shuttle pilot route planning is underway and on track to finish in Budget Period 2. No significant concerns were identified by this reviewer.

Reviewer 2:

The reviewer remarked that not only was the demonstration successful, but the concept has already been adopted by the Austin transit agency. This is truly impressive for a study of this type.

Reviewer 3:

This reviewer commented that project progress appeared to be on time and delivering results in each of the pilot neighborhoods. The creation and launch of the electric last mile (ELM) payment system and the kiosk were very good. The reviewer commented that the pricing study was well-conceived and executed.

Reviewer 4:

The reviewer noted that the project is 90% complete; it appears that accomplishments and progress are on track to meet objectives and goals.

Reviewer 5:

Overall and as a project strength, this reviewer observed significant progress during Budget Periods 1 and 2, thereby demonstrating successful electric shuttle services in two busy Austin-area neighborhoods. However, the reviewer remarked that a project weakness is the lack of clarity regarding how far the autonomous vehicle demonstration will get during the last quarter of the project because most of the project budget has been expended.

Reviewer 6:

The reviewer said the limitations on this technology for this application outweigh the benefits. The reviewer liked that the project is looking at electric shuttles to “bridge the last mile” to provide diverse transportation options, but the reviewer did not see the benefit on a national scale.

Question 4: Collaboration and Coordination Among Project Team—the degree to which the appropriate team members and partners are involved in the project work and the effectiveness of the collaboration between and among partners.

Reviewer 1:

The reviewer remarked that collaboration effectiveness is proven by this effort’s success, from the ride-hailing service performance (less than five-minute wait time, generally), to the pricing experiment, to the adjustment to serve customers who lacked cell phones.

Reviewer 2:

The reviewer commented that an effective project team was assembled to carry out this project, with private industry and public partners involved, providing an excellent mix of expertise among team members. Team members are well suited to project work and their working relationships appeared to the reviewer to be appropriate for the project of this scope.

Reviewer 3:

Collaboration and coordination among partners appear to the reviewer to be very effective. This is supported by the accomplishments to date, including the creation of a reproducible transit service.

Reviewer 4:

The reviewer said the team worked well together as demonstrated by implementation of a new transit service.

Reviewer 5:

According to the reviewer, a strength of this project is the development of strong transit operator and retail property collaborative partners, which have been key to the project's success. Weaknesses the reviewer found are as follows: challenges finding electric shuttle operators with Americans with Disabilities Act (ADA) compliant shuttles, which should have been discovered and addressed prior to the project start; and The U.S. Department of Transportation (DOT) National Highway Traffic Safety Administration (NHTSA) should have been brought on as an advisory partner sooner in the project.

Reviewer 6:

The reviewer noted that the partners on this project are mostly in business with the City of Austin. For this project to succeed on the national level, it would need major companies and other city transportation officials on an advisory or review committee to evaluate the transferability of this technology to other localities.

Question 5: Overall Impact—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:

This reviewer highlighted two project strengths: one of the private retail property partners (Simon) continued with the e-shuttle after the demonstration period was over (in the Domain shopping area); and the project's transit agency partner (Capitol Metro) has continued to implement e-shuttles in several areas on their own as a result of the project.

Reviewer 2:

The reviewer indicated that it is rare that a demonstration project of this type immediately leads to adoption of its concept in the real world. Whether it will be adopted in areas beyond Austin remains to be seen, but the impact already exceeds expectations. The project also collected data that shows that 45% of the trips taken on the new system would otherwise have been served by single-occupant internal combustion engine (ICE) vehicles and 40% would have been ride-shared ICEs. Instead, the reviewer observed that these trips were served by electric vehicles connecting to public transit, an impressive impact.

Reviewer 3:

The reviewer stated that this project has good potential to contribute to increasing transportation efficiency through the piloting of electric and AV “last mile” shuttles and evaluating technology solutions to transit. The project has completed three electric shuttle pilot projects, as well as developed a technology kit for vehicle data collection systems. The reviewer noted that data gathered to date has informed the local transit on pricing models for “last mile” services, and when the autonomous vehicle shuttle pilot is completed, it will provide additional data with regard to the feasibility of this technology for the application.

Reviewer 4:

The overall project impact appeared to the reviewer to be significant since the local transit provider has already adopted the method for electric shuttle deployments developed in this project.

Reviewer 5:

The reviewer said that implementation by a transit service has already occurred.

Reviewer 6:

It seemed to the reviewer that there are too many application limitations for this technology in this application. It may work very well for Austin, but those circumstances are not easily replicated in other parts of the country.

Question 6: Use of Resources. Are DOE resources being leveraged and funds being used wisely? Should DOE fund similar projects in the future?

Reviewer 1:

The cost share is very good and appeared to be utilized effectively from this reviewer's perspective.

Reviewer 2:

The reviewer noted the project is meeting its goals, and the results are useful to decision makers and transit services.

Reviewer 3:

The reviewer commented that the 50-50 cost-share leverages DOE funds, and described the project cost as relatively modest compared with its accomplishments: implementing an innovative extension of transit that uses electric vehicles to connect passengers to transit; demonstrating reasonable ridership and efficient service times; and showing a large displacement of ICE trips.

Reviewer 4:

According to the reviewer, DOE should continue to fund these types of demonstration projects and further expand the focus into autonomous electric vehicle shuttle projects.

Reviewer 5:

The reviewer commented that the use of DOE funding to pilot electric and AV "last mile" shuttles and evaluate technology solutions to transit is a critical strategy and activity to help increase transportation system and transit-routing efficiency. Projects that serve as "living labs" are important to test new ideas, collect data, and inform research on energy-efficient transportation technologies and systems.

Reviewer 6:

The reviewer found that this project has too many limitations. Austin is a good location in terms of weather and population and city density. This project is also subsidized, which is not going to be the case everywhere. The reviewer expressed support for gathering data for electric shuttles, but only as part of a larger project that uses a variety of technologies that can have all or parts of the structure used in other localities.

Presentation Number: ti088
Presentation Title: Making the Business Case for Smart, Shared, and Sustainable Mobility Services
Principal Investigator: Shannon Walker (City of Seattle Department of Transportation)

Presenter
 Shannon Walker, City of Seattle
 Department of Transportation

Reviewer Sample Size
 A total of six reviewers evaluated this project.

Question 1: Project Objectives—the degree to which the project objectives support the DOE/VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:
 The reviewer remarked that the objective of this project—to encourage adoption of electric vehicles by transportation network company (TNC) drivers—is extremely important. The reviewer explained that it is often simply assumed that vehicle and ridesharing services will be electrified, but this is not at all a foregone conclusion. In reality, achieving this goal faces many challenges. According to the reviewer, this project aims to find the incentives and mechanisms necessary to electrify this new and rapidly growing transportation mode.

Reviewer 2:
 The reviewer acknowledged that the project objectives support DOE and VTO objectives and address many barriers related to the promotion of electric vehicles, including the lack of data, the lack of understanding the technology benefits of electric vehicles, and the lack of electric vehicle supply equipment (EVSE) infrastructure, which are all critical barriers to the acceleration of electric vehicle (EV) adoption.

Reviewer 3:
 The reviewer noted that the project is well-aligned with DOE goals to increase alternative fuel use and improve transportation efficiency through increased use of electric vehicles by shared mobility entities.

Reviewer 4:
 The reviewer noted that the Project Objective and Project Overview slides describe the project’s specific objectives and barriers addressed, as well as how the project supports the DOE and VTO objectives of

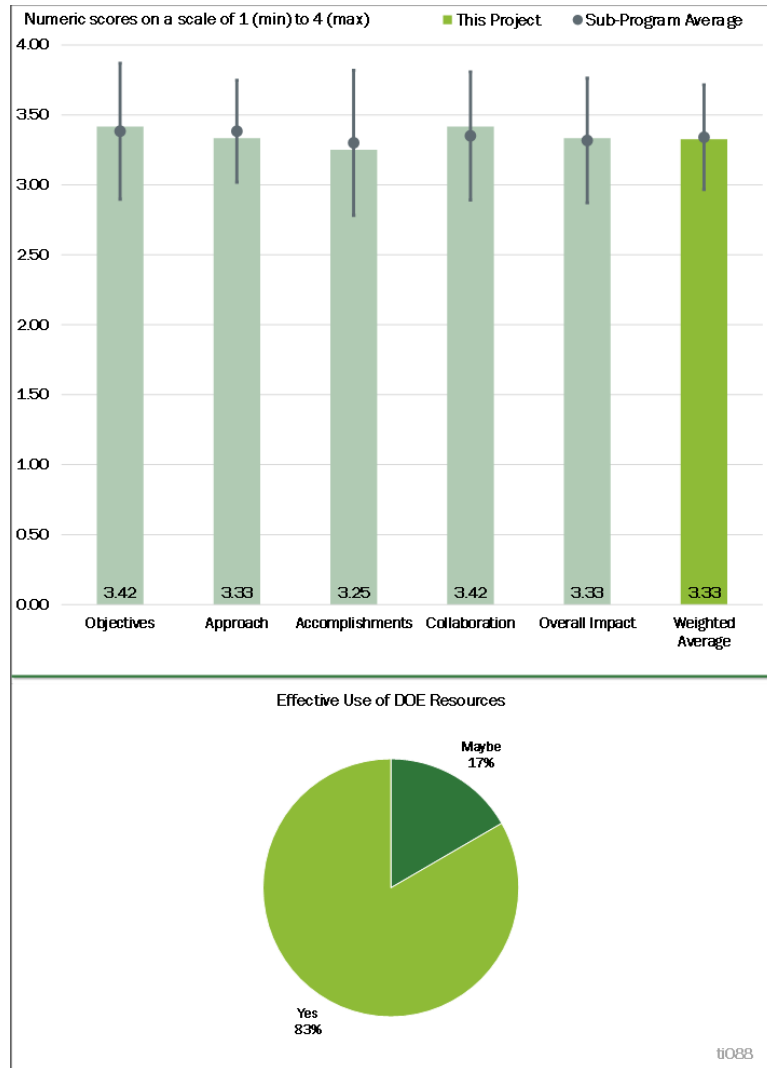


Figure 7-3 – Presentation Number: ti088 Presentation Title: Making the Business Case for Smart, Shared, and Sustainable Mobility Services Principal Investigator: Shannon Walker (City of Seattle Department of Transportation)

increasing transportation efficiency. The project addresses several of VTO's Technology Integration goals (e.g., national and energy security, affordability for businesses and consumers, and reliability and resiliency) through activities meant to accelerate the use of EVs in shared mobility applications in four major United States (U.S.) markets, and establishes best practices that can be replicated nationally. The project objectives were described by this reviewer as generally effective for the planned scope.

Reviewer 5:

Fostering increased EV adoption among shared mobility fleets and users in major U.S. markets strongly supports VTO objectives and was highlighted by this reviewer as a project strength. No target numbers were provided in the presentation, which made it unclear to the reviewer how much EV and charging infrastructure adoption will occur among target fleets and users in each location as a result of the project.

Reviewer 6:

The reviewer indicated that transitioning ride-share vehicles to EVs would be an outstanding accomplishment. Ride-share and taxi services are excellent candidates for EVs because they are on the road for extended periods in stop-and-go traffic. The project is focused on four major cities: Seattle, Portland, New York, and Denver. The reviewer noted that the project is in the early phase, with only 20% of the work done, but so far has assembled an impressive list of partners. The reviewer commented that the barriers listed are general. It would be good to know if the cities in this project have location-specific barriers as well.

Question 2: Project Approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives—the degree to which the project is well-designed, feasible, and aligned with other efforts.

Reviewer 1:

The reviewer said the Project Approach slide provides an effective methodology to accomplishing the project objectives and supporting the integration of advanced transportation technologies and practices. By piloting a series of programs in several widely varied urban environments, the project will develop, test, and prove market-viable techniques for EV adoption in shared mobility applications. The reviewer found that good detail is provided on the Approach and Milestone slides with regard to the planned tasks and activities and progress to date.

Reviewer 2:

The reviewer said the project approach is well thought out and designed. The inclusion of four geographically and varied urban environments and cities will help to support the acceleration of advanced transportation technologies in various locations throughout the country.

Reviewer 3:

The reviewer noted the project's approach is focused on charging convenience, access and price for shared vehicle entities in four major U.S. markets. The approach also includes development of an EV Shared Mobility Playbook and deployment, which are essentially a compelling value proposition for shared vehicle entities and drivers to use EV with predictable and convenient affordable charging. The reviewer remarked that this project will generate and collect valuable data that will inform existing and future shared mobility applications, and will be valuable to many other regions.

Reviewer 4:

The reviewer commented that the project has the potential to be highly impactful using the ride-share niche market. By targeting ride-share vehicles that are on the road for extensive periods, the EVs are the most practical fit. Battery technology vehicles are less expensive to operate with lower electricity cost and lower maintenance. The reviewer suggested it would be helpful to include in the best practices handbook an estimated calculation of return on investment (ROI) (x miles driven to offset the upfront cost of the vehicle.)

Reviewer 5:

This reviewer described outreach campaigns targeting TNC drivers in Seattle and Portland as well-designed and a strength. Another strength was trying different approaches across different metropolitan areas, which may give a good idea about what does or does not work in some areas. According to the reviewer, electric charging is non-subsidized and market priced (40-cents per kilowatt-hour [kWh]) without a subsidy (at least during the pilots). A project weakness is a lack of clarity regarding how new users would be attracted to using an EV-based TNC and/or shared mobility services.

Reviewer 6:

The reviewer indicated that this project has suffered setbacks due to the loss of key partners. Although this was due to those partners' business decisions and not the fault of the project organizers, it has delayed progress nonetheless. At this point, tools and resources have been developed to promote electric vehicles to TNC drivers, but it was unclear to the reviewer whether those will be effective in overcoming the barriers (largely economic) to widespread electric vehicle adoption.

The present approach appeared to the reviewer to rely heavily on outreach and marketing. The chief barriers for TNC drivers, however, appear to be the higher first cost of EVs and the lack of an adequate charging infrastructure. The reviewer suggested that the delay may give this project an opportunity to rethink its strategy and develop alternative approaches that leverage existing incentives and infrastructure development, take advantage of the availability of used electric vehicles, and work with other stakeholders (utilities, state and local government agencies) to enhance the value of plug-in electric vehicles (PEVs) to TNC drivers. This might be done by insuring low electricity costs, developing incentives to purchase used instead of new PEVs, putting potential drivers in the seats of PEVs for learning by doing, and marketing to TNC customers and drivers to create electric ride demand. Creating market pull may also be a useful strategy. The reviewer asked the project team whether riders can be convinced to favor riding in a clean, electric vehicle and whether TNCs can be persuaded to offer EVs (when available) as a choice alternative in addition to standard and premium vehicles.

Question 3: Project Accomplishments and Progress toward overall project and DOE objectives and goals—the degree to which progress/significant accomplishments have been achieved, measured against performance indicators and demonstrated progress toward project objectives and DOE goals.

Reviewer 1:

The reviewer praised the completion of the EV Shared Mobility Playbook as an excellent accomplishment. Deployment with external stakeholders through multiple channels can result in best practices and tailored approaches. The reviewer reported that the EVSE Roadmap Strategy incorporates 11 metrics into the Dynamic EVSE Prioritization Model, provides implementation guidance, and is easily replicated—this is a great start. The reviewer suggested that focusing EVSE deployment on the high-volume, shared mobility user will have to be continually evaluated.

Reviewer 2:

The reviewer said that a project strength is completion of potential high-value studies and reports on electrifying ride-hail services and shared mobility. Although the project will implement different types of pilots among five different city and regional partners, the reviewer commented that the project seems to lack a comparative analysis that assesses the approach(es) that do or do not work best.

Reviewer 3:

The reviewer indicated that the pilot plan has been clearly identified for each of the cities, with a strategy for each, key partners identified, and several barriers identified. The reviewer suggested that it would be useful for the case study to include the specific barrier, how it was addressed, and whether it addressed the problem effectively. If not, this reviewer recommended that the lesson learned should be described.

Reviewer 4:

The reviewer said that adequate progress has been made toward achieving project goals. With approximately 50% of the 36-month project completed, only 20% of the work has been completed. Issues related to project partners dropping out have slowed progress with regard to vehicle deployments and direct current fast charging (DCFC) installations. The project team has published and communicated a variety of resources, including case studies, a literature review, and the EVSE Roadmap for Shared Mobility Hubs. No significant concerns have been identified, according to the reviewer.

Reviewer 5:

The reviewer noted that the project is only 20% complete. Based on the description of milestones it appeared to the reviewer that the project will meet all anticipated accomplishments by September 2020.

Reviewer 6:

The reviewer remarked that given the setbacks previously mentioned, the project is moving ahead very well. However, it is only 20% completed and so much remains to be done. However, this can be an opportunity to adapt to changes in the market and in the attitudes of key players.

Question 4: Collaboration and Coordination Among Project Team—the degree to which the appropriate team members and partners are involved in the project work and the effectiveness of the collaboration between and among partners.

Reviewer 1:

The reviewer asserted that an effective project team has been assembled to carry out this project, with private industry, public agencies, and Clean Cities Coalition partners involved, providing an excellent mix of expertise among team members. Team members are well-suited to project work and their working relationships appeared to the reviewer to be appropriate for a project of this scope.

Reviewer 2:

The reviewer commented that it appears the collaboration and coordination among the project team is excellent and that key partners and stakeholders in each of the four cities have been included.

Reviewer 3:

The reviewer found the broad collaboration with city government entities, infrastructure, Clean City Coalitions, and regional shared mobility providers to be excellent. The project appeared to the reviewer to have good coordination and sharing among the four markets.

Reviewer 4:

The reviewer said the project has identified a very good mix of partners that are appropriate to each city. This creates a strong foundation for this project.

Reviewer 5:

The reviewer remarked that this is a strong team, combining important metropolitan areas with expertise in TNC operations and EV market development. Although the project is only 20% done, much has been accomplished.

Reviewer 6:

The project strength identified by this reviewer is the inclusion of strong partners across four major metropolitan areas. However, a weakness is that the project team seems very fluid because a few partners (illuminocity, Maven, Car2Go) are no longer part of the project.

Question 5: Overall Impact—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:

This reviewer commented that the approach, broad reach, and coordination of this project—combined with the ability to replicate it in future locations—suggests it can have high impact.

Reviewer 2:

The reviewer remarked that a project strength is that it has conducted valuable outreach to TNC and shared mobility companies, making them more aware of EVs. Two weaknesses were highlighted by the reviewer. Firstly, it is unclear how the published case study reports on electrifying car share and ride-hail services are being shared and further distributed. Secondly, the reviewer commented that only a couple of charging stations have been installed to date; the presentation did not clearly indicate immediate plans for additional installs.

Reviewer 3:

The reviewer stated that the focus of the project is electric technology. Other technologies would not make any sense for this niche market.

Reviewer 4:

The reviewer observed that the project is in an early stage; these comments are based mainly on the potential to contribute. This reviewer explained that finding the means and motivations to electrify TNCs is extremely important due to the rapid growth of this mode and its potential role in a connected, automated, electrified, and shared transportation future. There is no guarantee of electrification. According to the reviewer, incentives and policies are in place, but there are also major barriers to be overcome. Lack of familiarity with electric vehicles and therefore lack of confidence in their viability as TNC vehicles is a key barrier that this project is working to overcome. The reviewer hoped the project scope will expand somewhat to find ways to insure that low-cost electricity at public charging stations becomes one of the advantages of EVs to TNC drivers, and that some forms of incentives can be developed for the purchase of used PEVs by TNC drivers. Perhaps a demand pull can also be created by outreach and marketing to riders and persuading TNCs to feature EVs. According to the reviewer, the market is rapidly changing and the delay caused by the withdrawal of key partners can be seen as an opportunity to creatively adapt the program.

Reviewer 5:

The reviewer said the project has good potential to contribute to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency by accelerating the use of EVs in shared mobility applications. With a significant rise in the number of TNC vehicles being operated, it is important that as many of these vehicles as possible are operating as zero-emission EVs. The reviewer indicated that in the four pilot project locations, the development of supporting DCFC is critical to helping develop the local and regional market for EVs by increasing the access to and availability of fast charging. Additionally, the reviewer suggested that the findings of this project can be replicated nationally.

Reviewer 6:

The reviewer noted the overall impact of the project will help other areas interested in shared mobility applications understand how EVs can be utilized and integrated into target markets.

Question 6: Use of Resources. Are DOE resources being leveraged and funds being used wisely? Should DOE fund similar projects in the future?

Reviewer 1:

The reviewer stated that ride-share vehicles are the ideal candidates to use EV technology. These vehicles have the potential to impact the industry and drive the price down given the volume and miles driven on a daily basis. If this project is successful, the reviewer offered that it can be replicated in other major cities and

eventually lower the adoption cost though increase of volume and demand. The reviewer recommended also including rider incentives in return for feedback. For example, providing the riders with an option for requesting EVs through their app by offering special discounts.

Reviewer 2:

The reviewer remarked that the cost sharing in this project (\$2 million DOE, \$6 million participants) is an extraordinary leveraging of DOE resources. Clearly, the participants are invested in the success of the project.

Reviewer 3:

The reviewer stated that this is a highly leveraged project for DOE, with a broad collaboration of key stakeholders and locations.

Reviewer 4:

This reviewer noted significant cost shared and resources that appear to be used effectively and wisely.

Reviewer 5:

The reviewer said the use of DOE funding to accelerate the use of EVs in shared mobility applications is a critical strategy and activity to advance the market of all alternative vehicles, due to the high number of miles driven in these vehicles, as well as the opportunity for public education and outreach as they are introduced to electric vehicle technologies. Projects that support demonstration and implementation strategies and activities, such as barrier removal, should assist with market transformation in the local and regional target area.

Reviewer 6:

This reviewer asserted that DOE should continue funding these types of projects. However, the reviewer suggested that it may be better for future projects of this type to be more geographically focused, or focus on one fleet audience across a wide geography. The audience and geography for this project both seem to be so wide that there are really four different projects happening independently, with little (or unclear) integration or proposed cross-analysis of results.

Presentation Number: ti089
Presentation Title: Accelerating Alternative Fuel Adoption in Mid-America
Principal Investigator: Kelly Gilbert (Metropolitan Energy Center Inc.)

Presenter
 Kelly Gilbert, Metropolitan Energy Center Inc.

Reviewer Sample Size
 A total of six reviewers evaluated this project.

Question 1: Project Objectives—the degree to which the project objectives support the DOE/VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:
 The reviewer said the program understood that one size does not fit all and matched the types of technology and alternative fuel to the usage. This model supports the program’s best practice deployment objectives. By working with municipalities, school districts, fuel retailers, Clean Cities partners, and universities, the reviewer asserted that the program has an outstanding opportunity for success. This provides the ability to understand the needs and application of a variety of vehicles and match them with the most efficient vehicle technology. According to the reviewer, this program has a high probability for long-term sustainable application and is replicable in other regions. These efforts have led to 44,000 barrels of petroleum reduced.

Reviewer 2:
 The reviewer said the project supports diversity because it promotes use of several different alternative fuels and provides needed capital to support natural gas projects at time when many funding efforts are focused only on electric vehicles and related infrastructure. The reviewer remarked that it will enhance transportation efficiency by filling in gaps in the nation’s alternative fuel infrastructure development by making it possible for more fleets to operate on alternative fuels and also by reducing the need for some fleets to purchase vehicles with costly, extended-range packages.

Reviewer 3:
 The reviewer noted that this project seeks to accomplish three objectives: improving access to alternative fuels, increasing alternative fuel vehicle (AFV) deployment, and sharing lessons learned. The reviewer indicated that this thoughtful approach should lead to valuable information and insights on AFV deployment in the Midwest.

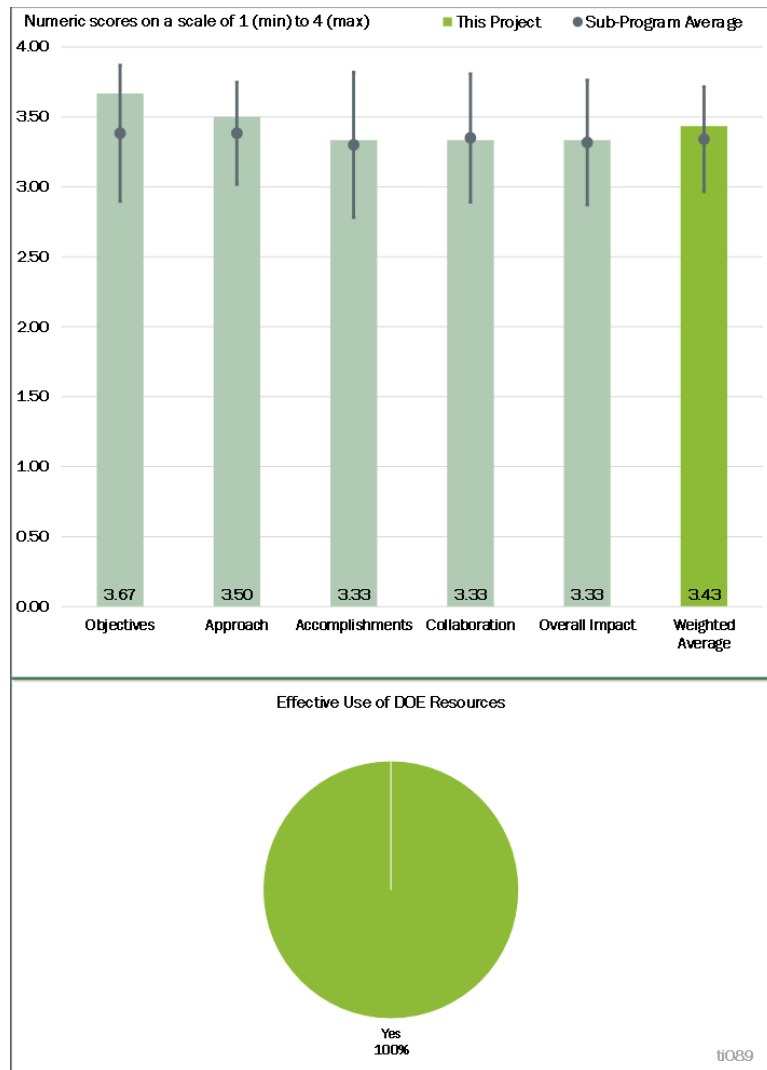


Figure 7-4 – Presentation Number: ti089 Presentation Title: Accelerating Alternative Fuel Adoption in Mid-America Principal Investigator: Kelly Gilbert (Metropolitan Energy Center Inc.)

Reviewer 4:

The reviewer commented that the Project Objective and Project Overview slides describe the project's specific objectives and barriers addressed, as well as how the project supports the DOE and VTO objectives of increasing fuel diversity through the use of alternative fuels. The project addresses several of VTO's Technology Integration goals, such as national and energy security, affordability for business and consumers, and reliability and resiliency, through activities meant to accelerate the deployment of alternative fuel vehicles, as well as supporting infrastructure through community-based partnerships throughout Missouri, and Kansas. The project objectives appear to be generally effective for the planned scope, according to the reviewer.

Reviewer 5:

The reviewer noted that the project has clear objectives that support DOE and VTO objectives and effectively contributes to increasing fuel diversity through the use of alternative fuels and expanding the availability of alternative fueling stations, especially along key AFV Corridors. The reviewer observed that the number of compressed natural gas (CNG) and propane vehicles being added to area fleets is somewhat modest, but will establish a good baseline for expansion and for other interested parties to see AFV's being deployed effectively.

Reviewer 6:

The reviewer said that a project strength is its focus on alternative fuels adoption and alternative fuel corridor development, and it is well-aligned with VTO objectives. A weakness identified by this reviewer is that the hydrogen infrastructure feasibility study does not seem well-integrated in the project, which also lacks a champion.

Question 2: Project Approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives—the degree to which the project is well-designed, feasible, and aligned with other efforts.

Reviewer 1:

It was clear to the reviewer that a great deal of thought and research has gone into this project to ensure that it supports advanced transportation technologies and practices by matching the best technology to each specific type of application. For example, the reviewer noted that using CNG in municipal work trucks and EVs in shuttle fleets yield the highest rate of return on investment, both in terms of dollars and in terms of energy savings.

Reviewer 2:

The reviewer stated this project has a thoughtful approach that begins with stakeholder engagement before deploying vehicles. The estimated fuel cost savings is considerable, reaching nearly \$1 million by year 3.

Reviewer 3:

The approach from planning to executive strategy appeared to the reviewer to be well designed to ensure success. A key benefit will be the long-term availability of infrastructure and the lessons-learned aspect of case studies, which can be influential in encouraging other fleets to take similar actions.

Reviewer 4:

The reviewer said the Project Approach section provides a generally effective methodology to accomplishing the project objectives and supporting the integration of advanced transportation technologies and practices. The project's approach is to: conduct community workshops to educate, promote alternative fuels, and generate new AFV projects; develop and expand fueling infrastructure along key highway corridors, as well as deploying AFVs; and share data and best practices. Adequate detail is provided on the Approach slides with regard to the planned tasks and activities. Finally, the reviewer asserted that this project will complement the efforts of the Federal Highway Administration (FHWA) Alternative Fuel Corridor designation initiative by identifying corridor gaps and opportunities to extend existing corridors.

Reviewer 5:

The reviewer noted that the method employed by this project is similar to other successful programs. The project team has enlisted a good number of project partners with a varied mix of municipalities, private companies, fuel providers, and a university. The reviewer commented that the project team has increased community awareness through workshops, is making progress toward deploying new AFVs in the area, and is creating a repeatable model for other projects to follow.

Reviewer 6:

According to the reviewer, a project strength is that it includes some good activities focused on closing key corridor gaps on Interstate (I)-70, I-49, and I-35. The reviewer noted two weaknesses in the project: some of the proposed deployment work does not seem necessarily innovative; and the fleet data collection aspects of the project are unclear.

Question 3: Project Accomplishments and Progress toward overall project and DOE objectives and goals—the degree to which progress/significant accomplishments have been achieved, measured against performance indicators and demonstrated progress toward project objectives and DOE goals.

Reviewer 1:

The reviewer observed that the project has met its early milestones in the administrative and technology areas. Vehicle deployments and budgeted spending have been delayed due to vehicle availability, but that appeared to the reviewer to be a common theme, given the current AFV market. Each of the two project team's workshops generated a new AFV project within the region, immediately showing the effectiveness of the plan.

Reviewer 2:

The reviewer said this project has yielded a savings of 44,000 barrels of oil and continues to save as it moves forward. Additionally, the users continue to benefit from the lower cost of fuel and maintenance utilizing clean, efficient technology. To ensure long-term success and continuation, the reviewer observed that the project is generating best practice deployment guides, establishing functional goods movement corridors, and educating others through regional AFV spokesperson(s).

Reviewer 3:

The reviewer stated that the early workshops spawned more projects; some infrastructure installation has taken place; some project changes are underway due to changes in market conditions; and some original project objectives may not be feasible.

Reviewer 4:

The project is still in the early stages of implementation but appeared to the reviewer to be sufficiently on track.

Reviewer 5:

The reviewer found that progress has been fairly moderate to date, but activities thus far appear commensurate with the amount of budget spent.

Reviewer 6:

The reviewer commented that slow progress has been made toward achieving project goals. According to the Overviews, only 12.5% of the project has been completed and the presenter discussed that a 1-year extension to the project end date is in process. Adequate progress related to workshops has been made, with several of them identifying new end-users. Vehicle deployment and infrastructure development are all underway, but appeared to the reviewer to be behind schedule. No significant concerns have been identified.

Question 4: Collaboration and Coordination Among Project Team—the degree to which the appropriate team members and partners are involved in the project work and the effectiveness of the collaboration between and among partners.

Reviewer 1:

The reviewer said an effective project team has assembled to carry out this project, with private industry, public agencies, and Clean Cities Coalition partners involved, providing an excellent mix of expertise among team members. Team members are well suited to project work and their working relationships appeared to the reviewer to be appropriate for the project of this scope.

Reviewer 2:

According to the reviewer, collaboration and coordination within the team follows accepted practice for such projects: Google Drive document collection, monthly group calls, check-ins between Metropolitan Energy Center (MEC) and subcontractors regarding progress and troubleshooting. The project appeared to be moving along smoothly with all partners engaged and participating at appropriate levels.

Reviewer 3:

The reviewer noted the project team appears to have consistent communication, according to the presenter.

Reviewer 4:

The reviewer commented that key partners are in place and structure established. Both public and private sector participants have been involved. The reviewer indicated that the notes do not provide additional information on the ongoing nature of collaboration.

Reviewer 5:

The reviewer said there are many key partners involved in the project work to ensure its success. The project is working with municipalities, school districts, fuel retailers, and universities, as well as local Clean Cities partners.

Reviewer 6:

The reviewer noted that some key private and fleet partners are not fully-committed to the project, which is challenging as the project has not been underway for even a year and runs until 2021.

Question 5: Overall Impact—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:

The reviewer found that the project is showing good early results from the planned activities and has generated two new projects out of the community outreach program. The project leaders recognize the power of word-of-mouth advertising and have effectively created a new group of AFV ambassadors who will spread the word through their own successful deployments. The reviewer commented that the lasting effects and Best Practice Deployment Guides will be useful to fleets across the United States through Clean Cities channels, while the hydrogen study will inform future work.

Reviewer 2:

According to the reviewer, project strengths include a renewable natural gas (RNG) vehicle project (in Dodge City) and an EV program (in Olathe, Kansas), which have directly resulted and stemmed from the project workshops. Additionally, there has been strong engagement of target fleets (e.g., Kansas City, Missouri and Grain Valley School District).

Reviewer 3:

The reviewer indicated that this project is deploying all types of alternative fuels tailored to specific needs. Airport shuttle buses run on either CNG or electricity, school buses are moving from CNG to propane, municipal work trucks are running on CNG, and shuttle buses are electric.

Reviewer 4:

The reviewer said this project has good potential to contribute to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency by developing alternative fueling infrastructure along the key interstate highway corridors, as well as the deployment of new AFVs. By focusing on the installation of electric, CNG, and liquefied petroleum gas (LPG) fueling sites, the reviewer suggested that this project will be able to address critical fueling needs for different vehicle and fueling technologies, as well as being able to address all classes of vehicles (light duty [LD], medium duty [MD], and heavy duty [HD]).

Reviewer 5:

The reviewer judged this as having an excellent chance of being highly successful. At this point in the implementation, the reviewer commented that it is hard to say more though.

Reviewer 6:

The reviewer stated that the project still has the potential to achieve significant outcomes, if it can overcome the current challenges.

Question 6: Use of Resources. Are DOE resources being leveraged and funds being used wisely? Should DOE fund similar projects in the future?

Reviewer 1:

The reviewer commented that DOE funding of projects like this is critical to getting technology out of the laboratory and into the fleets for use. Until alternative fuels become mainstream, the reviewer said, there will continue to be a need for financial assistance given the uncertainty of fuels, the transportation market, and the high barriers to technology deployment. According to the reviewer, the case studies involving the latest technology are critical and there is a continuing need for them because technology is always improving.

Reviewer 2:

The reviewer found that the project is generating a best-practice deployment guide for mid-America. That guide can be used and revised, as needed, by other regions in the country. Having a nationwide guide for deployment by region and use would be a useful tool for current and future users, according to the reviewer. Users will be more willing to adopt these technologies as long as they are easy to understand, adopt, and lead to savings.

Reviewer 3:

The reviewer said that use of DOE funding to develop highway corridor and adjacent community fueling infrastructure is a critical strategy and activity to advance the market for all alternative fuel vehicles. Additionally, deploying new AFVs will provide additional “through-put” to help the station economics. The reviewer remarked that these projects that support implementation strategies and activities, such as barrier removal, should assist with market transformation in the local and regional target areas.

Reviewer 4:

The reviewer commented that the project leaders have effectively leveraged DOE funds to attract financial commitment from non-DOE partners. Expenditures have been below expectations to this point, due to market conditions beyond their control. There did not appear to the reviewer to be any unnecessary expenditures or questionable items budgeted. This project should net a good return on the DOE investment, and serve well to further DOE and VTO goals.

Reviewer 5:

The use of DOE resources appeared to the reviewer to be valid for this project.

Reviewer 6:

The reviewer suggested that the project team make sure future projects containing a lot of deployment activity, like this project, have a better data collection component.

Presentation Number: ti090
Presentation Title: Southeast Alternative Fuel Deployment Partnership
Principal Investigator: Will Manget (Center for Transportation and the Environment)

Presenter
 Will Manget, Center for Transportation and the Environment

Reviewer Sample Size
 A total of six reviewers evaluated this project.

Question 1: Project Objectives—the degree to which the project objectives support the DOE/VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:
 The reviewer said the project has a great diversity of fuels, partners, and target audience. The project has thoughtful deliverables identified that are related to lessons learned.

Reviewer 2:
 The reviewer found that the Project Objectives are sharply focused on supporting DOE and VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency. The project has a direct and substantial impact upon addressing barriers. According to the reviewer, Project Objectives maximize the impact of the vehicle and infrastructure deployments and utilize the strengths of the major partners.

Reviewer 3:
 The reviewer stated that the project supports the development of AFV corridors through partnerships with key fleets that already have familiarity with the technology. Building infrastructure using these anchor fleets will build the foundation and prepare for new fleets that have never used alternative fuel technologies.

Reviewer 4:
 The reviewer said the Project Objective and Project Overview slides describe the project’s specific objectives and barriers addressed, as well as how the project supports the DOE and VTO objectives of increasing fuel diversity through the use of alternative fuels. The project addresses several of VTO’s Technology Integration goals, such as national and energy security, economic growth, affordability for business and consumers, and reliability and resiliency, through activities meant to accelerate the deployment of alternative fuel vehicles and

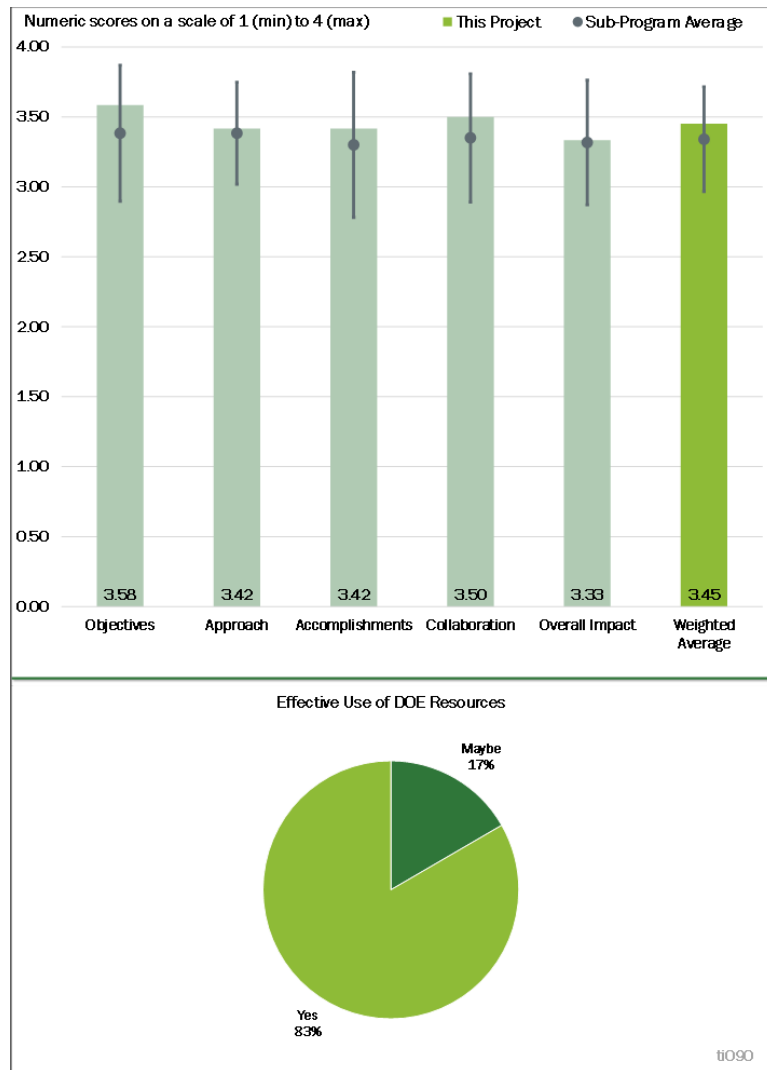


Figure 7-5 – Presentation Number: ti090 Presentation Title: Southeast Alternative Fuel Deployment Partnership Principal Investigator: Will Manget (Center for Transportation and the Environment)

infrastructure throughout the southeastern United States. The project objectives appeared to the reviewer to be generally effective for the planned scope.

Reviewer 5:

The reviewer indicated that the project provides critical support for expanding use of alternative fuels and provides support for a diversity of fuels including both natural gas and electricity. The reviewer thought that there should be more emphasis on public fueling as opposed to private fueling. Achieving success in fleets that privately fuel is important and there is benefit to highlighting these opportunities. The reviewer suggested that public access infrastructure would seem to provide bigger opportunity to impact more fleets, however.

Reviewer 6:

The reviewer remarked that a project strength is the project's aim at advancing AFV fleets, infrastructure, and Alternative Fuel Corridors in the Southeast which is well aligned with VTO objectives. Conversely, a project weakness is that it appears to be geared toward HD fleets that do not spend a lot of time on highways. Additionally, the corridor development aspect of the project was not well explained in the presentation.

Question 2: Project Approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives—the degree to which the project is well-designed, feasible, and aligned with other efforts.

Reviewer 1:

The reviewer remarked that the project has a detailed work plan. The project has a thoughtful approach to vehicle and infrastructure deployment. It is good, the reviewer stated, to include write-ups on lessons learned through case studies. The reviewer especially liked the idea of a key performance indicator (KPI) -based workshop. The project has a detailed approach to corridor evaluation and development.

Reviewer 2:

The reviewer noted that the Project Approach section provides an effective methodology to accomplishing the project objectives and supporting the integration of advanced transportation technologies and practices. Further, the reviewer reported the following project approach: accelerate deployment of AFV fleets and infrastructure; accelerate development of Alternative Fuel Corridors; accelerate development of Strategic AFV Fleet Partnerships; and perform an analysis of CNG stations for Future Hydrogen Infrastructure Deployment. The reviewer praised the excellent detail provided on the Approach and Milestone slides with regard to the planned tasks and activities and progress to date. Finally, the reviewer asserted that this project will complement the efforts of the FHWA Alternative Fuel Corridor designation initiative by identifying corridor gaps and opportunities to extend existing corridors.

Reviewer 3:

The reviewer observed that the project Approach contributes to achieving project objectives not only by deploying AFVs in the area, but also by studying the impact of those vehicles, gathering information to assist with future deployments, and expanding the alternative fuel infrastructure in key areas along Alternative Fuel Corridors to gain the maximum benefit. The reviewer found that the project has a sound plan to identify potential partners and work with them on determining which specific vehicles would best fit their needs. The project identified gaps in the infrastructure, especially along the designated Alternative Fuel Corridors, and targeted priority locations for potential development.

Reviewer 4:

The project design and implementation appeared to the reviewer to provide significant opportunity for success.

Reviewer 5:

The reviewer said the work that has been done is very good with the existing fleets. The existing fleets (Waste Management [WM] and UPS) are familiar with CNG and are good as the initial adopters of the corridor.

According to the reviewer, the project would have been in a stronger position if it had identified the next generation of fleets—particularly those that are new to CNG and other alternative fuels.

Reviewer 6:

The reviewer remarked that a project strength is that it will collect AFV operational and maintenance data over 12-months for 280 vehicles, which is a very strong aspect of the project. Conversely, the reviewer noted three project weaknesses: the project does not contain any focus on EV corridors in Alabama (there are currently no FHWA designated Alternative Fuel Corridors in Alabama); there is no agreement with fleets on providing baseline diesel vehicle maintenance data (partners have resisted, though this is pretty critical information to have); and the project provides for non-public stations, which is atypical.

Question 3: Project Accomplishments and Progress toward overall project and DOE objectives and goals—the degree to which progress/significant accomplishments have been achieved, measured against performance indicators and demonstrated progress toward project objectives and DOE goals.

Reviewer 1:

The reviewer highlighted three project accomplishments as strengths: 117 of 279 project vehicles have been deployed (80% have been ordered at time of presentation submission); two stations have been commissioned; and 80% of fleet routes have been evaluated for readiness and opportunities.

Reviewer 2:

The reviewer indicated that the project partners have deployed a significant number of alternative fuel vehicles already and are on pace to reach deployment goals. The reviewer also noted the project has finished construction of two out of the three CNG refueling stations.

Reviewer 3:

The reviewer stated the project appears to be on track and achieving intended purposes. A significant number of vehicles has been deployed.

Reviewer 4:

The reviewer said this project is collecting data on CNG maintenance; however, it will not include any historical data and/or comparison with conventional vehicles. The Center for Transportation and the Environment (CTE) is using training provided by its partners. The reviewer recommended taking the existing training and creating a new training for new adopters, then using that to encourage new fleets to join the program.

Reviewer 5:

The reviewer said the Budget Period 1 goals were mostly on track. It appeared to the reviewer that some vehicle deployment is behind schedule, but the team appears to have a plan in place to rectify.

Reviewer 6:

The reviewer indicated that good progress has been made toward achieving project goals. Vehicle deployment and infrastructure development are all underway, with 165 of the 279 planned vehicles being delivered and two of the three fueling infrastructure sites being completed. Some delays have resulted from original project partners dropping out. No significant concerns have been identified.

Question 4: Collaboration and Coordination Among Project Team—the degree to which the appropriate team members and partners are involved in the project work and the effectiveness of the collaboration between and among partners.

Reviewer 1:

The reviewer observed that an effective project team has been assembled to carry out this project, with private industry, public agencies, and Clean Cities Coalition partners involved, to provide an excellent mix of

expertise among team members. Team members are well-suited to project work and their working relationships appeared to the reviewer to be appropriate for the project of this scope.

Reviewer 2:

The reviewer said that team members meaningfully contribute to carrying out the work of the project, are well suited to perform the work, and have excellent working relationships. The project manager is effective in bringing team members together, and was able to overcome the loss of a key infrastructure partner and still accomplish the project goal of installing public-access CNG fueling station in Birmingham, Alabama.

Reviewer 3:

The reviewer noted that the project includes a significant number of important partners and the collaboration effort appears well defined.

Reviewer 4:

The reviewer found that a good project structure has been defined.

Reviewer 5:

The reviewer said that having partners, such as WM and UPS that have years of experience with CNG, is key to getting the first leg of the project off the ground. Moving forward, the reviewer suggested that the project should use these partnerships to leverage more fleets with limited experience and knowledge to adopt CNG and other AFVs.

Reviewer 6:

The reviewer highlighted two project strengths: a lost CNG infrastructure partner was replaced fairly rapidly (Birmingham municipal station was replaced with Clean Energy Fuels); and private partners have been mostly well-engaged and committed to the project. The reviewer noted that a project weakness is that the City of Atlanta has not been well-coordinated or very engaged with the project.

Question 5: Overall Impact—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency.

Reviewer 1:

The reviewer remarked that the fleets that have been selected are extremely influential businesses and the case studies and lessons learned should be impactful in encouraging other fleets to follow their lead.

Reviewer 2:

The reviewer said this project is fostering substantial alternative fuel vehicle and infrastructure investments in the Southeast.

Reviewer 3:

The reviewer stated that this project has already deployed a large number of vehicles (more than 100), although many of these vehicles may have been deployed without the project.

Reviewer 4:

The reviewer commented that the project needs to include a discussion about how to bring in more partners that are new to AFVs.

Reviewer 5:

The reviewer said the project has good potential to contribute to increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency by developing alternative fueling infrastructure along key interstate highway corridors, as well as deploying new AFVs. By focusing on the installation of electric and CNG fueling sites, this project will be able to address critical fueling needs for different vehicle and

fueling technologies. Additionally, the reviewer commented that the project will analyze and assess opportunities, costs, and benefits of using CNG station locations for future hydrogen fueling infrastructure deployment, which could help leverage this project's investments for future hydrogen fueling locations. According to the reviewer, it should be noted that funding should be prioritized for public fueling stations, so more than one fleet may benefit from the public funding investment.

Reviewer 6:

The reviewer said the project deployed a good number of AFVs into the region, but an interesting question was raised at the peer review regarding the UPS fleet and how much impact this project really had in prompting or facilitating their purchase of 160 vehicles, 57% of the project total. The Project Manager demonstrated a broad knowledge of vehicle types, route analysis, etc., which would be helpful in assisting fleet managers with choosing the best-fitting vehicles, but this reviewer knew that UPS already has a large AFV fleet, and likely has the same base of knowledge. The reviewer asserted that it certainly makes sense to include UPS in the project, if for no other reason than to learn from its vast experience, but project management should be very careful about claiming credit for something UPS would likely have done anyway—it could easily come across as padding the results of the project.

Question 6: Use of Resources. Are DOE resources being leveraged and funds being used wisely? Should DOE fund similar projects in the future?

Reviewer 1:

The reviewer found the cost share and funding provided to be an excellent use of DOE funding and provide much needed capital for these types of activities. Until alternative fuels become truly mainstream and achieve scale, the reviewer observed that it will continue to be necessary to fund these types of activities.

Reviewer 2:

The reviewer said this project will advance AFVs in a number of ways in the South. The project brings together a number of important companies in the truck market with Clean Cities Coalitions and will help advance AFVs in this important region.

Reviewer 3:

The reviewer thought that DOE funds and resources are being used wisely and effectively and that DOE should definitely fund projects like this in the future.

Reviewer 4:

The reviewer noted that funds are being used wisely. The project is very large (includes three CNG stations), which carries a fair amount of risk. Future projects might be better if kept smaller (contain two CNG stations rather than three), according to the reviewer.

Reviewer 5:

The reviewer said building an alternative fuel corridor is key to ensuring long-term success of alternative fuels. The reviewer suggested that, for the future, having a mix of fleets that have extensive experience (like this project) with fleets that do not.

Reviewer 6:

The reviewer indicated that the use of DOE funding to develop highway corridor and adjacent community fueling infrastructure is a critical strategy and activity to advance the market of all alternative fuel vehicles. Additionally, deploying new AFVs will provide additional “through-put” to help the fueling station economics. These projects that support implementation strategies and activities, such as barrier removal, should assist with market transformation in the local and regional target areas. According to the reviewer, funding should be prioritized for, and/or limited to, public fueling stations so more than one fleet may benefit from the federal government's funding investment. Additionally, while the reviewer lauded the efforts of Waste Management and UPS to operate their fleet on alternative fuels, future projects should focus on

providing opportunities for first-time users or smaller fleets without the resources of WM or UPS (who would probably be pursuing this fleet conversion with or without public funds).

Acronyms and Abbreviations

ADA	Americans with Disabilities Act
AFV	Alternative fuel vehicles
ANL	Argonne National Laboratory
AV	Automated vehicle, or Autonomous vehicle
BMS	Behavioral Micro-Simulation, developed by RPI
CAV	Connected and automated vehicle
CNG	Compressed natural gas
CTE	Center for Transportation and the Environment
DCFC	Direct current fast charging
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EEL	Energy-efficient logistics
EERE	Energy Efficiency and Renewable Energy
ELM	Electric last mile
EV	Electric vehicle
EVSE	Electric vehicle supply equipment
FHWA	Federal Highway Administration
GHG	Greenhouse gas
GMU	George Mason University
GPS	Global positioning system
HD	Heavy-duty
I	Interstate
ICE	Internal combustion engine
KPI	Key performance indicator
kWh	Kilowatt-hour
LD	Light-duty

LPG	Liquefied petroleum gas
MD	Medium-duty
MEC	Metropolitan Energy Center
NHTSA	National Highway Traffic Safety Administration
NYC	New York City
PEV	Plug-in electric vehicle
POLARIS	Planning and Operations Language for Agent-based Regional Integrated Simulation
RNG	Renewable natural gas
ROI	Return on investment
RPI	Rensselaer Polytechnic Institute
SVTrip	Stochastic vehicle trip
TI	Technology Integration
TNC	Transportation network company
U.S.	United States
UT	University of Texas
VTO	Vehicle Technologies Office
WM	Waste Management, Inc.

