

7. Technology Integration

To strengthen national security, enable future economic growth, support energy dominance, and increase transportation energy affordability for Americans, the Vehicle Technologies Office (VTO) funds early-stage, high-risk research. The 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 and works with partners across industry and academia 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 connected and automated 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 U.S. Department of Energy (DOE) research on the most critical research and development (R&D) barriers, and accelerate progress. VTO focuses on research that industry either 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.

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 enable energy resiliency with affordable alternatives to conventional fuels that may face unusually high demand in emergency situations. The subprogram supports Data and Systems Research activities, including “living lab” projects—i.e., competitively-awarded projects to validate data, technologies, and systems in the field, serving as an important feedback loop to inform future Vehicle Technologies research planning. TI also supports Vehicle Technologies statutory requirements related to alternative fuels and the annual Fuel Economy Guide, and includes the Advanced Vehicle Competitions activity that supports science, technology, engineering, and mathematics (STEM) and workforce development interests.

Subprogram Feedback

DOE received feedback on the overall technical subprogram areas presented during the 2018 Annual Merit Review. Each subprogram technical session was introduced with a presentation that provided an overview of subprogram goals and recent progress, followed by a series of detailed topic area project presentations.

The reviewers for a given subprogram area responded to a series of specific questions regarding the breadth, depth, and appropriateness of that DOE VTO subprogram’s activities. The subprogram overview questions are listed below, and it should be noted that no scoring metrics were applied.

Question 1: Was the program area, including overall strategy, adequately covered?

Question 2: Is there an appropriate balance between near- mid- and long-term activities?

Question 3: Were important issues and challenges identified?

Question 4: Are plans identified for addressing issues and challenges?

Question 5: Was progress clearly benchmarked against the previous year (for multi-year projects)?

Question 6: Are the projects in this technology area addressing the broad problems and barriers that the Vehicle Technologies Office (VTO) is trying to solve?

Question 7: Does the program area appear to be focused, well-managed, and effective in addressing VTO's needs?

Question 8: What are the key strengths and weaknesses of the projects in this program area? Do any of the projects stand out on either end of the spectrum?

Question 9: Do these projects represent novel and/or innovative ways to approach these barriers as appropriate?

Question 10: Has the program area engaged appropriate partners?

Question 11: Is the program area collaborating with them effectively?

Question 12: Are there any gaps in the portfolio for this technology area?

Question 13: Are there topics that are not being adequately addressed?

Question 14: Are there other areas that this program area should consider funding to meet overall programmatic goals?

Question 15: Can you recommend new ways to approach the barriers addressed by this program area?

Question 16: Are there any other suggestions to improve the effectiveness of this program area?

Responses to the subprogram overview questions are summarized in the following pages. Individual reviewer comments for each question are identified under the heading Reviewer 1, Reviewer 2, etc. Note that reviewer comments may be ordered differently; for example, for each specific subprogram overview presentation, the reviewer identified as Reviewer 1 in the first question may not be Reviewer 1 in the second question, etc.

Presentation Number: tI918

Presentation Title: TI Overview

Principal Investigator: Mark Smith (U.S. Department of Energy)

Question 1: Was the program area, including overall strategy, adequately covered?

Reviewer 1:

This reviewer responded positively and felt that the presenter did a great job of going over high-level TI objectives, while still detailing some of the highlighted projects.

Reviewer 2:

The reviewer commented that the presentation did a very good job of laying out overall program elements of the TI Team as well as relevance and importance of core activities to the VTO and DOE.

Reviewer 3:

The reviewer stated yes; the presentation adequately covers the TI program strategy.

Question 2: Is there an appropriate balance between near- mid- and long-term activities?

Reviewer 1:

This reviewer stated yes; the presenter showed the group's near- and long-term goals, of which there was a good balance.

Reviewer 2:

Although the presentation did not explicitly identify near-, mid-, and long-term activities, this reviewer noted that it did cover the full timeframe. Many of the activities were near-term, including first responder training, technical assistance, information and tools, and aggregate purchasing power. The reviewer reported that mid-term activities included the high visibility demonstration, best practices, permitting and safety issues, and Technologists-in-City pilots. Long-term activities highlighted by this reviewer included informing living labs and workforce development, and curriculum development.

Reviewer 3:

This reviewer indicated that there is too much emphasis on historic and current activities and not enough information about future activities, especially mid- and long-term activities.

Question 3: Were important issues and challenges identified?

Reviewer 1:

The reviewer stated yes; the presentation adequately identifies important issues and challenges.

Reviewer 2:

Important issues and challenges observed by this reviewer included workforce development; technical assistance, gap analysis, and feedback; policy deployment; and aggregating purchasing power.

Reviewer 3:

This reviewer commented that the presenter did a good job of highlighting some of the issues that TI attempts to tackle. However, the reviewer did not see a lot of detail regarding issues and challenges because this was an overview presentation.

Question 4: Are plans identified for addressing issues and challenges?

Reviewer 1:

The reviewer asserted that plans and activities addressed all key challenges and issues.

Reviewer 2:

This reviewer explained that the presenter did a good job of identifying some of the overarching challenges that TI is attempting to tackle and showed examples of funded projects to address these.

Reviewer 3:

The reviewer stated no; the presentation focused solely on historic and current activities. The reviewer observed no information in the presentation about plans for addressing issues and challenges.

Question 5: Was progress clearly benchmarked against the previous year (for multi-year projects)?

Reviewer 1:

The reviewer indicated that, as a program overview, it did not specifically address progress against the previous year. Project examples were provided, but the progress aspect was left to the more detailed, project reviews that followed. The reviewer described this approach as appropriate.

Reviewer 2:

The reviewer explained that this question did not apply because the presentation was an overview. The presenter did show enacted budgets for this year and last year.

Reviewer 3:

This reviewer stated no; the presentation included no information benchmarking progress against the previous year.

Question 6: Are the projects in this technology area addressing the broad problems and barriers that the Vehicle Technologies Office (VTO) is trying to solve?

Reviewer 1:

The reviewer indicated yes; TI is an important solution component to the question that VTO is attempting to address.

Reviewer 2:

This reviewer responded positively and noted that current projects are addressing the broad problems and barriers that VTO is trying to solve. The reviewer suggested that the presentation would be improved with a discussion of plans for continuing to do so in the mid- and long-term.

Reviewer 3:

Although the projects address workforce development and best practice sharing, the reviewer thought that the demonstration project needs more metrics to demonstrate success.

Question 7: Does the program area appear to be focused, well-managed, and effective in addressing VTO's needs?

Reviewer 1:

This reviewer responded positively and noted that the program area appears to be focused, well-managed, and effective in addressing VTO's needs.

Reviewer 2:

The reviewer stated yes; the program area is well-focused and managed, based on the presentation.

Reviewer 3:

This reviewer observed well-defined tool development and information that appear to be hitting the target audience. The reviewer explained that the demo projects seem to lose steam and need a better process for developing and transferring lessons learned.

Question 8: What are the key strengths and weaknesses of the projects in this program area? Do any of the projects stand out on either end of the spectrum?

Reviewer 1:

The reviewer commented that first responder training and deployment is a real strength, and that the EcoCAR program is outstanding, well-managed, and continues to improve and expand. Regarding the Clean Cities coalition network, the reviewer pointed out that it plays a key role in linking stakeholders as well as deploying awareness and best practices.

Reviewer 2:

This reviewer described the Clean Cities Coalitions as a strength of TI. Further, the reviewer noted that projects funded through TI go a long way in helping VTO meet its long- and near-term goals.

Reviewer 3:

The reviewer explained that key strengths include ongoing efforts to collaborate with fleets through Clean Cities projects, coordinators, and funding; and to educating fleets and the public through the Alternative Fuels Data Center (AFDC) and fueleconomy.gov websites. The key weakness identified by this reviewer is a lack of vision for mid- and long-term planning. Acknowledging that the projects in this program area have been successful for years, the reviewer inquired about what the future holds and whether the program area can adjust with future issues and/or needs.

Question 9: Do these projects represent novel and/or innovative ways to approach these barriers as appropriate?

Reviewer 1:

This reviewer responded positively and felt that the TI-funded projects represent innovative ways of removing technical barriers to meeting VTO's overarching goals.

Reviewer 2:

The reviewer stated yes; the projects represent novel and/or innovative ways to approach the barriers identified, and the projects have been recognized as leaders in their fields for years. The question considered by this reviewer is whether that can continue.

Reviewer 3:

Although the projects in this portfolio are very important, this reviewer did not think they are particularly novel. The reviewer advised that thoughtful consideration of key outputs and metrics could be helpful.

Question 10: Has the program area engaged appropriate partners?

Reviewer 1:

The reviewer indicated yes and described partner engagement as one of the program area's strengths, especially in its partnerships with fleets, Clean Cities Coalitions, and national laboratories.

Reviewer 2:

This reviewer responded positively and observed a broad set of partners including Clean Cities, universities, national laboratories, and industry.

Reviewer 3:

The reviewer answered yes and commented that the program has a good spread of industry, government, academia, and national laboratory partners.

Question 11: Is the program area collaborating with them effectively?

Reviewer 1:

Based on the presentation, this reviewer felt that the program collaborates effectively with its partners.

Reviewer 2:

The reviewer stated yes; the program area collaborates with its partners effectively and has done so for many years. The reviewer hoped that this can continue.

Reviewer 3:

This reviewer responded positively and noted that the program area appears to be collaborating with individual and regional stakeholders. The reviewer was unsure whether the program area gets the most out of best practice sharing.

Question 12: Are there any gaps in the portfolio for this technology area?

Reviewer 1:

This reviewer observed no gaps in the portfolio for this technology area and asserted that the portfolio is appropriate for the program area's objectives.

Reviewer 2:

There were no obvious gaps noted by this reviewer, though a stronger relationship between gap analysis and technology roadmaps was recommended.

Reviewer 3:

Although the presentation lacked great detail on specific projects funded by TI, this reviewer did not see any gaps in the portfolio from a high level.

Question 13: Are there topics that are not being adequately addressed?

Reviewer 1:

This reviewer observed no inadequately addressed topics, but advised that the program needs to continue engaging with fleets and consumers to stay on top of issues as they evolve.

Reviewer 2:

The reviewer did not notice any topics that were not being adequately addressed even though the presentation lacked any great detail of the TI-funded programs.

Reviewer 3:

This reviewer identified policy deployment and collaboration between major industry players.

Question 14: Are there other areas that this program area should consider funding to meet overall programmatic goals?

Reviewer 1:

Based on the presentation, the reviewer did not see any other areas that the program should consider funding to meet its overall programmatic goals.

Reviewer 2:

This reviewer stated no; the program area just needs to stay engaged as technologies and personal mobility choices evolve.

Reviewer 3:

The reviewer suggested that TI should consider pulling together a high-level summary roadmap that covers all of VTO, as well as engaging the light-, heavy-, personal, and commercial sectors in periodic crosstalk similar to what is done in the combustion area.

Question 15: Can you recommend new ways to approach the barriers addressed by this program area?

Reviewer 1:

This reviewer did not have any specific recommendations for ways to approach the barriers addressed in this program area.

Reviewer 2:

The reviewer recommended facilitating more cross-sector and cross-industry discussions.

Reviewer 3:

This reviewer suggested more emphasis on engaging a younger consumer audience; there are likely to be significant changes in personal mobility choices over the next 20-30 years, with new technologies and new ways of viewing transportation options. The program must stay engaged with this younger audience to remain relevant. The reviewer forecasted that the old “one car per person” model is likely to disappear and cautioned that the program cannot get caught up in doing “business as usual.”

Question 16: Are there any other suggestions to improve the effectiveness of this program area?

Reviewer 1:

This reviewer did not have any suggestions to improve the effectiveness of this program area.

Reviewer 2:

The reviewer stated no and suggested that the program area continue engaging fleets and consumers and adapting to their needs.

Reviewer 3:

This reviewer advised to stay focused and relevant.

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 #	Objectives	Approach	Accomplishments	Collaboration	Overall Impact	Weighted Avg.
ti070	Advanced Vehicle Technology Competitions—EcoCAR	Kristen Wahl (ANL)	7-10	3.75	3.81	3.94	3.69	3.75	3.83
ti079	Training for Cost-Effective, Code-Compliant Gaseous Fuel Maintenance Facilities	Ted Barnes (Gas Technology Institute)	7-18	3.50	3.50	3.30	3.50	3.00	3.37
ti080	Safety Training and Design, Permitting, and Operational Guidance for Gaseous Fuel Vehicle Facilities	Rob Adams (Marathon Technical Services USA)	7-23	3.50	3.60	3.60	3.60	3.30	3.55
ti081	WestSmartEV: Western Smart Plug-In Electric Vehicle Community Partnership for Electric Vehicles and Infrastructure	Chad Teply (PacificCorp)	7-28	3.50	3.50	3.50	3.50	3.33	3.48
ti082	U.S. Fuels Across America's Highways—Michigan to Montana (M2M)	Ted Barnes (Gas Technology Institute)	7-31	3.50	3.50	3.00	3.50	3.17	3.27

Presentation ID	Presentation Title	Principal Investigator (Organization)	Page #	Objectives	Approach	Accomplishments	Collaboration	Overall Impact	Weighted Avg.
ti083	Midwest EVOLVE (Electric Vehicle Opportunities: Learning, Events, Experience)	Lisa Thurstin (ALA of Upper Midwest)	7-34	3.50	3.50	3.38	3.50	3.38	3.44
ti084	Northwest Electric Vehicle Consumer Showcase	Jeff Allen (Drive Oregon [Forth])	7-38	3.63	3.50	3.25	3.38	2.88	3.35
ti085	Advancing Plug-In Electric Vehicle Adoption in New England through Events and Outreach	Joel Levin (Plug-In America)	7-42	3.33	3.33	3.33	3.33	3.17	3.32
Overall Average				3.56	3.57	3.49	3.53	3.30	3.50

Presentation Number: ti070
Presentation Title: Advanced Vehicle Technology Competitions—EcoCAR
Principal Investigator: Kristen Wahl (Argonne National Laboratory)

Presenter

Kristen Wahl, Argonne National Laboratory

Reviewer Sample Size

A total of eight 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 noted this is a terrific program that draws attention and interest to DOE's VTO program objectives and helps to train engineers and professionals who can be employed in activities that promote alternative fuel use and efficient vehicles.

Reviewer 2:

The reviewer noted that this project has a proven record of developing and showcasing talented students to seed the automobile industry with experienced, enthusiastic, and dedicated advanced technology engineers. The idea behind hosting a technology competition is solid, and the reviewer described the program as well-conceived and fully supported by original equipment manufacturers (OEM) manufacturers and suppliers. The reviewer could think of no better way to support the goal of developing future technicians and engineers.

Reviewer 3:

This reviewer explained that project objectives have been achieved through tremendous real-world experiences for the future innovators and engineers with a contagious enthusiasm and impressive results. It was easy for this reviewer to understand why students are motivated to participate, how much they are able to learn, and how it equips them for a successful career in automotive engineering.

Reviewer 4:

The reviewer commented that the program focuses on creating real world hands-on experience for university engineering students to develop new integrated technical solutions for new vehicles. The focus on new fuels and new technologies is consistent with DOE's objective of increasing fuel diversity.

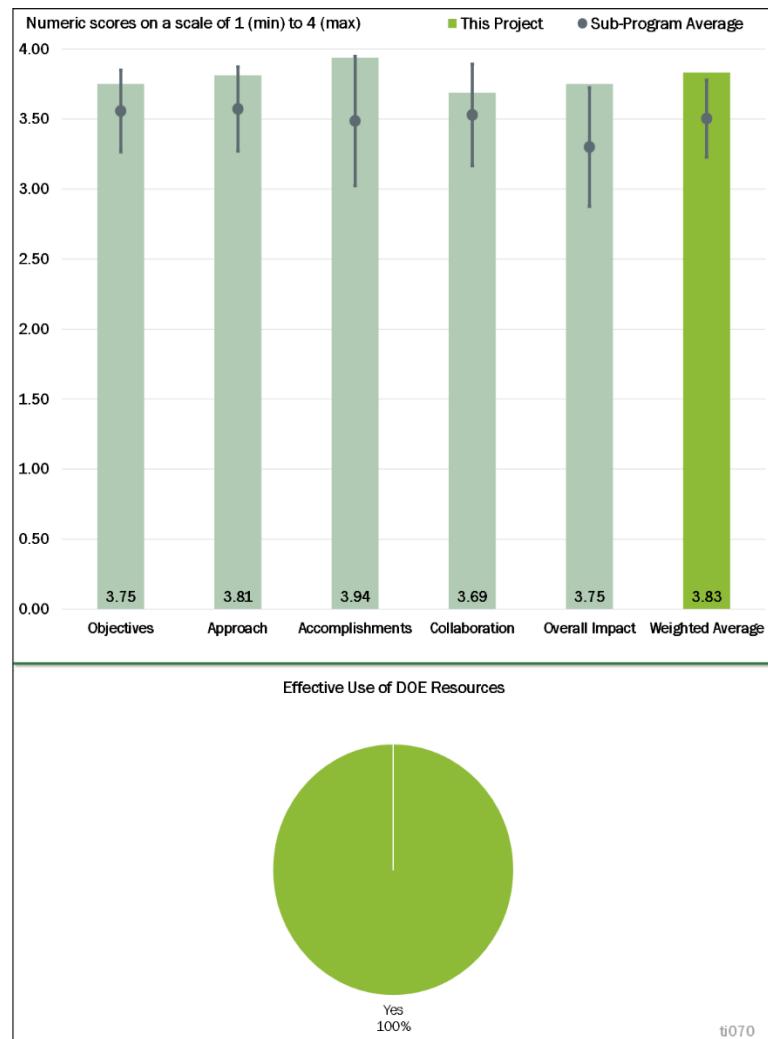


Figure 7-1 - Presentation Number: ti070 Presentation Title: Advanced Vehicle Technology Competitions—EcoCAR Principal Investigator: Kristen Wahl (Argonne National Laboratory)

Reviewer 5:

The reviewer highlighted the following: the project clearly addresses a lack of trained engineers and scientists, which is cited as a barrier; advanced vehicle technology curricula emphasizes experimental learning; Argonne National Laboratory (ANL) performed a fair competition for EcoCAR year 3 as targeted; and the powertrains demonstrated clearly met safety and efficiency goals.

Reviewer 6:

The reviewer noted that the project supports the DOE/VTO objectives of increasing fuel diversity through alternative fuel use and increasing transportation efficiency. The project objectives accomplish this primarily by “seeding” the automotive industry with future innovators and engineers with real-world experience in advanced vehicle technologies; demonstrating advanced vehicle technologies and alternative fuels that can increase transportation energy efficiency; and ensuring that the technical integrity of advanced vehicle technologies aligns with automotive industry standards. Each of these items, as asserted by this reviewer, helps ensure that the automotive industry will continue to develop advanced, energy-efficient vehicle technologies in the future.

Reviewer 7:

The reviewer identified two strengths: the project represents a mature, robust advanced vehicle technology workforce development effort that strongly supports DOE/VTO objectives; and the program includes an advanced driver assistance system (ADAS) component, paving the way for further integration of connected autonomous vehicle technologies into future EcoCAR competitions.

Reviewer 8:

According to the reviewer, the objectives for this project were well-described and address the barriers noted in the overview slide. Additionally, the reviewer suggested proportionally addressing barriers and project objectives on the project objective slides to improve the presentation. Although most of the barriers quadrant focuses on the lack of skilled workforce and workforce development, this reviewer reported that three-fourths of the objectives slide focuses on the demonstration, competition, and showcase element.

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 commented that the program appeared to be well-designed and run and did not have suggestions for improvement.

Reviewer 2:

According to the reviewer, EcoCAR continues to build on the success of previous competitions and does an excellent job of encouraging, educating, and fostering young talent for the automotive industry to create future generations of advanced technology vehicles. This reviewer observed a thoroughly researched, well-conceived, and expertly executed program.

Reviewer 3:

The reviewer indicated that the project has very specific and well-conceived goals and deliverables. It is very results-oriented and continues to evolve and grow over the years.

Reviewer 4:

The reviewer remarked that the project approach supports the integration of advanced transportation technologies and practices to support overall project objectives. The project is well-designed, feasible, and aligned with other efforts, and does an excellent job of bringing together automotive industry representatives with university staff and students to replicate real-world experience in developing advanced vehicle technologies. The project is also well-aligned with other VTO efforts, especially Clean Cities University, that

are intended to ensure a well-trained engineering workforce that continues advanced technology vehicle development.

Reviewer 5:

The reviewer noted that the approach seems most appropriate considering the real-world, hands-on experience the students receive, their exposure to the multi-year vehicle development process that is modeled after the auto industry, and the competitive environment that enhances the comprehensive engineering education, training, and mentoring the students receive.

Reviewer 6:

The reviewer observed the following strengths: the project's four-year design curriculum that allows for a comprehensive automotive workforce development program (encompassing engineering; electronics/computing; project management; communications; STEM education; etc.); and the program's rigorous and thorough vehicle safety inspections.

Reviewer 7:

This reviewer acknowledged an outstanding approach that prepares the students for a career in the automotive industry: year 1, modeling and simulation; year 2, integration into an existing vehicle; year 3, system full functionality; and year 4, "showroom ready," followed by "take to the road." The reviewer was impressed by the number of Clean Cities internships—114 interns/year. This reviewer also reported that the project approach emphasizes partner collaboration, including significant cost share (\$88 million), which allows the teams to tap into needed resources. The reviewer also noted that the briefing was unclear as to which specific advanced technology vehicle categories/types were advanced in the competition.

Reviewer 8:

It was clear to the reviewer that this project used a thoughtful and deliberate approach for achieving its goals that very much parallels the industry development path. The reviewer thought there was an excellent emphasis on safety, integration with university curricula, and leveraging of Clean Cities, including intern placement across North America. For the presentation, it was challenging for the reviewer to follow the milestones slide because the project start was excluded, years 1 and 2 were unmentioned, and there was no project end milestone indicated. The reviewer suggested that the slide could be better framed to best orient the audience to the time period of focus.

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 asserted that the project is outstanding in terms of accomplishments and demonstrated progress toward project objectives and DOE goals. The following significant accomplishments were highlighted by this reviewer: vehicle integration, safety, and testing; vehicle development; emissions testing and development; ADAS development; innovation; project management and communications; STEM outreach and community involvement activities; and media and public relations exposure. The reviewer noted that the number and variety of the project's accomplishments demonstrates how well the project aligns with DOE objectives in all facets of developing, testing, deploying, and promoting advanced technology vehicles to increase energy efficiency in transportation.

Reviewer 2:

It was obvious to the reviewer that EcoCAR's success was demonstrated in the number of program alumni who have gained employment with advanced vehicle technology manufacturers and supplier companies. The reviewer also noted that the program attracts the best and brightest students from the best engineering schools, and channels them into the automobile industry.

Reviewer 3:

The reviewer noted that annual participation rates, program competitiveness, and the number of students that have participated attest to the program's value and achievements.

Reviewer 4:

The reviewer reported that the project is a competition with very specific metrics, and that every team accomplishes major deliverables even though there is an overall winner.

Reviewer 5:

According to the reviewer, year 3 of EcoCAR met or exceeded all milestones, and the teams were largely successful meeting vehicle safety inspection (13/16, 14/16). This reviewer also pointed out that vehicle testing yielded several strong performances in acceleration, breaking, lateral acceleration, and energy consumption. Mileage accumulation (100 to 1,000) and continuous endurance drive (50 to 200m) were very impressive to the reviewer, as was total mileage accumulation (13,764) and teams that met mileage and endurance goals (9 of 16). This reviewer further highlighted that the expansion into ADAS activity demonstrates the EcoCAR program's evolution as technology continues to evolve.

Reviewer 6:

The reviewer thought that the project accomplishments and progress were impressive for the teams that successfully completed their integration and inspections, but expressed disappointment in seeing that several teams did not successfully complete their projects or participate in all of the workshops. The reviewer also noted that the expanded reach of the STEM outreach and community involvement program was especially gratifying to see.

Reviewer 7:

This reviewer offered feedback with respect to content and delivery. Regarding content, the reviewer noted that teams overachieved the goals set out for them. Specific accomplishments mentioned included the following: 90% of teams were 100% integrated, and 14 of 16 teams passed safety tests, which is higher than average; 11 of 16 teams made it to the finals round, which is the most ever; and 13 of 16 completed dynamic test events. The reviewer suggested that it would be good to highlight why certain teams missed their targets.

Continuing input regarding content, the reviewer found it notable that the teams had the opportunity to access the chassis dynamometer and that all teams passed safety inspection for dynamometer testing. The reviewer was extremely impressed to see the incorporation of ADAS elements into the project and that the project accommodated high-risk investigations outside the critical path in order to attract a greater diversity of talent and spur innovation. The reviewer said incorporating project management and communications topics was also laudable for contributing to the sense that the project provided a comprehensive and rounded learning experience that would have direct workforce applicability.

Regarding delivery, this reviewer would have liked to have seen results presented in tabular or chart form in which the project and team goals were specifically delineated and the accomplishments were compared against these targets. The reviewer also thought it would be helpful to provide a reference point or baseline on which to judge the accomplishments against previous efforts.

Reviewer 8:

None were noted by this reviewer.

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 the results speak for themselves, especially statistics on the high percentage of graduates going to work in the automotive industry. It was also gratifying for this reviewer to see the strong collaboration between government and industry sponsors.

Reviewer 2:

The reviewer observed an outstanding project regarding the degree to which team members and partners are involved in the project work, as well as the level of effective collaboration between and among partners. The real strength of the project is in the outstanding collaboration among all involved parties: DOE, General Motors (GM), 30 other government and industry sponsors, 16 universities, and ANL. The reviewer explained that this unique collaboration helps ensure that future automotive engineers get real-world experience in developing, testing, deploying, and promoting advanced, fuel-efficient vehicle technologies, further promoting the DOE objective of energy-efficient transportation.

Reviewer 3:

The reviewer noted that EcoCAR has a large number of partners, many of them large corporations, yet manages to coordinate effectively between them to foster collaboration and active participation in the program. Many sponsors lend time, talent, and resources to assist the student teams, rather than just providing monetary support.

Reviewer 4:

The reviewer opined that new coordination with the National Science Foundation (NSF) will ensure a “technology push” into the EcoCAR program as basic R&D can be matured in this program with low technology readiness level concepts. The reviewer reported that each team has a communications manager that has helped bolster knowledge of the program and attracted more students and sponsors. Project management training provided to ensure the teams were aware of milestones, budgets, fundraising, and risk management appeared to have paid off smartly by this reviewer. The reviewer also described the 251 million total impressions in year 3 of EcoCAR as very impressive. This reviewer observed very strong STEM outreach for the next generation of participants, and added that having 333 total youth events over 3 years and reaching out to 10,000 students is key to strong continuation.

Reviewer 5:

The reviewer remarked that the program blends the best of both the competitive and the collaborative models. Teams were motivated to compete, and the program not only had an overall winner but had competitive elements throughout the four years of the project. The reviewer thought the project emphasized collaboration and sharing and provided information and best practices throughout the program to even up the teams.

Reviewer 6:

The reviewer noted two project strengths including leveraging participation and subject matter expert (SME) knowledge from other DOE/VTO programs and agencies (e.g., the NSF), and leveraging substantial industry and partner funding. One weakness noted by the reviewer was that effort does not yet involve other OEMs or the United States Council for Automotive Research.

Reviewer 7:

The reviewer commented that the project clearly demonstrated incorporation of an extraordinarily high degree of collaboration across industry, government, and academic sectors. The project clearly left the impression that it explored every opportunity to leverage the investment of government and sponsor funds to achieve significant impact. For example, this reviewer highlighted its partnership with NSF to deliver STEM-focused education to teach students about marketing, outreach, and communications. The reviewer also suggested

spending more time discussing the various forms of collaboration that resulted, especially noting any new collaborations that might have emerged as a result.

Reviewer 8:

Based on the presentation, the reviewer noted that there appeared to be a strong team in place to support the individual universities, but was unsure how much collaboration exists between different partners.

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 commented that the excitement, interest, and young professionals facilitated by this program will go a long way toward advancing alternative fuel and efficient vehicle use.

Reviewer 2:

The reviewer remarked that the fact that so many graduates go to work in the automotive industry and that such a high percentage of Advanced Vehicle Technology Competitions (AVTC) alumni are responsible for protected intellectual property spoke highly of the program's success and the excellent technical training and mentoring received by graduates.

Reviewer 3:

The reviewer thought that the project's overall impact since 2014 has been excellent. In the reviewer's view, the project has already contributed, and will continue to contribute in the future, to increasing fuel diversity through using alternative fuels and increasing transportation efficiency. The project has "seeded" the automotive industry with hundreds of engineers with real-world experience in developing, testing, deploying, and promoting fuel-efficient, advanced technology vehicles. The reviewer said that 85% of project graduates go to work in the automotive industry, where they make significant contributions to advanced technology vehicles. Further, the project delivers a "diverse fleet of student-built prototype vehicles" that provide valuable data for research and education. Lastly, the project fosters strong collaboration among all participants, contributing to future efforts to educate automotive engineers and to develop fuel-efficient transportation technologies.

Reviewer 4:

The reviewer described EcoCAR as a fine example of a tailored, government-led program in partnership with academia and industry that continuously achieves great impact. With strong support from academia, the students' education is more industry-relevant while simultaneously accomplishing other important objectives such as team-building, fundraising, STEM outreach, and problem solving. The reviewer also noted that data such as 85% of EcoCAR participants going to work in the automotive industry and 53% being part of intellectual property within 2 years of working in industry is a testament to the program's impact on making students "job-ready."

Reviewer 5:

Based on past performance, the reviewer believed that EcoCAR and its successors will continue to have a significant impact by attracting and developing quality engineering talent to pursue careers in advanced technology vehicles.

Reviewer 6:

The reviewer indicated that the most important impact of this program is creating future engineers and researchers. As stated, 25,000 engineers have come through the program since its inception, and these engineers are the industry's future.

Reviewer 7:

The reviewer noted the following strengths: schools get to keep the cars for ongoing education; historically, 85% of graduates have entered the automotive industry workforce; and technical work conducted by school teams provides important data back to R&D staff at GM. As a minor weakness, the reviewer suggested that the program further increase engagement of high school and community college automotive/vocational programs.

Reviewer 8:

The reviewer thought the project clearly demonstrated significant impact with key metrics such as delivering 25,000 graduates since 1988 with an impressive 85% choosing employment in the automobile industry. The reviewer suggested providing a reference baseline on presentation slides against which to judge the metrics. For example, this reviewer asked how the cited 53% of GM-hired AVTC alumni with at least one piece of protected intellectual property compare against the baseline of all new hires or specific groups of new hires. Additional metrics of note for the overall impact slide were the number of academic papers produced, media impressions, patents filed for or issued, etc. Some were sprinkled throughout the accomplishments/progress section or otherwise raised during the question and answer period. The reviewer noted it would have been easier to follow and would have left a greater impression on the audience if the accomplishments/progress section focused on progress against the project plan and addressed accomplishments, achievements, and impacts in the final section.

This reviewer indicated that some of the notable achievements that could have been added in the impacts part of the presentation include the following: 50% of GMs hires have at least one piece of intellectual property within 2 years of working with the company; students know how to hit the ground running; and graduates earn about 10%-15% more than their peers in industry out of college. In sum, the reviewer would have liked more specific evidence of the project's impact presented in the slides such as details on types of patents awarded, changes to university curricula to create more advanced vehicle technology curricula, and cross-pollination such as interdisciplinary programs.

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 DOE funding was strongly leveraged through this well-developed project.

Reviewer 2:

The reviewer opined that the program represented a modest investment of DOE's resources and was well worth it.

Reviewer 3:

The reviewer described the use of resources as appropriate and consistent with the size of this project, and that additional resources from cost-sharing participants helped the program accomplish even larger objectives than would have otherwise been achievable. The reviewer also pointed out that GM deserves special recognition for the use of vehicles, the Milford track, and other contributions to this exceptional program.

Reviewer 4:

The reviewer asserted that the program was well worth the investment and, based on the number of qualified engineers and scientists the program has produced, efforts should be made to expand it to additional schools.

Reviewer 5:

The reviewer remarked that DOE resources were being leveraged and funds were being used wisely. The project features strong collaboration with more than 30 government and industry sponsors who contribute funding and in-kind support. The reviewer explained that the return on DOE investment was worthwhile given the project's success in helping develop an automotive engineering workforce with real-world experience in all facets of advanced vehicle technology development and deployment.

Reviewer 6:

There are few projects of which this reviewer was aware that can justifiably claim to leverage government funds to magnify project impact. It was difficult for the reviewer to see how the project team could have performed better in this regard.

Reviewer 7:

The reviewer believed EcoCAR is an excellent use of DOE funds and has proven its value by leveraging millions of dollars in capital and resources from partner sponsors.

Reviewer 8:

The reviewer observed a highly-leveraged program in which many industry stakeholders contribute resources and funding.

Presentation Number: ti079
Presentation Title: Training for Cost-Effective, Code-Compliant Gaseous Fuel Maintenance Facilities
Principal Investigator: Ted Barnes (Gas Technology Institute)

Presenter
Ted Barnes, Gas Technology Institute

Reviewer Sample Size
A total of five 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 thought the project's training objectives supported the safe use of natural gas, propane, and hydrogen fuels by fleets, and were well aligned with DOE/VTO objectives.

Reviewer 2:
The reviewer noted that the principal organizer clearly has the technical skill set and the pulse of industry to address all of the issues and concerns that may arise from such training and operational guidance.

Reviewer 3:
The reviewer said that the presentation related broad VTO integration goals to relevant project objectives. From this reviewer's perspective, the objective correctly stated that gaining hands-on experience with facility tours were important elements to addressing the barrier related to consumer lack of technical experience with new fuels. The reviewer added that a compendium of best practices and lessons learned is planned and warranted to have a larger and more lasting impact.

Reviewer 4:
The reviewer asserted that overcoming alternative fuels barriers is important, particularly when it comes to clarifying or explaining compliance with complex regulations or safety codes that may not be well understood because of the lack of trained professionals in the alternative fuels field.

Reviewer 5:
Overall, the reviewer commented that project objectives supported the DOE/VTO objectives of increasing fuel diversity through using alternative fuels and increasing transportation efficiency. However, the project presentation did not emphasize the key objective of "increasing transportation efficiency." The presentation stated that the project seeks to support the DOE/VTO objectives of "increasing national security by reducing

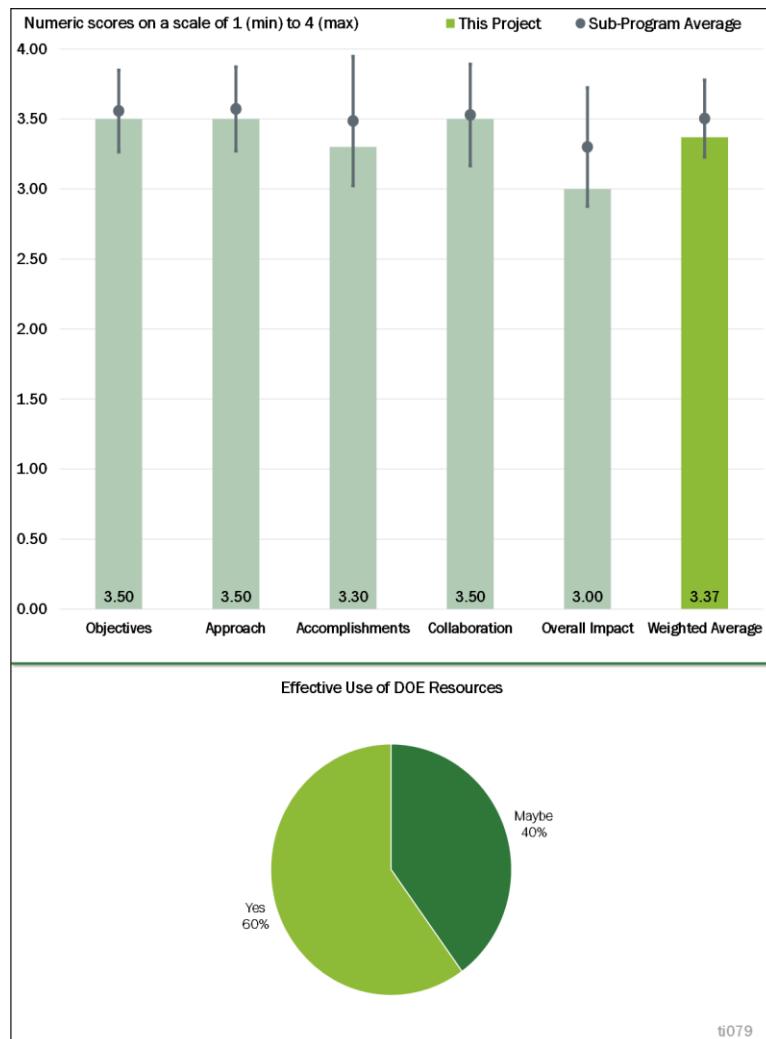


Figure 7-2 - Presentation Number: ti079 Presentation Title: Training for Cost-Effective, Code-Compliant Gaseous Fuel Maintenance Facilities Principal Investigator: Ted Barnes (Gas Technology Institute)

barriers to the use of alternative fuels, and promoting economic growth by increasing opportunities related to advanced technology vehicles and affordability for businesses.” The reviewer noted that the project objectives were generally effective, but could be improved by including focus on increasing transportation efficiency.

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 described the development of best practice documents, training sessions, and follow-on web-based information and training tools as an excellent approach.

Reviewer 2:

The reviewer indicated that the principal investigator (PI) did not recreate the wheel by repeating previous publications; National Renewable Energy Laboratory reports were leveraged instead. The PI worked with NGVAmerica and others to develop training curriculum resulting in excellent training materials that reflected the work of education professionals. This reviewer added that web-based information sources will help ensure the widest dissemination of training materials. Further, the reviewer noted that having only five visits limits the impact that might otherwise have been accomplished with additional training visits.

Reviewer 3:

The reviewer identified the following strengths: executed trainings are targeted and efficiently run; and technical hardware is available for direct handling/hands-on interaction at the trainings.

Reviewer 4:

The reviewer thought that the project approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives was excellent and that the project was well-designed, feasible, and aligned with other DOE/VTO efforts. It was noted that the project focused on three alternative fuels (natural gas, hydrogen, and propane) and the approach featured three distinct phases: material development (developing the technical basis for training materials and creating the training curriculum); training program review, planning, and development (workshop development/planning, dedicated project website, instructor-led training module, video and interactive elements, and instructor guide and student handbook); and training program implementation (establishing and implementing workshop events, establishing web-based information sources, and recording metrics on program success). The project was aligned with Marathon Technical Services to coordinate efforts based on relative strengths. The reviewer suggested that the project approach presentation could be improved by identifying “metrics on program success” and reporting on success to date.

Reviewer 5:

The program was excellent as far as it goes, according to the reviewer. It is desirable to have no-cost training from Marathon Technical Services, a firm that has extensive real-world experience and can provide sage advice on best practices and an appropriate administration of the code requirements. The reviewer also noted that program beneficiaries in the nine cities identified for training will undoubtedly receive invaluable training and advice. The only concern this reviewer expressed is how the information will be disseminated through webinars, websites, and workbook distributions. The reviewer suggested considering continuation of the current hands-on program in additional cities, with the co-sponsorship of other private and public sector organizations and with a more coordinated train-the-trainer outreach. It will be difficult to replicate the success of this program electronically or simply by making the workbooks available, according to the reviewer.

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:

It was clear to the reviewer that the accomplishments and progress closely track the project work plan to the extent of achieving the identified project milestones.

Reviewer 2:

The reviewer noted that three of five visits have been completed and each appeared to have been a success with good participation. The PI demonstrated flexibility by going from a half-day session with multi-fuels, which this reviewer commented is hard to do, to half-day sessions with a single alternative fuel. The reviewer pointed out that training material was completed in a timely fashion and that website development appeared to be making good progress.

Reviewer 3:

Although work remains to be done, the reviewer believed that this effort is in its early stages and appears on track for achieving objectives.

Reviewer 4:

Strengths according to the reviewer include good geographic distribution of trainings and strong training materials developed by the project. However, as a weakness, the reviewer noted that the six training sessions to be delivered by the project seemed slightly low.

Reviewer 5:

The reviewer thought the project's accomplishments appeared to be generally effective, and that progress is on schedule by meeting its milestones. The project has completed "Codes Reports" and "Keys Issues and Best Practices Reports" for propane, natural gas, and hydrogen, and has developed curriculum plans and training materials (technical reports, educational materials, best practices, and website). It has developed workshop materials, is identifying workshop locations and schedules, and has conducted some workshops. As noted by the reviewer, however, the presentation offered little information or data on activity impacts other than "Workshop and material information sent to thousands of stakeholders; over 3,500 LinkedIn views" on Slide 11. The reviewer would like to have seen the location and number of workshops that have been conducted and will be conducted, the number of workshop attendees, the number of distributed technical reports and educational materials, and the number of website users. The reviewer recommended a more robust listing of impacts to highlight project accomplishments.

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 noted that collaboration in developing guidance materials appeared to have included experts in the industry and was carried out efficiently.

Reviewer 2:

The reviewer described the organization and coordination between the PI, the eight Clean Cities Coalitions, the facilities' operators, and the participating fleet owners as commendable.

Reviewer 3:

The reviewer remarked that the Gas Technology Institute (GTI) could not have picked a better partner on hydrogen expertise than Frontier Energy (California Fuel Cell Partnership). Superior Energy Services (propane) and Clean Energy Fuels (compressed natural gas [CNG]) appeared to this reviewer to be strong

technical organizations with good expertise on those respective fuels. The reviewer pointed out that teaming with Clean Cities has delivered greater outreach locally and regionally, and that the project was active on social media, as evidenced by 3,500 LinkedIn views. This reviewer also observed targeted outreach, as evidenced by authorities having jurisdiction, fire marshals, and code officials attending.

Reviewer 4:

Project collaboration and coordination appeared to be good from this reviewer's perspective. The reviewer noted that the team members and partners appeared to be appropriate and the collaboration appeared to be effective. The key collaborators observed by this reviewer are SMEs in natural gas (Clean Energy Fuels), hydrogen (Frontier Energy), propane (Superior Energy Services), and the Clean Cities coordinators. The reviewer also highlighted, however, that the project presentation did not provide adequate information about roles or detail about the level of involvement for each of these collaborators.

Reviewer 5:

The reviewer noted strengths including Sandia National Laboratories' involvement and participation to bolster the project, and that the project was well-coordinated with a similar, separate VTO-funded project led by Marathon Technical Services. The single weakness reported by this reviewer is the minimal/challenging engagement of local/municipal inspectors in the trainings.

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 wrote that measuring impact is not possible because the project is in the early stages of conducting training sessions with more work to follow.

Reviewer 2:

The reviewer noted that the developed materials offered an extraordinary resource for the participating stakeholders, but the impact is still largely limited to the reach of audiences in the selected cities. While electronic and print versions of the material will be available, it probably will not have the same impact as the organized workshops where the subject matter can be more effectively presented and explained.

Reviewer 3:

It appeared to the reviewer that the project has already contributed—and will continue to contribute—to increasing fuel diversity through using alternative fuels and increasing transportation efficiency. However, the project presentation offered little information or data on the overall impact of the project activities. According to the reviewer, this type of "impact" information is needed to rate the project's overall impact higher than "good."

Reviewer 4:

Two weaknesses were indicated by this reviewer: it is unclear how proactively the (very good) training materials developed will be disseminated going forward; and the number of executed trainings through the project is somewhat low (six), thus limiting the overall impact without a continuation plan.

Reviewer 5:

This reviewer described two observations as both positives and negatives. Firstly, although the locations receiving the training are being positively impacted, the reviewer commented that the impact of this effort is limited because there are only three locations (and a total of five). Secondly, while the presenter was correct in saying that workers do not have time for three-day training sessions, the impact is limited because of only half-day training. Described as a positive, this reviewer noted that materials made available through a dedicated website will help with dissemination, and thus potentially positively address overall impact.

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 project is efficiently tackling an important area with minimal investment from DOE, according to this reviewer.

Reviewer 2:

The reviewer pointed out that the reviewed project is very similar to a separate one led by Marathon. Now that each approach has been piloted, this reviewer suggested the best elements of each be kept and merged into a new, single effort.

Reviewer 3:

This reviewer stated yes; resources are being used wisely for this and the accompanying Marathon project. However, the reviewer was unsure if further investment in the very specific barrier is necessary—the two efforts together may have covered enough regions and will have so-called “trained the trainer(s).”

Reviewer 4:

The reviewer found that funds were utilized wisely, but maximizing the program’s value requires updates beyond webinars and a website. The reviewer said that more on-site trainings are required around the country.

Reviewer 5:

To the reviewer, it was not easy to determine whether DOE resources were being leveraged and funds used wisely because the project presentation offered almost no information or data about the overall impact of project activities. The reviewer remarked that this type of “impact” information is needed to determine whether the project is a wise use of DOE resources. Also, it was unclear to the reviewer why DOE funded both this project and project TI080 (Marathon), which appear to have extensive overlap with project TI079 (GTI). (DOE Program Clarification: TI080 [Marathon] and TI079 [GTI] have similar goals and each address the same gaseous fuel safety training need. However, each project has a different approach, training plan, and distinctly different geographic target markets. Project overlap and duplication is minimized by collaboration between the two project teams throughout the performance period. Workshop site locations are chosen to avoid duplication and expand geographic coverage. Technical background materials are shared between teams to promote consistency. This dual training approach was intentional, with the goal of determining which training aspects of each workshop approach are most effective and impactful in actual practice. Lessons learned will inform future training activities going forward and, if successful, possibly lead to expansion of this training to include additional geographic territories.)

Presentation Number: ti080
Presentation Title: Safety Training and Design, Permitting, and Operational Guidance for Gaseous Fuel Vehicle Facilities
Principal Investigator: Rob Adams, (Marathon Technical Services USA)

Presenter

Rob Adams, Marathon Technical Services USA

Reviewer Sample Size

A total of five 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 were consistent with VTO's goals of energy security, economic growth, and affordability, and could provide needed guidance and training across the natural gas, hydrogen, and propane industries.

Reviewer 2:

The reviewer indicated that the project's training objectives supported the safe use of natural gas, propane, and hydrogen fuels by fleets, and were well-aligned with DOE/VTO objectives.

Reviewer 3:

The reviewer remarked that this project addresses a critical barrier to increasing the use of alternative fuels—understanding how to comply with complex regulatory or safety codes relating to fuels. The need for guidance and education in this area is important because of the newness of alternative fuels and lack of experts.

Reviewer 4:

The reviewer asserted that project objectives align with VTO goals as well as stated barriers. The reviewer noted that upgrading a garage to accommodate gaseous vehicles is a nonstarter for most. Fortunately, it is often not required and this effort could make a difference in informing such a determination. The reviewer pointed out that the project objective to build on past projects avoids a “reinventing the wheel approach” and makes more effective use of resources. The reviewer also reported that the effort intends to reach out to nine metropolitan areas, which is good coverage for a project of this size.

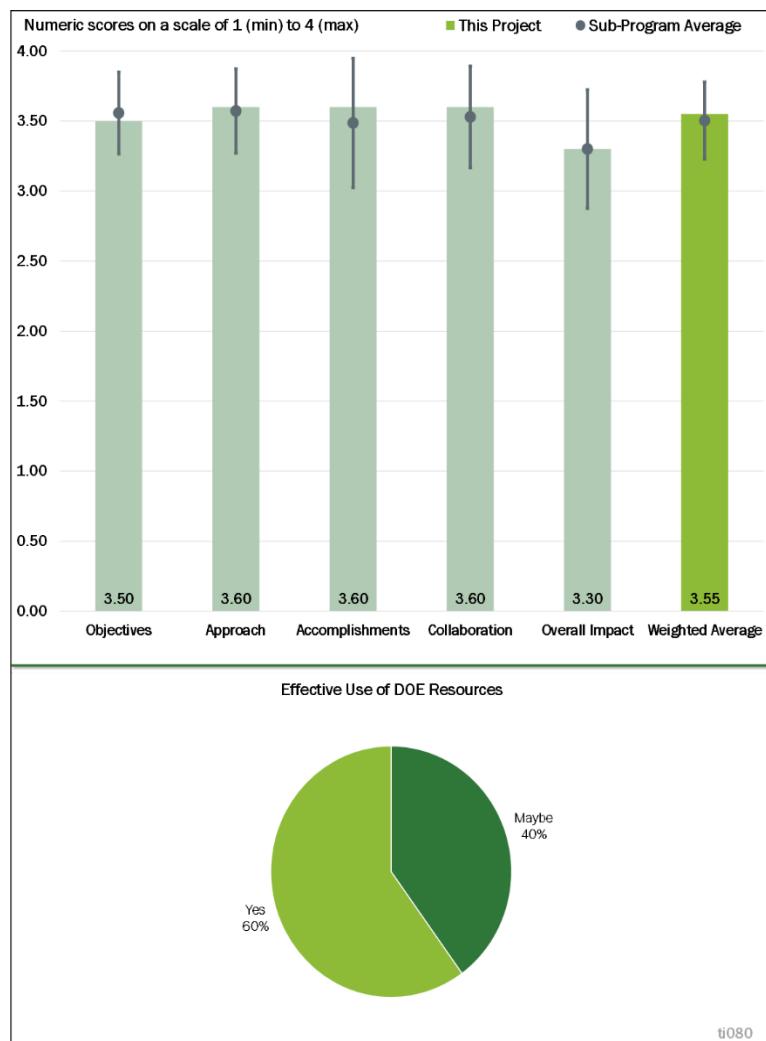


Figure 7-3 - Presentation Number: ti080 Presentation Title: Safety Training and Design, Permitting, and Operational Guidance for Gaseous Fuel Vehicle Facilities Principal Investigator: Rob Adams, (Marathon Technical Services USA)

Reviewer 5:

The reviewer thought that overall, the project supported the DOE/VTO objectives of increasing fuel diversity through alternative fuel use and increasing transportation efficiency. However, the DOE/VTO objectives that the project seeks to support, as indicated by the project presentation are the following: national security (safe and cost effective garages encourage transition to domestic gaseous fuels); economic growth (reduced cost will improve monetary viability of projects, which equals more projects); affordability (reduce cost through rigorous, but not excessive, upgrades); and reliability (ensure that garages operate safely, thereby avoiding incidents). Acknowledging that the project objectives are similar to some DOE/VTO objectives, this reviewer pointed out that the project does not emphasize the key objective of “increasing transportation efficiency.” Further, the reviewer remarked that the project objectives are generally effective, but could be improved by including focus on increasing transportation efficiency.

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 observed careful planning in year 1 for the best sites to visit, which has led to great turnout when executing the workshops. Additionally, this reviewer commented that peer-reviewing the training materials increases the quality of the training delivered. The reviewer also highlighted that the nine sites selected represent a good cross-section of areas with a large presence of industrial garages in the United States.

Reviewer 2:

The reviewer described the project approach to supporting the integration of advanced transportation technologies and practices to support overall project objectives as excellent. The project was well-designed, feasible, and aligned with other DOE/VTO efforts. The reviewer reported that the project focused on multiple alternative fuels (CNG, liquefied natural gas [LNG], propane, and hydrogen) and the approach featured three distinct phases: identification and evaluation of gaseous fuel garages to host training sessions; development of user-friendly training manuals and other materials; and gaseous fuel training sessions in selected garages. The reviewer added that the project aligned with GTI to coordinate efforts based on relative strengths.

Reviewer 3:

The reviewer noted that providing training at no-cost was a good incentive for attendees and a means for building strong training attendance. Also considered a strength by this reviewer were the developed training sessions that involve site visits/tours of host fleet facilities (21 different facilities in all).

Reviewer 4:

The reviewer stated that the approach was well thought-out and suggested that it would be great to add follow-on materials such as video tutorials. Otherwise, this reviewer would not change the approach.

Reviewer 5:

The reviewer remarked that it was notable that GTI worked with Marathon Technical Services to coordinate efforts based on each of their strengths. Conversely, while the scope of projects TI079 and TI080 were different—as were the project partners and geographical locations—the reviewer thought there still seemed to be some replication of effort between the two projects. Nonetheless, the interaction between the two project investigators produced a more comprehensive document than is likely to have been the case otherwise.

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:

To the extent of evaluating the project's accomplishments and progress, this reviewer thought the project was well-planned and executed and was producing outstanding, quantifiable results in terms of meeting milestones and achieving outreach goals.

Reviewer 2:

The reviewer highlighted the following strengths: the project is on track to deliver a good number of training sessions; training attendance is good (some have sold out); and the project has developed 18 case studies for a representative sample of garage upgrade projects, which is a very valuable asset to the project and DOE.

Reviewer 3:

The project's accomplishments were described by this reviewer as very effective and on schedule to contribute to project objectives and DOE goals. The project was meeting its milestones, and the presentation provided good information on the impacts of its activities, such as the number of training sessions conducted (and to be conducted), locations of past and future training sessions, types of materials developed, and "legacy impact" beyond year 3.

Reviewer 4:

The reviewer thought that the 18 case studies developed to-date provided a broad amount of coverage across the four alternative fuel types demonstrated at the workshops. The training manuals appeared to be user-friendly with plenty of diagrams and photos to accompany the text. The reviewer also noted that the large amount of interest and attendance generated by the three site visits/workshops in Buffalo, New York; Canton, Ohio; and Columbus, Ohio. This reviewer also reported that the PI mentioned the Buffalo training was sold out.

Reviewer 5:

It was not possible for this reviewer to fully answer this question because the project is still in the early stages with more training sessions and materials to follow at a later time.

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:

It was clear to this reviewer that the project was well managed and well-coordinated between the SMEs and Clean Cities Coalitions.

Reviewer 2:

The reviewer noted that the collaboration in developing materials and consulting other experts in the field appeared to have been conducted efficiently and effectively.

Reviewer 3:

Collaboration and coordination on the project appeared to be excellent to this reviewer, who also observed appropriate team members and partners as well as effective collaboration. The key collaborators were Clean Fuels Ohio and several other Clean Cities coalitions. Additionally, the reviewer commented that the project presentation provided good information about collaborator roles and their level of involvement.

Reviewer 4:

The reviewer noted that Marathon was working with Clean Fuels Ohio and several other Clean Cities organizations to coordinate the training. This reviewer further indicated that Marathon and the team identified 21 host fleet facilities to conduct training across the nine cities that will be visited. This increased coordination ensures that all alternative fuels will be covered in each city.

Reviewer 5:

The reviewer highlighted two strengths: the project is well-coordinated with a similar, separate VTO-funded project led by Marathon Technical Services; and the project is effectively partnered with eight Clean Cities Coalitions nationally. Similarly, this reviewer noted the following two weaknesses: minimal and/or challenging engagement with local and municipal inspectors, overall; and engagement with private fleets has been difficult, thus far.

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 noted that it appears the project has already contributed, and will continue to contribute, to broadening fuel diversity through alternative fuel use and increasing transportation efficiency.

Reviewer 2:

The reviewer thought that while this effort only involves indoor refueling at industrial garages, the approach and accomplishments maximize the impact that such an effort can achieve given the resources being applied. Clean Fuels Ohio has proven to be an effective partner in communicating with Clean Cities Coalition partners in advance of workshop visits and for general information dissemination. Additionally, the reviewer noted that the case studies prepared for best practice garage upgrades should go a long way toward informing decision makers that are interested in switching to CNG, LNG, hydrogen, or propane for indoor operations.

Reviewer 3:

The reviewer noted that it was early to assess the impact of this program at this stage.

Reviewer 4:

This reviewer stated that one must conclude that the project has been very impactful in terms of the workshops completed, the audiences reached, and the collaborations achieved. However, the reviewer suggested that additional consideration should be given to how the materials developed can continue to be effectively disseminated and updated.

Reviewer 5:

As a strength, the reviewer commented that the developed case studies provide valuable, shared industry best practices for operations from a variety of fleets. Although the project intends for trainings to be replicable, the reviewer observed no clearly-defined means for achieving this. Further, there has been no National Alternative Fuels Training Consortium engagement to date. It also was unclear to the reviewer how proactively developed training materials will be disseminated going forward.

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 the project was tackling an important issue and represents modest investment by DOE.

Reviewer 2:

The reviewer stated yes; resources were wisely applied in this project and the outcomes were very beneficial. Because this and the accompanying GTI project may have achieved an appropriate level of information dissemination, the reviewer was unsure if more projects of this type should be awarded in the future. State, regional, and local officials may be able to use the information and continue the training and awareness into the future.

Reviewer 3:

The reviewer thought the project was very similar to a separate one led by GTI. Now that each approach has been piloted, this reviewer suggested that the best elements of each be kept and merged into a new single effort.

Reviewer 4:

The reviewer suggested that thought should be given to consolidating resources utilized in the development of both this program and TI079 for the purpose of funding additional outreach and hands-on training while assuring that the materials disseminated remain current.

Reviewer 5:

According to the reviewer, it appeared that DOE resources were being leveraged and funds used wisely; DOE probably should fund similar projects in the future. However, it was unclear why DOE funded both this project and project TI079 (GTI), which have extensive overlap with project TI080 (Marathon). For future projects, this reviewer recommended that DOE select one provider to avoid overlaps and duplication of effort. (DOE Program Clarification: TI080 [Marathon] and TI079 [GTI] have similar goals and each address the same gaseous fuel safety training need. However, each project has a different approach, training plan, and distinctly different geographic target markets. Project overlap and duplication is minimized by collaboration between the two project teams throughout the performance period. Workshop site locations are chosen to avoid duplication and expand geographic coverage. Technical background materials are shared between teams to promote consistency. This dual training approach was intentional, with the goal of determining which training aspects of each workshop approach are most effective and impactful in actual practice. Lessons learned will inform future training activities going forward and, if successful, possibly lead to expansion of this training to include additional geographic territories.)

Presentation Number: ti081
Presentation Title: WestSmartEV:
Western Smart Plug-In Electric
Vehicle Community Partnership for
Electric Vehicles and Infrastructure
Principal Investigator: Chad Teply
(PacificCorp)

Presenter

James Campbell, PacificCorp

Reviewer Sample Size

A total of three 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 objective and overview slides effectively described the project's specific objectives, as well as how the project supports the DOE/VTO objectives of increasing fuel diversity through the use of alternative fuels and increasing transportation efficiency. The reviewer said that the project addressed several of VTO's TI goals, such as energy security, economic growth, affordability, and reliability/resiliency through the development of electric vehicle (EV) charging infrastructure along highways (direct-current fast-charging [DCFC]) and at workplace locations (Level 2). This reviewer further indicated that project objectives appeared to be effective for the planned scope.

Reviewer 2:

The reviewer remarked that the project objectives addressed multiple barriers across multiple states.

Reviewer 3:

The project, according to the reviewer, increased diversity by expanding fuel infrastructure, which is a critical gap area. This reviewer also highlighted the high value for deployment focus, and noted that only a single fuel (electricity) was selected with the project covering a limited geographic area. The reviewer opined that additional work is needed for diversity of fuels and geographies present in the United States.

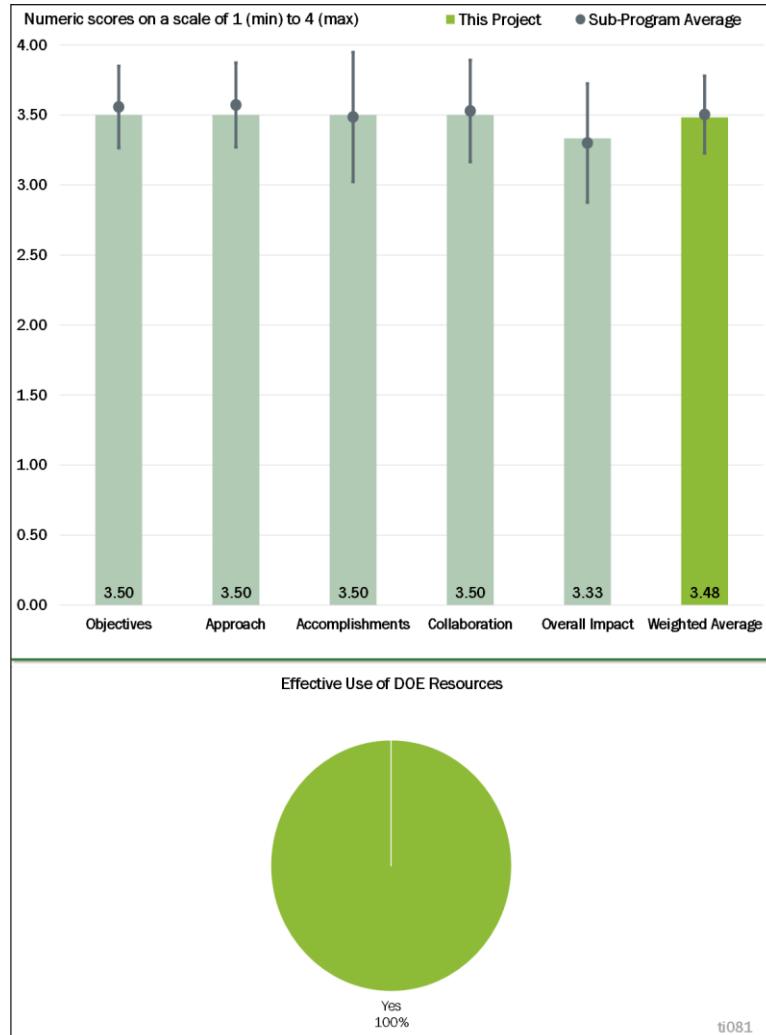


Figure 7-4 - Presentation Number: ti081 Presentation Title: WestSmartEV:
Western Smart Plug-In Electric Vehicle Community Partnership for Electric
Vehicles and Infrastructure Principal Investigator: Chad Teply (PacificCorp)

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 thought the project approach section provided an effective methodology to accomplishing the project objectives and supporting the integration of advanced transportation technologies and practices. All six of the project tasks were well-aligned in providing a comprehensive approach to the goal of increasing EV market penetration through the development of corridor and workplace charging. The reviewer observed adequate detail provided on the approach and milestone slides with regard to the planned tasks and activities.

Reviewer 2:

The reviewer explained that the approach resulted in a number of states and stakeholders coming together to build-out the infrastructure for EV corridors.

Reviewer 3:

The reviewer noted that the project expanded DCFC stations, Level 2 stations, and vehicles through incentives.

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:

According to the reviewer, very effective progress has been made towards achieving project goals. All pilot phase milestones have been completed and the expansion phase milestones were all underway. The reviewer reported that 20 of 65 DCFC chargers and 343 of 600 Level 2 workplace chargers have been installed. Additionally, charger location analysis, charger utilization data analysis, and the smart mobility activities appeared to be on track for successful completion. This reviewer further stated that no concerns have been identified.

Reviewer 2:

The reviewer noted that this project resulted in a multi-state memorandum of understanding to develop EV corridors and that the use of EVs has doubled in the region since the inception of this program.

Reviewer 3:

The reviewer reported that it is early in project, and also highlighted model and initial integration progress.

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:

Team collaboration and coordination appeared to result in very good results from this reviewer's perspective. The inclusion of the University of Utah's University Transportation Center was beneficial to the program.

Reviewer 2:

The reviewer observed an effective project team assembled to execute this project, with industry and Clean Cities coalition partners involved, which provides an excellent mix of expertise among team members. The project team roles were defined and collaboration/communication among project partners appeared to be appropriate for the project scope. Additionally, this reviewer pointed out that the project partnered with state agencies, infrastructure providers, local non-profits, and industry advocacy groups.

Reviewer 3:

The reviewer would like to see more progress reported from Clean Cities coalitions in the project area, as well as a system for lessons learned and repeatability beyond the project area.

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:

As mentioned in prior comments, this reviewer explained that the project had significant impacts and brought together several states to coordinate efforts and resources to build-out the EV infrastructure network across multiple states.

Reviewer 2:

The reviewer asserted that the project was effective in contributing to increasing fuel diversity through alternative fuel use and increasing transportation efficiency. The project contributed to electrifying the I-15 corridor in Utah and indirectly supported the doubling of the number of EVs in the state. Additionally, this reviewer reported that PacifiCorp committed to a continued investment of \$2 million per year for 2 years beyond the project period of performance. Finally, the reviewer added that the project efforts have contributed to the electrification of six buses in the Park City transit fleet.

Reviewer 3:

The reviewer remarked that the project advances DCFC and Level 2 EVs for the project area, but 65 DCFC and 600 Level 2 vehicles will only be a fraction of what is needed to service 50,000 EVs. Far more community partnerships and leverage must be identified. The reviewer suggested reviewing the cost of gasoline compared with the cost of electricity in the project area. The reviewer thought that chargers may see more use, or consumers may be more interested in vehicles, if costs were lower than gasoline, or if there were times when costs would be lower than grid costs at home.

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 opined that the use of DOE funding to develop highway corridors and workplace charging is a critical strategy/activity to advancing the EV market. The projects that support implementation strategies and activities, such as barrier removal, should assist with market transformation in the local/regional target area. Additionally, the reviewer commented that smart mobility and data analysis activities are an important project component that can provide lessons learned to other adopters as well as provide critical data to industry, decision makers, and government/national laboratories.

Reviewer 2:

The reviewer stated that the use of resources was efficient and resulted in data that could be used by other areas/regions around the country to replicate the program.

Reviewer 3:

The reviewer indicated that the project shows the high value of technology integration and installation in a project area and that similar projects should consider a nationwide application. Good use of Clean Cities coalitions was observed by this reviewer, who suggested that numerous other geographies could benefit from similar corridor projects run in collaboration with Clean Cities and utilities. The reviewer explained that 65 DCFC and 600 Level 2 are inadequate for high market levels of EV adoption, and asserted that far more resources must be dedicated to this deployment. This reviewer further suggested that other fuels be deployed in supported partnerships by DOE to help secure our energy, economic, and environmental futures.

Presentation Number: ti082
Presentation Title: U.S. Fuels Across America's Highways—Michigan to Montana (M2M)
Principal Investigator: Ted Barnes (Gas Technology Institute)

Presenter
 Ted Barnes, Gas Technology Institute

Reviewer Sample Size
 A total of three 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 noted that the lack of infrastructure for alternative fuels continues to be a barrier that impedes deployment of alternative fuel vehicles (AFVs). In areas where stations have not been deployed and incentives are not strong, it can be difficult to get stations installed, therefore it takes a collaborative effort to identify stakeholders including fleets or users that will buy vehicles that can refuel at new stations. The reviewer commented that this is a worthwhile effort to address shortcomings in key areas of the country where no one entity can address all the issues involved.

Reviewer 2:
 The reviewer explained that the project objective and overview slides describe the project's specific objectives, as well as how the project supports the DOE/VTO objectives of increasing fuel diversity through alternative fuel use and increasing transportation efficiency. The project addresses several VTO TI goals, such as energy security, economic growth, affordability and reliability/resiliency, through the development of alternative fuel infrastructure (EV, CNG, and propane) along the I-94 highway corridor from Michigan to Montana. The project objectives appeared generally effective for the planned scope from this reviewer's perspective.

Reviewer 3:
 The reviewer remarked that the project's objectives lined up nicely with the Federal Highway Administration's (FHWA) Alternative Fuels Corridor Program—a multi-alternative fuel initiative (EV, CNG, and propane) to build-out infrastructure on I-94 from Billings, Montana to Port Huron, Michigan, to create a sustainable alternative fuels corridor.

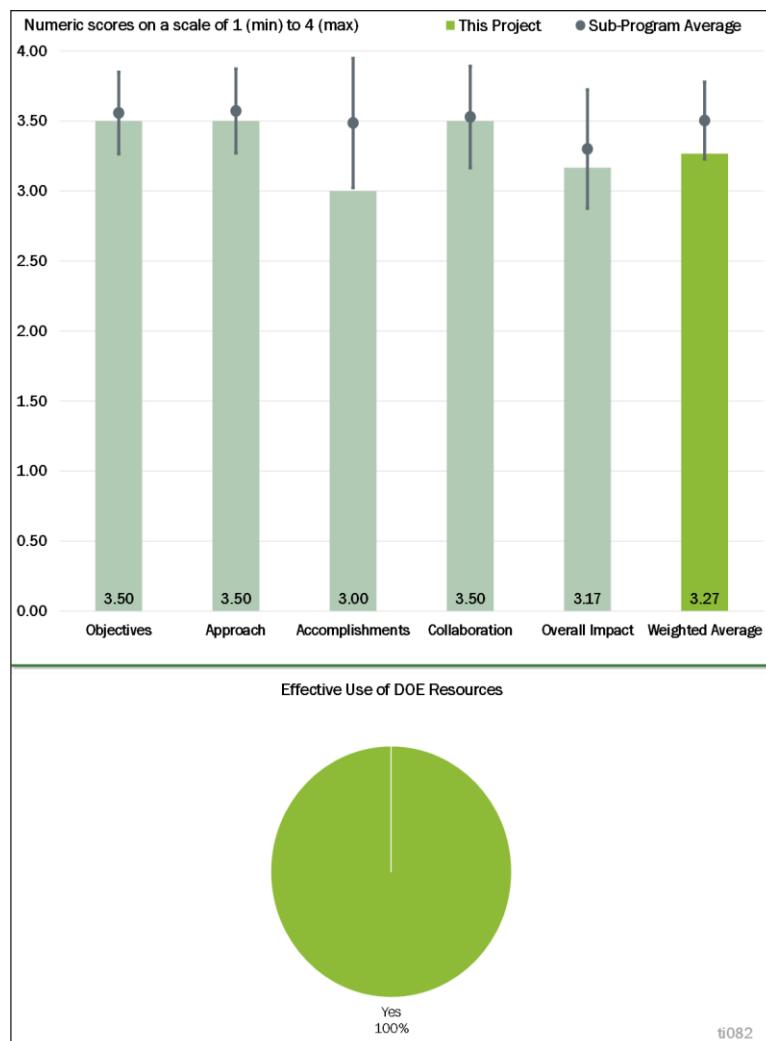


Figure 7-5 - Presentation Number: ti082 Presentation Title: U.S. Fuels Across America's Highways—Michigan to Montana (M2M) Principal Investigator: Ted Barnes (Gas Technology Institute)

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 project approach appears to be well-conceived.

Reviewer 2:

The reviewer noted that the project approach section provided an effective methodology for accomplishing project objectives and supporting the integration of advanced transportation technologies and practices. Adequate details were also provided with regards to planned tasks and activities on the approach slides. The reviewer pointed out that presentation highlighted additional efforts and opportunities leveraged by the project, such as the FHWA Alternative Fuels Corridor designation initiative.

Reviewer 3:

The reviewer remarked that the approach required significant effort to coordinate on-location infrastructure, signage needs, and data collection.

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:

Because this project is in an early stage of development with two more years to go, this reviewer stated that the accomplishments are good.

Reviewer 2:

According to the reviewer, once the scalability of various alternative fuel infrastructure is achieved, this project will be a model for other areas in the country looking to build-out alternative fuel infrastructure along interstate corridors. The focus on economic growth and reliability/resiliency of alternative fuel infrastructure will provide much-needed information/data for other areas of the country looking to implement similar efforts.

Reviewer 3:

The reviewer observed adequate progress made towards achieving project goals, and noted that vehicle deployment, infrastructure planning, and outreach/training activities were underway. This reviewer reported that 30 CNG long-haul trucks (of the 60 planned) have been deployed. While the planning efforts are underway, slower progress has been made regarding fueling infrastructure development because none of the 15 planned sites have been completed yet. While the reviewer had no significant concerns identified, the reviewer had difficulty determining exactly how actual progress should be measured against the project plan due to the absence of a milestone table in the presentation.

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 was impressed with the degree of collaboration and coordination between the public and private sectors to implement this project.

Reviewer 2:

The reviewer observed an effective project team assembled to carry out this project and lauded the excellent mix of expertise of team members involved from industry and Clean Cities coalition partners. Team members

are well-suited to the project work and the working relationships appeared to be appropriate for a project of this scope.

Reviewer 3:

This reviewer commented that a strong team for success appears to have been put in place.

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 thought that the project's overall impact will be significant and serve as an excellent case study for other areas of the country working on building out alternative fuel infrastructure along interstate corridors.

Reviewer 2:

The reviewer noted that the project has good potential to contribute to increasing fuel diversity through alternative fuel use and increasing transportation efficiency by deploying alternative fuel infrastructure along the highly traveled I-94 corridor in the Midwest. By focusing on installing electric, CNG, and propane fueling sites, this project will be able to address critical fueling needs for different vehicle/fueling technologies and all classes of vehicles (light-, medium-, and heavy-duty).

Reviewer 3:

Given where the project team is in development, this reviewer described overall impact as good.

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 resources appeared, to the reviewer, to be efficiently used and will hopefully result in the funding of other corridor projects throughout the country.

Reviewer 2:

The reviewer believed that the project addresses an important issue and is a good use of DOE's funding because there are relatively few deployment programs and fewer that focus on fueling infrastructure.

Reviewer 3:

Using DOE funding to develop highway corridors and adjacent community fueling infrastructure is a critical strategy/activity to advance the market of all alternative vehicles, according to the reviewer. These projects that support implementation strategies and activities, such as barrier removal, should assist with market transformation in the local/regional target area.

Presentation Number: ti083
Presentation Title: Midwest EVOLVE (Electric Vehicle Opportunities: Learning, Events, Experience)
Principal Investigator: Lisa Thurstin (ALA of Upper Midwest)

Presenter
Lisa Thurstin, ALA of Upper Midwest

Reviewer Sample Size
A total of four 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 noted that the project objectives were focused on the education of both consumers and dealerships to help overcome perceptions about new technologies. The reviewer indicated that they addressed several VTO goals and the identified barrier, “consumer and fleet reluctance to purchase new technologies.”

Reviewer 2:
This reviewer thought the project pulled together a significant portion of the Midwest states to provide education about EVs and expanding fuel diversity.

Reviewer 3:
The reviewer remarked that the project was aimed at understanding and reducing barriers to alternative fuel use in the Midwest, and was well-aligned with DOE/VTO objectives.

Reviewer 4:
Like similar projects, the reviewer indicated that this one had a clear objective to get interested consumer and fleet buyers behind the wheel for real-world experience in EVs.

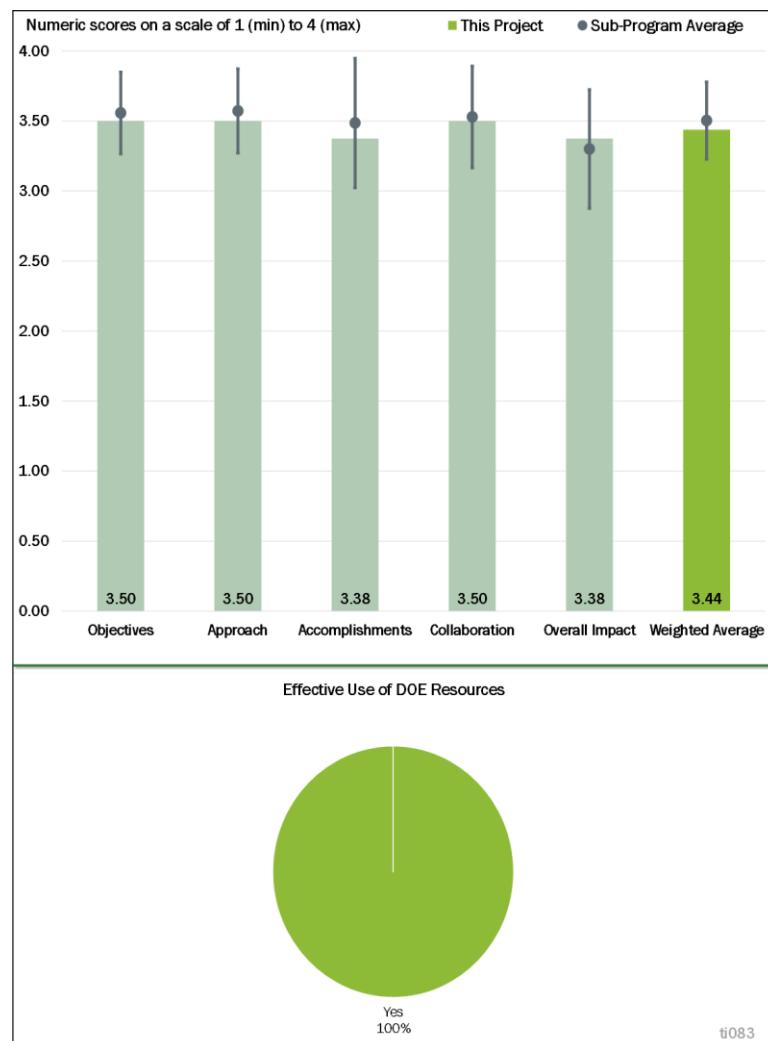


Figure 7-6 - Figure 7-7 - Presentation Number: ti083 Presentation Title: Midwest EVOLVE (Electric Vehicle Opportunities: Learning, Events, Experience) Principal Investigator: Lisa Thurstin (ALA of Upper Midwest)

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 noted that the project approach was solid and well-rounded with a good mix of events and venues. Including dealership training and establishing an EV Owner's Forum to enlist current EV owners as technology ambassadors could reap ancillary benefits as well.

Reviewer 2:

This reviewer reported that the approach included large, small, and workplace events combined with survey and data collection to achieve the goals of providing hands-on experience and demonstrating EV use. The project was developing outreach materials to help educate dealers and utilities, which the reviewer believed is a key piece of EV adoption. In conclusion, this reviewer described the approach as effective.

Reviewer 3:

The reviewer remarked that the project successfully pulled together partners and consumers for EV experiences, education, and analysis through surveys.

Reviewer 4:

The reviewer identified two strengths: the project is cooperating with ANL to track EV sales across the Midwest, which is a key approach for measuring project effectiveness; and the project provides valuable dealer training, including an online dealer information forum that has been developed and enables EV owners to provide valuable dealer reviews and ratings.

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 was impressed with the accomplishments achieved at the approximate halfway point. The team was only required to hold 8 events in Budget Period 1, but completed 35. The project was on track to meet goals for events over the course of the project. The project team also developed the EVolution tool that helps guide consumers purchasing EVs. With 2,300 test drives completed and 2,400 surveys collected, this reviewer explained that the project team was making progress on ensuring the ability to collect surveys from a majority of participants, which can be a challenge.

Reviewer 2:

The reviewer indicated that the project appeared to be on schedule to meet its goals. Extra events were held and relevant data were collected, indicating an increase in positive perception of EVs.

Reviewer 3:

The reviewer noted that the project was making full progress on all milestones for Budget Period 1. The reviewer was aware of project successes through EV media and the project's nationwide marketing initiative, and asserted that 2,300 test drives is an impressive metric success.

Reviewer 4:

The reviewer saw as a strength how the project has delivered a substantial number of deliverables—2,400 surveys, 2,300 test drives—at 50% project completion. The reviewer identified the following weaknesses: a total number of targeted ride-and-drives—in total and by state—has not been set; extended-test drives have been challenging due to lack of available demonstration EVs in the Midwest; and survey results indicate only 13% of test drive event attendees had never experienced an EV before, which suggests that these events are not targeting a large number of uninitiated people new to the technology.

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 saw clear evidence of high levels of collaboration among the project team, shown by the impact of project events and diversity of program partners and locations.

Reviewer 2:

The reviewer noted that the project appeared to have assembled a strong team of partners with a variety of Clean Cities coalitions signing on and actively participating.

Reviewer 3:

Two project strengths were noted by this reviewer: the project involves a large number of robust partnerships, and partners are strongly leveraged (helping the project thus far spur 130 additional events not funded by the project); and the project is effectively partnered with six Clean Cities coalitions across the Midwest.

Reviewer 4:

The reviewer thought that the official project partners were a bit unclear. However, it looked like the Clean Cities coalitions and the project lead were working well together and engaging many other stakeholders in the region.

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 commented that the driver experience was a metric clearly showing the impact and an opportunity to expand impact. This reviewer also described 50,000 event attendees as a positive engagement metric. Clearly, choices of macro and micro events have been successfully operationalized to have high overall impact, and this reviewer further asserted that experience data collected from project participant survey metrics was great.

Reviewer 2:

The reviewer noted that the impacts had increased engagement from dealerships and workplaces who were interested in adding charging stations. Both of these impacts are helping to overcome the lack of infrastructure in the region and a lack of vehicles, which are identified barriers. This reviewer added that surveys have also shown an increase in EV appreciation, which is helping to change perceptions.

Reviewer 3:

The reviewer stated that the project had decent impact, noting the large number of participants having experienced EVs through the various drive events. Holding drives in conjunction with large auto-related events like the Chicago Auto Show seemed to be an ideal way to attract interested auto consumers. The reviewer remarked that the exit surveys indicated that the drive programs were effective in positively changing perceptions.

Reviewer 4:

No comments regarding overall impact were noted from this reviewer.

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 thought this project was an excellent use of DOE resources. The hands-on experience was a great way to change people's impression of any new technology, and the project has shown strong results.

Reviewer 2:

This reviewer indicated that the project is a good use of VTO resources that helps to increase EV adoption and achieve VTO goals. Additionally, the reviewer pointed out that DOE will have information from the surveys as well, which will help in future projects.

Reviewer 3:

The reviewer asserted that the project could be repeated elsewhere and stated that there is a clear need. Examples of future projects suggested by this reviewer could be to continue in project areas as new models are available, or expand into other U.S. regions that could benefit from electric-powered vehicles or other alternative fuels.

Reviewer 4:

The reviewer noted that the project addressed important VTO objectives. Future similar projects, according to the reviewer, should strive to have strong OEM/dealer involvement, and should heavily target audiences with no EV experience or exposure (in addition to those with greater EV familiarity and higher likelihood of purchasing).

Presentation Number: ti084
Presentation Title: Northwest Electric Vehicle Consumer Showcase
Principal Investigator: Jeff Allen (Drive Oregon [Forth])

Presenter
Zach Henkin, Drive Oregon (Forth)

Reviewer Sample Size
A total of four 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 EV project moves diversity forward by one additional fuel, and that such education objectives are critical to the fuel diversity goal. Lack of awareness and technical expertise for AFVs is a critical area of approach. Additionally, great strategy and goals were observed by this reviewer.

Reviewer 2:
The reviewer noted that the project is aimed at increasing EV use in the Pacific Northwest, and is well-aligned with DOE/VTO objectives.

Reviewer 3:
The project objectives tie directly to VTO goals by focusing on reducing reliance on oil and developing awareness to increase adoption.

Reviewer 4:
The reviewer commented that the project has clear, attainable objectives with measurable results; a multi-faceted approach with physical, virtual, and mobile components; and an innovative EV showroom education center that is unique among similar projects. Providing drive opportunities was described by this reviewer as an excellent approach for influencing people's opinion of EVs, and if steady traffic can be achieved, the EV showroom has potential for great educational opportunities. Although the low- and moderate-income campaign was unique, the reviewer was not sold on its potential effectiveness, given the relatively high cost of some EVs compared to conventional vehicles typically purchased by low- to moderate-income consumers. The utility engagement component shows promise, and the use of leased vehicles for test drives ensured vehicle availability.

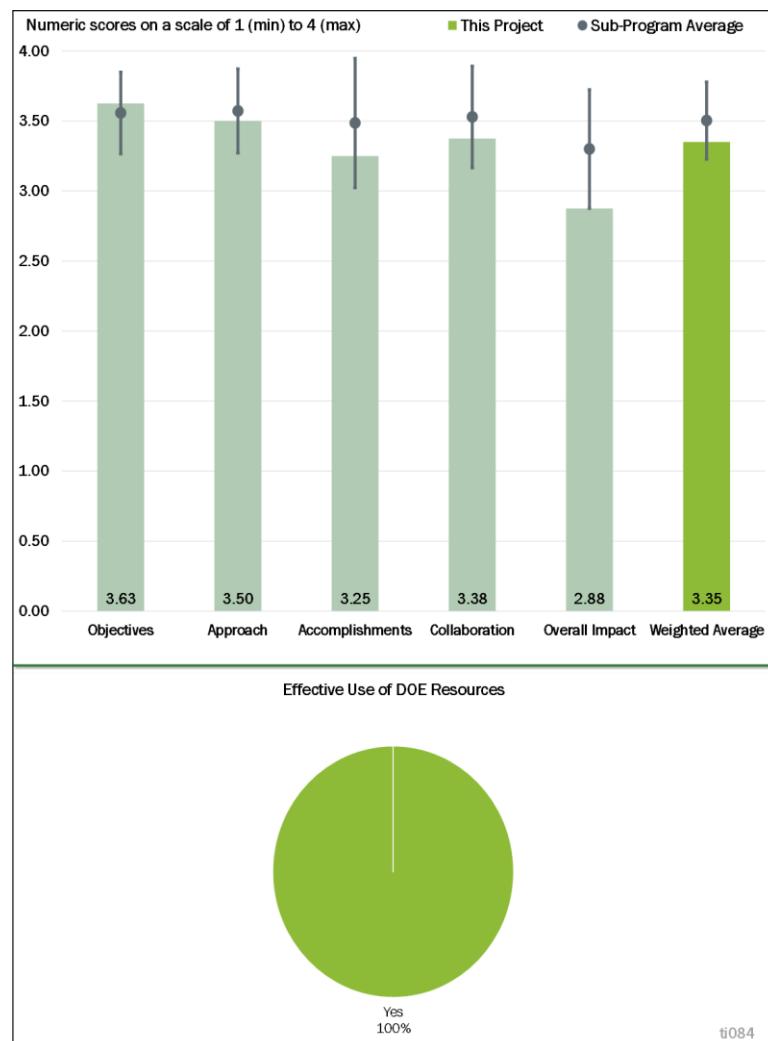


Figure 7-8 - Presentation Number: ti084 Presentation Title: Northwest Electric Vehicle Consumer Showcase Principal Investigator: Jeff Allen (Drive Oregon [Forth])

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 downtown EV showcase/showroom keeps four to six vehicles available for inspection and test drives on a daily basis, which is a very good number.

Reviewer 2:

This reviewer described the project as well-defined, and asserted that physical, mobile, and virtual are important strategies. Including data collection and questionnaires allows the analysis of experience and feedback cycles. The reviewer further commented that the project approach aligns with EV experience and education needs, locally and nationwide.

Reviewer 3:

The reviewer opined that the Portland, Oregon EV showroom is an extremely effective approach for education and outreach. It is a really innovative idea, has proven to be effective, and is being replicated in other cities around the country. This reviewer described the ride and drives and online tools as effective for achieving project objectives.

Reviewer 4:

The reviewer stated that the ride and drive concept was a solid base for this project because it had been proven effective elsewhere. Some elements of this program offered unique or innovative approaches for reaching new types of consumers, but did not appear to have as much potential for success. The EV showroom in downtown Portland is well-situated geographically and demographically, but it was unclear to the reviewer that there was a strong strategy in place to get consumers into the showroom other than grabbing passersby off the sidewalk. The reviewer also noted that the presentation did not make clear what those consumers could actually do once inside the showroom.

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 reported that the project has achieved all of its Budget Period 1 goals and is progressing on-time with Budget Period 2 goals. The reviewer pointed out that it only took six months to set up the EV showroom, which is very efficient, and that the team has a good rate of survey completions—over 50%—for the ride and drives.

Reviewer 2:

The reviewer noted that the project has made full progress on Budget Period 1 and is making impressive progress into Budget Period 2. It was very significant to this reviewer that the facility and vehicles have been secured and that experiences are underway. The physical showcase is visible not just to Oregon, but also to the nation. The pop-up showcases progress was also described by this reviewer as significant.

Reviewer 3:

The reviewer indicated that the project appeared to be on pace to meet its stated objectives, with several milestones checked off, though some appeared to be easier “low-hanging fruit.” For instance, 2,500 visitors to the EV showroom does not seem like a lot for being in such a prominent location. The reviewer commented that the number of test drive events might be lagging behind the progress of other similar projects.

Reviewer 4:

One challenge noted by the reviewer—not by any fault of the project—is that Oregon’s EV rebate is not yet in place.

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 noted that this project gathered a good team who can provide all the required expertise. Clean Cities coalitions are good outreach partners to ensure fleets are engaged, and a consultant providing communication services elevates the public relations professionalism of the project. Lastly, this reviewer remarked that including a partner with ties to utilities is an effective strategy to engage that sector.

Reviewer 2:

The reviewer observed a strong coalition of diverse partners, but a smaller number of partners than projects of similar budget size and scope. The project team seemed to have had good success enlisting staff for the EV showroom.

Reviewer 3:

As observed by the reviewer, the numerous collaborators were working well together and made good use of Clean Cities coalitions for fleets. Engaging additional Clean Cities coalitions could have integrated more geographies or consumer markets that could be helpful for information sharing later in the project. The reviewer described weekly relationships with dealers as significant and valuable.

Reviewer 4:

The reviewer noted as a strength that the project has engaged 135 utilities to date. However, dealer engagement has been spotty throughout the project. The reviewer opined that this is an area that needs focused attention and work.

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 noted that the team was tracking vehicle identification numbers to understand the sales impact and saw a 23% growth rate from last year, which is a good improvement that has the team on track to meet its goals. The reviewer reported that the project team’s EV showroom is also being replicated, which shows an impressive impact even before the project ends.

Reviewer 2:

EV use in the Pacific Northwest has steadily advanced and increased, though it was not entirely clear to the reviewer how to assess the project’s impact on that growth.

Reviewer 3:

The reviewer thought the presentation was unclear if a 23% increase in vehicle sales growth was a goal, was even related to project, or was only related to active state vehicle incentives. EV sales growth nationwide appeared to have been 26% nationwide, and was 36% between 2015 and 2016—both of which appear higher than the project period report. The reviewer suggested that perhaps other metrics may be more appropriate to gauge impact of test drives or experiences. Other states are already taking advantage of lessons shared in the Pacific Northwest experience center, which this reviewer described as wonderful.

Reviewer 4:

The reviewer commented that the project still has some work to complete all of its objectives, so it may be too soon to measure the program's impact. The number of delivered test drives and completed surveys is low compared to other projects, but the project team noted a good increase in the number of EV sales through group buys.

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 thought the project is a good use of DOE funds as it has an interesting approach with unique elements. When more milestones are achieved, this reviewer believed it will deliver good value for DOE's investment and will be an effective tool for demonstrating EVs and for positively influencing people's perceptions of them.

Reviewer 2:

The reviewer described this project as an appropriate use of resources that has tested new ways to engage consumers and achieve VTO goals.

Reviewer 3:

The reviewer remarked that this project's goals, collaborations, and accomplishments represent something that is needed in all corners of the United States. This reviewer described the EV showroom, pop-up, and content planning to be shared as potentially very valuable, and that other state partnerships on electricity or other consumer fuels could be highly valuable for VTO goals.

Reviewer 4:

The reviewer had no noted comments on the use of resources.

Presentation Number: ti085
Presentation Title: Advancing Plug-In Electric Vehicle Adoption in New England through Events and Outreach
Principal Investigator: Joel Levin (Plug-In America)

Presenter
Eric Cahill, Plug-In America

Reviewer Sample Size
A total of three 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 asserted that the project objectives are solid and in line with stated DOE goals. The formula of introducing interested or curious consumers and fleet managers to EVs through personalized test drives is solid and should yield good results. This reviewer further explained that educating dealers and creating a replicable blueprint for hosting drive events are unique project objectives and show a well-conceived plan that addresses the issue from multiple fronts.

Reviewer 2:
The reviewer commented that the project objectives directly relate to DOE VTO goals by increasing alternative fuel use and reducing petroleum use.

Reviewer 3:
The reviewer noted that the project objectives were to educate dealers on EVs and expose consumers to them through ride and drives. It was somewhat unclear to this reviewer whether the objectives were achieved.

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 liked that the project placed additional emphasis on educating dealers to effectively market and sell EVs. The reviewer opined that this element is somewhat overlooked in other projects and makes good sense because an educated dealer is perhaps more important to adopting EV use than just creating demand or

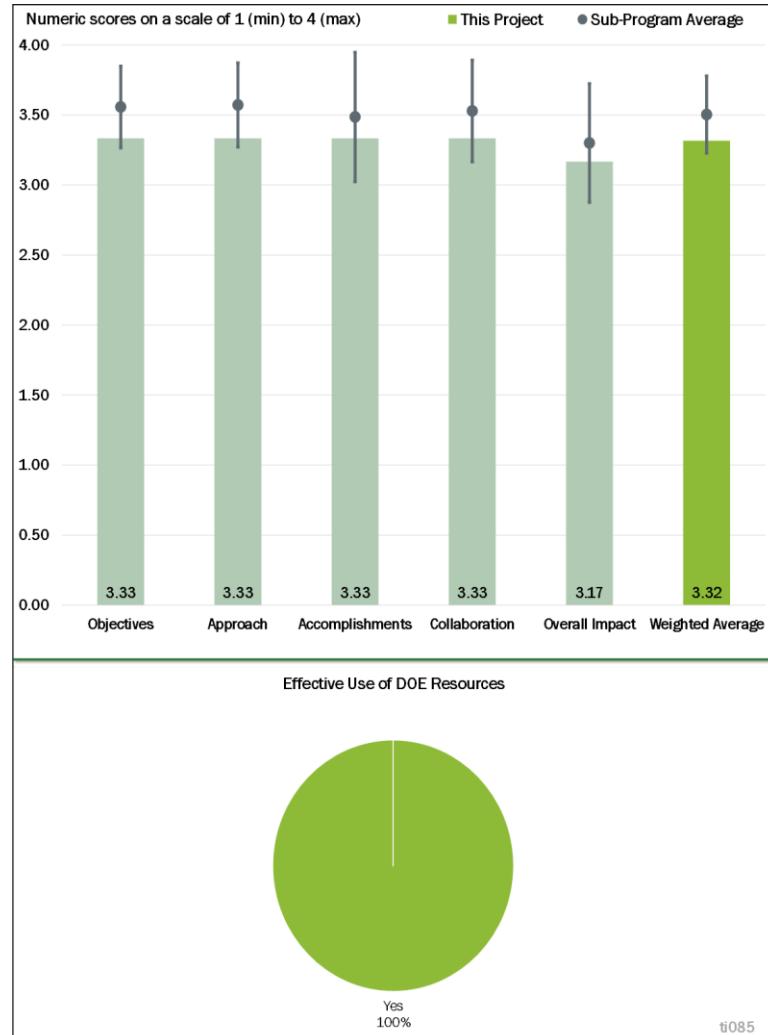


Figure 7-9 - Presentation Number: ti085 Presentation Title: Advancing Plug-In Electric Vehicle Adoption in New England through Events and Outreach Principal Investigator: Joel Levin (Plug-In America)

consumer interest. The presenter demonstrated a depth of knowledge in how the traditional dealership system is set up and how to address the introduction of a disruptive “new” product into the sales mix.

The reviewer explained that the project also has strong elements of consumer engagement through test drives at public and workplace venues, and gives consideration to data collection, recognizing the better quality of pre-and-post-drive data that can be collected through workplace drives. Another strong element noted by the reviewer was creating a replicable model for other organizations to host drive events. Overall, this reviewer observed a well-conceived project that should achieve great value for the investment.

Reviewer 2:

The reviewer indicated that showcases for the public, fleets, and at workplaces are raising regional awareness and inspiring consumers to consider an EV. Developing dealership training was described by this reviewer as a good way to raise awareness and, based on the project team’s experiences, it appeared that the project team is adjusting its approach to work best with dealers for the remainder of the grant.

Reviewer 3:

The reviewer thought the project approach seemed to be well thought-out and detailed, but was unsure if the execution resulted in intended objectives.

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 noted that the project was on pace to meet or exceed its goals for the number of ride and drive experiences. The dealership training was well-received and resulted in dealers asking for additional training. Survey results also indicated a significant increase in positive perception of EVs.

Reviewer 2:

This reviewer described ride and drive participation as great, but commented that the survey collection rate could be higher. The project had over 1,513 ride and drive experiences but only collected 555 pre-drive surveys and 317 post-drive surveys. Data collection is important so the project team can understand the impact. The reviewer asserted that the best practices guide for showcases is a good resource that has been created, and that the project teams’ work with dealerships is great progress. The surveys from the dealers are very effective and can help inform activities during Budget Period 3 and beyond.

Reviewer 3:

The reviewer believed a larger baseline was needed to measure results, and that completing the “Best Practice” guide will help document project successes.

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:

This reviewer remarked that the project team seemed very well organized and knowledgeable about the regional auto marketplace. The reviewer also noted that it had delivered an impressive number of test drives for a relatively small project, which was a testament to the organizational strength and active partner participation.

Reviewer 2:

The project collaboration seemed appropriate for the scope from this reviewer's perspective. The reviewer also commented that the Clean Cities coalitions have good contacts, and adding additional partners throughout the state and industry helped to broaden reach.

Reviewer 3:

The reviewer indicated that collaboration and coordination between the project lead and dealerships seemed to work well.

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 asserted that this project conducted an impressive number of test drive experiences, collected some meaningful data, and contributed guidance to assist future projects in replicating success. That alone was noteworthy to this reviewer, who added that the impact of this project is effectively extended for years to come when combined with the drive programs.

Reviewer 2:

The reviewer noted that dealership trainings are currently focused in Massachusetts and could be broadened to include the other states in the region. Also, this reviewer suggested that the team should focus on collecting the ride and drive surveys to ensure data are available to support project outcomes.

Reviewer 3:

The reviewer believed the overall impact will be useful, but noted that the baseline needs to be larger to fully measure impacts.

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 described a well-conceived and strongly managed program with multiple facets, some of which are unique to this program. The number of test drives was impressive for the relatively small DOE investment, and the replicable model for duplicating the project team's success should help future projects make even better use of DOE resources.

Reviewer 2:

The reviewer agreed that the project is a good use of DOE resources. Dealer education about alternative fuels is very important and continued consumer education through ride and drives is a worthwhile use of resources.

Reviewer 3:

This reviewer observed a good use of resources, but suggested giving more thought to measuring intended results.

Acronyms and Abbreviations

ADAS	Advanced driver assistance system
AFDC	Alternative Fuels Data Center
AFV	Alternative fuel vehicles
ANL	Argonne National Laboratory
AVTC	Advanced Vehicle Technology Competitions
CNG	Compressed natural gas
DCFC	Direct-current fast-charging
DOE	U.S. Department of Energy
FHWA	Federal Highway Administration
GM	General Motors
GTI	Gas Technology Institute
kWh	Kilowatt hour
LNG	Liquefied natural gas
M2M	Michigan to Montana
NSF	National Science Foundation
OEM	Original equipment manufacturer
PI	Principal Investigator
R&D	Research and Development
SME	Subject matter expert
STEM	Science, technology, engineering, and math
TI	Technology Integration
VTO	Vehicle Technologies Office

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