8. Technology Integration

Our nation's energy security depends on the efficiency of our transportation system and on which fuels we use. Transportation in the United States already consumes much more oil than we produce here at home and the situation is getting worse. The U.S. Department of Energy's (DOE's) Vehicle Technologies Office (VTO) supports research and development (R&D) that will lead to new technologies that reduce our nation's dependence on imported oil, further decrease vehicle emissions, and serve as a bridge from today's conventional powertrains and fuels to tomorrow's hydrogen-powered hybrid fuel cell vehicles. VTO also supports implementation programs that help to transition alternative fuels and vehicles into the marketplace, as well as collegiate educational activities to help encourage engineering and science students to pursue careers in the transportation sector. Following are some of the activities that complement the VTO's mission.

Energy Policy Act of 1992

The Office of Ene gy Efficiency and Renewable Ene gy (EERE) manages several programs designed to fulfill th requirements of the original and amended versions of the Energy Policy Act of 1992 (EPAct) that regulate and guide specific types of fleets with the goal of reducing the United State petroleum consumption.

EERE's VTO implements the EPAct Alternative Fuel Transportation Program. This compliance program works with covered fleets—which include certain state and alternative fuel provider fleets (e.g., utilities)—to redu petroleum consumption and increase the use of alternative fuels.

Clean Cities

DOE's Clean Cities program advances the nation's economic, environmental, and energy security by supporting local actions to cut petroleum use in transportation. Part of DOE's VTO, Clean Cities has saved more than 7.5 billion gallons of petroleum since its inception in 1993.

Nearly 100 local coalitions serve as the foundation of the Clean Cities program by working to cut petroleum use in communities across the country. Clean Cities coalitions are comprised of businesses, fuel providers, vehicle fleets, state and local government agencies, and community o ganizations. Each coalition is led by an on-theground Clean Cities coordinator, who tailors projects and activities to capitalize on the unique opportunities in their communities. Nationwide, nearly 15,000 stakeholders participate in Clean Cities coalitions, and through their collective efforts they are transforming local and regional transportation markets and contributing to Clean Cities' goals and accomplishments.

At the national level, the program develops and promotes partnerships, publications, tools, and other unique resources. At the local level, coalitions leverage these resources to create networks of local stakeholders and provide technical assistance to fleets implementing alternative and renewable fuels, idle-reduction measures, fue economy improvements, and emerging transportation technologies.

Clean Cities efforts support reduced dependence on petroleum at the local, state, and national levels. Clean Cities activities include:

- Building partnerships with local coalitions of public- and private-sector transportation stakeholders;
- Developing unbiased and objective information resources about alternative fuels, advanced vehicles, and other strategies to cut petroleum use;
- Advancing interactive, data-driven online tools to help stakeholders evaluate options and achieve goals;
- Collecting and sharing best practices, data, and lessons learned to inform choices and build a strong national network;

- Providing technical assistance to help fl ets deploy alternative fuels, advanced vehicles, and idle-reduction measures;
- Working with industry partners and fleets to identify and address technology barriers
- Empowering local decision makers to successfully implement the best petroleum reduction strategy for their circumstance; and
- Seeding local alternative fuels markets through projects that deploy vehicles and fueling infrastructure.

Clean Cities dates back to the Alternative Motor Fuels Act of 1988 and the Clean Air Act Amendments of 1990. These laws, which encouraged the production and use of AFVs and the reduction of vehicle emissions, led to the creation of the Alternative Fuels Data Center (AFDC) in 1991. The AFDC's mission was to collect, analyze, and distribute data used to evaluate alternative fuels and vehicles.

In 1992, the enactment of EPAct required certain vehicle fleets to acquire AFVs. Subsequently, DOE created Clean Cities in 1993 to provide informational, technical, and financial resources to E Act-regulated fleets and voluntar adopters of alternative fuels and vehicles.

The AFDC became and continues to be the clearinghouse for these resources. Its sister website, FuelEconomy.gov, provides consumers with information on fuel economy, emissions, and energy impact of light-duty vehicles, based on vehicle data from the U.S. Environmental Protection Agency (EPA). The site also provides tips for drivers on maximizing fuel efficienc . FuelEconomy.gov was created in response to DOE's requirement under the 1975 Energy Policy and Conservation Act to publish and distribute an annual fuel economy guide for consumers.

Educational Activities

VTO offers a variety of resources and opportunities for students, university researchers and professionals. It also provides information for consumers through FuelEconomy.gov and the AFDC.

VTO's educational efforts focus on higher education and public outreach, but its parent EERE offers resources for K-12 energy education. VTO has hosted student competitions in advanced vehicle technologies for more than 25 years to educate the next generation of automotive engineers and accelerate the development of vehicle technologies.

VTO's graduate education program supports efforts at top universities to train a future workforce of automotive engineering professionals in developing and commercializing advanced automotive technologies. These universities' multidisciplinary curriculums and unique laboratory facilities will prepare students to overcome technology barriers preventing the development and production of cost-effective, high-efficiency vehicles for th U.S. market.

Subprogram Feedback

The U.S. Department of Energy (DOE) received feedback on the overall technical subprogram areas presented during the 2016 Annual Merit Review (AMR). 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. These questions were used for all VTO subprogram overviews.

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

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

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?

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, et

Subprogram Overview Comments: Linda Bluestein (U.S. Department of Energy) - ti000

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

Reviewer 1:
The reviewer commented that the deployment technology portfolio activities, which support replacement, elimination, or reduction of petroleum use, were very adequately discussed. In addition, the reviewer affirmed that the deployment activities also align extremely well with the EERE strategic plan to increase the use of higher efficiency advanced technology vehicles, to improve overall efficiency of the transportation systems, and to reduc greenhouse gas (GHG) emissions in the future.

Reviewer 2:
The reviewer stated that there was a good explanation of how DOE vehicle technologies deployment efforts work to address overall transportation system efficiency and directly support national GHG emissions reduction goals. The reviewer added that the program portfolio is based on a well-balanced, three-legged approach for petroleum use reduction (replace, reduce, and eliminate).

Reviewer 3:
The reviewer observed that the presentation appeared to cover the entire Technology Integration (TI) program including Clean Cities, Legislative and Regulatory, and Student Competitions. This program, being a bit different than the R&D portion of VTO, requires a different presentation structure.

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

Reviewer 1:
The reviewer summarized that the program area addresses near-, mid- and long-term goals by supporting the national goals to reduce emissions by 17% by 2020, 26-28% by 2025, and 83% by 2050.

Reviewer 2:
The reviewer stated that this appears to be an area of emerging focus for the program, noting that recent program planning has been strategically assessing next priority opportunities for fuels and technologies, and how to develop deployment efforts supporting these in the mid-longer term.

Reviewer 3:
The reviewer answered yes, clarifying that because of the nature of TI activities as related to deployment, most of the emphasis is specifically (and appropriately) upon nea -term efforts. The reviewer noted that the one longer-term focused effort perhaps is the education of the next generation of engineers under EcoCAR and other educational activities.

Question 3: Were important issues and challenges identified?

Reviewer 1:
The reviewer replied yes, describing the TI Program as focused upon deploying (and also providing the information necessary for deploying) new and advanced technologies, and elaborating that these technologies are aimed at reducing emissions (particularly GHGs) and petroleum use, which are the specific issues/challenges facing VTO. Within these overall issues/challenges, the reviewer noted that TI efforts are specifically focused on increasing the deployment of technologies that can be solutions, by providing critical technical, outreach, and other assistance necessary for adopters of these technologies.

Reviewer 2:
The reviewer remarked that the challenge to replace, eliminate, or reduce the use of petroleum was identified and discussed thoroughly.

Reviewer 3:
The reviewer observed that the presentation focused more on strategies and recent/current solutions—as well as areas of opportunity—rather than specific challenges

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

Reviewer 1:
The reviewer replied yes, elaborating that in addition to a well-proven approach to moving technologies into use (over 20 years of Clean Cities and regulatory fleet experience), there is a new e fort to work with the U.S. Department of Transportation (DOT) on the Systems and Modeling for Accelerated Research in Transportation (SMART) Mobility implementation. As for educating the next generation of engineers on these technologies, this reviewer affirmed that there is also a similar several-decade proven track record of success that continues to expand and innovate, moving the bar higher and enhancing this experience for students.

Reviewer 2:
The reviewer noted that a new area of emphasis was discussed, seeking the opportunity to incorporate existing alternative and advanced vehicle technology programs and efforts with Smart Cities/smart mobility technologies (connected vehicles and infrastructure, automation, transport planning, etc.), and that additional program plans are being developed.

Reviewer 3:
The reviewer stated yes, the program area identified the use of low carbon fuels, idle reduction, fuel economy improvements, and increasing the use of hybrid vehicles to help reduce petroleum consumption.

Question 5: Was progress clearly benchmarked against the previous year?

Reviewer 1:
This reviewer confirmed yes, pointing out that cumulative contributions from GHG emissions and petroleum reductions from Clean Cities were shown, dating back to the beginning of Clean Cities activities in the mid-1990s. The reviewer also recounted that regulatory program developments (compliance) were shown going back over a decade, emphasizing the virtually 100% compliance level, while educational programs listed the numbers of universities and students involved and detailed recent accomplishments.

Reviewer 2:
The reviewer declared that progress of GHG reduction and petroleum use reduction in the deployment activity continues to be one of the best success stories in VTO.

Reviewer 3:
The reviewer affirmed that program progress—in terms of petroleum displaced—has been tracked annually since 1993, showing an excellent record of progress (currently at 7.5 billion GGEs saved).

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 replied yes and elaborated that the projects are specifically addressing reducing emissions and petroleum use through ensuring that technologies move into use successfully. The reviewer explained that this not only requires setting up a programmatic structure to focus on introduction of use, but ensuring that the necessary information gets into the hands of users and potential users. This is important for helping to make decisions to adopt these technologies, and to ensure their success once in place (particularly by making sure that users' expectations are managed and met).

The reviewer also observed that additional deployments are also occurring through the regulated fleets e fort, a program with a nearly-20-year history of virtually 100% compliance. The reviewer added that this is virtually unheard of in the regulatory arena, and it is largely a testament to the high level of fleet outreach conducted by the project.

The reviewer concluded that as time moves on, both government and industry will have a continuing need for specially-trained engineers who understand these advanced technologies, and pointed out that this is the specific focus of the student competitions.

Reviewer 2:
The reviewer stated that the program is executing a broad array of activities to foster alternative fuel and advanced vehicle technology deployment and adoption, developing critical market pull.

Reviewer 3:
The reviewer characterized all of the projects in the TI Program as continuing to address the issues the VTO is trying to solve.

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

Reviewer 1:
The reviewer praised the overall program, including deployment, legislative and rulemaking, and advanced vehicle competitions as extremely well managed and effective.

Reviewer 2:
The reviewer replied yes, elaborating that TI's role is to focus on deploying new and advanced technologies, particularly as these emerge from VTO's R&D efforts, and remarking that this link is important and must be continued. The reviewer observed that as programs such as VTO are being pushed to "do more with less," increasing the overall impact of VTO will require an even greater tie between deployment and R&D activities, since it is only through deployment that any of these technologies reduce emissions or petroleum use.

Reviewer 3:
The reviewer noted that Clean Cities Program staff are regionally assigned, which allows for area-specific focus on fuels, technologies, and partners most prevalent and important to each region.

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 characterized all five major deployment activities of the program as very important. That said, of all of them, the reviewer suggested the consumer information outreach and education activities may have the greatest degree of reach, while training and stakeholder development and competitive funding are perhaps the next most important program activities.

Reviewer 2:
The reviewer remarked that the strength of the program is the real world reduction of petroleum use that is quantified each year through the deployment accomplishments. The reviewer highlighted the Clean Cities Program as the one that continues to stand out in the TI Program, adding that it continues to be a true success story.

Reviewer 3:
The reviewer stated that the key strengths really include the knowledge base built within the TI Program (in DOE, the national laboratories, the field, and with key consultants) and the relationships developed with thousands of stakeholders (other agencies, industry, associations, states, etc.), as well as involvement of knowledgeable users within the Clean Cities Coalitions. The reviewer remarked that the national network of coalitions is truly the strength of the program, and noted in addition that the program places significant emphasis on data collection from the coalitions to ensure programmatic metrics are being met.

Similarly, the reviewer stated, the regulated fleets program has built relationships with hundreds of state and utility fleets to ensure high levels of deployment, while the student competitions have created amazing relationships with numerous universities and with industry.

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

Reviewer 1:
The reviewer observed that while the Clean Cities network structure is over 20 years old, it still works and allows for continued innovative developments. In addition, the reviewer stated that the Clean Cities Program is adept at listening to users and developing information, tools, and other items based upon needs identified by these users. The program has specific events gauged to gather this input from its thousands of stakeholders

The reviewer praised Fueleconomy.gov as still a highly novel approach for delivering efficiency (and also alternative fuel) information to users, continuing to be one of the Federal Government's most-used sites. The reviewer remarked that the Legislative and Regulatory program is always looking for new ways to engage fleets in adopting new technologies at rates that go far above simple compliance. The reviewer specified that with each new student competition series, the innovation required by the teams grows, by design, and that this process thus allows for a way to continue developing better and better competitions.

Reviewer 2:
The reviewer commented that the Clean Cities Program and EcoCAR3 both are considered to be novel approaches to helping to address the barriers of the program, adding that they both are able to leverage government funds and provide a vast number of groups to collaborate with to reduce petroleum use.

Reviewer 3:
The reviewer noted that the Alternative Fuels Data Center (AFDC) website has expanded to include a substantial number of novel tools, and the program's recent competitive funding topics have sought and funded a wide range of innovative projects.

Question 10: Has the program area engaged appropriate partners?

Reviewer 1:
The reviewer remarked that partnerships are really the key to the TI efforts, observing that in Clean Cities, there are thousands of stakeholders ranging from local fleets to manufacturers to other government agencies. The reviewer offered that there are probably few other government programs that focus this heavily upon developing and maintaining the relationships necessary for success. The reviewer noted that regulated fleets e forts coordinate not only with hundreds of covered fleets, but also additional state o ganizations, fuels associations, and others, such as Clean Cities, federal fleets, and fuel suppliers (such as a joint workshop series a few years ago). The reviewer stated that under the educational program (particularly EcoCAR), there is specific coordination with not only universities, but also industry partners for the competitions. The reviewer concluded that all efforts under TI also include strong involvement of the national laboratories and key consultants, each of whom has developed expertise related to TI Program needs.

Reviewer 2:
The reviewer characterized the number of entities that the TI Program engages as extremely impressive. The reviewer elaborated that partners in the National Clean Fleets, Clean Cities, national laboratories, and colleges and universities in the EcoCAR3 program make the overall TI Program very effective.

Reviewer 3:
The reviewer remarked that the program has developed strong partnerships—with industry, corporate fleets, states, municipalities and many other stakeholders. The reviewer observed that Clean Cities Coalitions are completely built on partnerships and driven by independent stakeholders. The reviewer stated that the National Clean Fleets Partners Program is a good way for large national fleets to partner with the program; many of these fleets serve a pace-setters. The reviewer noted that the program has developed strong partnerships with the National Park Service (NPS).

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

Reviewer 1:
The reviewer remarked that, as evidenced by the success and results that the TI Program has experienced over the years, the collaboration with partners has been extremely effective.

Reviewer 2:
The reviewer noted that several of the Clean Cities Program's main activity areas are organized around and support partner collaboration, especially technical and problem solving assistance, training and stakeholder coordination, field metrics tracking, and funded projects

Reviewer 3:
The reviewer replied yes, as indicated above, the TI Program has been designed to explicitly work with all these partners, day in and day out. The reviewer elaborated that in Clean Cities, this involves stakeholder gatherings, funding opportunity announcements (FOAs), and participation in numerous outreach events. The legislative and regulatory activities also emphasize outreach to covered fleets, which has been key to ensuring the 100% compliance level within the fleets area. Finally, the reviewer added, in the educational area, DOE has very strong relationships with a number of universities, which has resulted in thousands of trained engineers, many of whom have moved into jobs related to transportation technologies. These educational competitions are specifically made possible through a collaboration with auto manufacturers and other component manufacturers.

Over the new few years, the reviewer observed, there may be an even greater need for coordination with other federal agencies (perhaps begun with the recent SMART Mobility Memorandum of Understanding [MOU] with U.S. DOT), as well as states, cities, industrial partners, and local technology implementers.

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

Reviewer 1:
The reviewer replied no, the overall program does a very good job of addressing the issues that need to be resolved to help reduce petroleum use.

Reviewer 2:
The reviewer noted that recent focus has appeared to be on electric technologies, but Clean Cities Coalitions appear to also remain interested in gaseous fuel and biofuel technologies, as well as efficiency and idle reduction, so it appears there is still a need for efforts that provide better balance among technologies.

Reviewer 3:
The reviewer offered that hydrogen (H2) may be seen as lacking program focus, so perhaps the program could identify and articulate minimum thresholds in terms of practical vehicle price point and vehicle/fueling availability, to clarify why the program is not doing more in this area.

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

Reviewer 1:
The reviewer stated that topics in the TI Program all appear to be adequately addressed.

Reviewer 2:
The reviewer suggested that perhaps the TI Program could be more coordinated with the Bioenergy Technologies Office (BE O), particularly on biofuel infrastructure deployment and early information sharing on the Co-Optima initiative (i.e., what would deployment trends need to look like to best encourage/enable co-optimized internal combustion engine (ICE) vehicle development and deployment? The reviewer wondered what consumer and fleet issues would need to be addressed and how Clean Cities could assist.

Reviewer 3:
The reviewer stated that it was unclear from the presentation what the real goals of the National Clean Fleets Partnership are, how it is being implemented, what the real successes are from it, and how the needs for this activity are changing/increasing over time. The reviewer observed that it seems like it has the potential to achieve a great deal, but it is unclear how that is going.

The reviewer also noted that there is a great demand for more and better outreach in TI Program areas and that these efforts tend to be largely limited by available funding. The reviewer commented that the joint workshops (regulated fleets, Clean Cities, and federal fleets) from a few years ago seemed like a very fective mechanism, and could be continued/expanded. The reviewer pointed out that none have been held in over two years, and that with changes in infrastructure development status and vehicle technology options (most were before plug-in electric vehicles [PEVs] were significantly available), this a gues for a need to resume the workshops. In addition, the reviewer said, with DOE interests in reaching beyond fleets to consumers, there is a need for perhaps expanding/adapting this model to more consumer-oriented stakeholders, such as automobile dealers.

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

Reviewer 1:
The reviewer characterized funding in the TI Program as being allocated appropriately. The reviewer does not think there are other program areas that need to be funded to meet the goals.

Reviewer 2:
The reviewer offered that staying aware and on top of what other agencies are doing—and co-investing/leveraging those activities where it makes sense—is valuable for the program. The reviewer suggested coordination with U.S. DOT, EPA, the U.S. Department of Agriculture (USDA), and others on how those agencies are approaching efforts to support transportation system efficiency and ene gy diversity (i.e., DOT and SMART Mobility, USDA and bio-economy development, EPA and its latest GHG analyses and priority reduction strategies).

Reviewer 3:
The reviewer observed that it seems like the funding approach in Clean Cities has moved from deployment to community readiness, but that it appears as though a mix of these two areas is still needed, particularly in the area of infrastructure. In addition, the reviewer remarked, more of the focus the past few years has appeared to be on electric technologies, but contributions in the program to date have appeared to come more from gaseous fuels and biofuels. So, again, as far as vehicle types, balance is important. Other suggestions from the reviewer include resuming workshops as described in question 13 above.

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

Reviewer 1:
The reviewer stated that over the years this program area has been and continues to be very effective in addressing the barriers to allow for petroleum displacement.

Reviewer 2:
The reviewer suggested that since Clean Cities is such a strong public and industry-facing effort, perhaps other VTO programs (hydrogen, fuels and lubricants, advanced vehicle technology, etc.) could utilize Clean Cities more as a way to demonstrate their funded technologies in the field, and collect feedback/information from valuable stakeholder groups. The reviewer also recommended that perhaps the Clean Cities Program could be positioned to serve as an outreach arm (of sorts) for the other VTO areas (e.g., if there is a lubricants technology that fleets should know about, can Clean Cities help communicate on that topic?).

Reviewer 3:
The reviewer's key recommendation is to continue to expand and innovate in the critical area of outreach, elaborating that this can mean more targeted multidisciplinary workshops (as described in question 13 above) or the use of new tools such as fleet data collection technologies or social media. The real key in TI, the reviewer remarked, is making sure users have the information necessary to make decisions and support the operation of the vehicles once in place (including through training technicians and others). The reviewer concluded that the best ways to do these things continue to change, so, the program, while having established highly effective methods for conducting this outreach, will need to continue to innovate and improve the delivery of these services.

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

Reviewer 1:
The reviewer replied no, the program area as currently implemented is extremely effective.

Reviewer 2:
The reviewer suggested perhaps some better alignment between EcoCAR activities and the other VTO research areas, offering, though, that this may already be happening. The reviewer also stated that university and vehicle education activities are very good, but that they do seem a bit disjointed from the rest of the portfolio. The reviewer clarified that it is fine; all program activities do not need to be clearly and directly linked, and this is just a observation.

Reviewer 3:
The reviewer said to remember how all of these TI project areas have been built and how successful they are, and use these attributes and structures when moving forward. The reviewer observed that a new technology or even integration approach is unlikely to be needed to change these bedrocks of the program, but new opportunities will require additional efforts (and funding) to address the new issues and challenges that come along with them.

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 8-1 – Project Feedback

Presentation Title	Principal Investigator and Organization	Page Number	Objectives	Approach	Accomplishments and Progress	Collaboration	Market Impact	Weighted Average
Plug-In Hybrid Electric Vehicle Demonstration Program and Social Media Campaign	Ardisana, Lizabeth (ASG Renaissance)	8-13	2.63	2.50	2.63	2.75	2.13	2.56
Drive Electric Orlando	Combs, April (Florida Department of Agriculture and Consumer Services/ Office of Energy)	8-17	3.38	3.38	3.00	3.38	3.25	3.21
Alternative Fuel Vehicle Curriculum Development and Outreach Initiative	Moore, Judy (West Virginia University Research Corporation)	8-21	3.50	3.10	3.20	2.80	2.70	3.15
Nationwide AFV Emergency Responder, Recovery, Re-Construction and Investigation Training	Klock, Andrew (National Fire Protection Association)	8-25	3.40	3.40	3.30	3.10	3.00	3.29

Presentation Title	Principal Investigator and Organization	Page Number	Objectives	Approach	Accomplishments and Progress	Collaboration	Market Impact	Weighted Average
Safe Alternative Fuels Deployment in Mid-America (The SAF-D Project)	Gilbert, Kelly (Metropolitan Energy Center, Inc.)	8-29	2.80	2.70	2.90	3.00	2.80	2.84
Initiative for Resiliency in Energy through Vehicles (IREV)	Powers, Cassie (National Association of State Energy Officials)	8-33	3.40	3.10	3.30	3.10	3.00	3.23
EcoCAR 3	Wahl, Kristen (ANL)	8-38	3.60	3.60	3.50	3.80	3.60	3.58
Overall Average			3.24	3.11	3.12	3.13	2.93	3.12

Plug-In Hybrid Electric Vehicle Demonstration Program and Social Media Campaign: Lizabeth Ardisana (ASG Renaissance) - ti064

Presenter
Brenda Prebo, ASG Renaissance

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

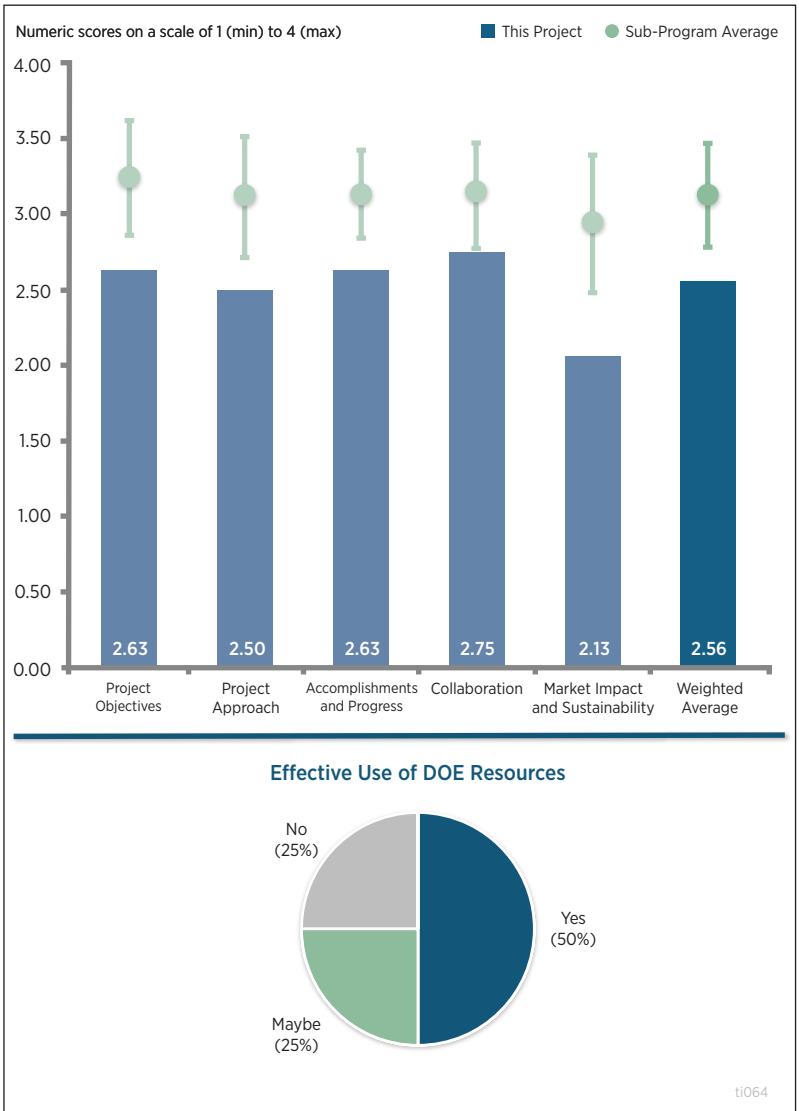

Figure 8-1 – Plug-In Hybrid Electric Vehicle Demonstration Program and Social Media Campaign: Lizabeth Ardisana (ASG Renaissance)

Reviewer 1:
The reviewer stated that the project objective and overview slides described the project's specific objectives, as well as how the project addressed specific barriers in the VTO Multi-Year Program Plan 2011-2015. Furthermore, the project objectives appeared to be generally effective.

Reviewer 2:
The reviewer found that the project had innovative outreach objectives; however, the extent to which these project objectives would translate into deployment (i.e., electric vehicle [EV] sales) was not entirely clear. This lack of clarity was, in part, due to limited original equipment manufacturer (OEM) involvement and/or specific messaging driving web audiences to auto dealerships

Reviewer 3:
The reviewer stated that the objective of reaching potential plug-in hybrid electric vehicle (PHEV) buyers to influence their decisions and steer them towards PHEVs was fundamentally sound. Given the pervasive reach of social media in today's culture and the likely predisposition of tech-savvy consumers to be inclined toward a plug-in vehicle, the use of online EV Ambassadors sounds like a good idea. The reviewer was not convinced that this type of campaign will have an immediate, significant, or even measurable impact on PHE sales, however. Thus, the reviewer did not score this project highly in terms of achieving DOE/VTO objectives of reducing petroleum use or reducing emissions.

Reviewer 4:

The reviewer did not agree that increasing awareness is commensurate with increasing acceptance of AFVs. The reviewer commented that social media is a very extemporaneous, transient, and fleeting—really superficial —wa of increasing awareness. The reviewer stated that the impression people get on social media is momentary but not long-lasting, and the purpose of social media seems to be instant gratification and sharing instant gratificatio

Regarding progress and goal tracking, the reviewer noted that there was no tracking or measurement of how one-month free trials led to actual AFV purchases. Furthermore, the project manager was not able to provide an example of where social media was instrumental in major purchases (greater than $20,000). Thus, the reviewer determined that DOE/VTO objectives of reducing emissions and reliance on petroleum based fuels are too serious to be achieved by the sharing of extemporaneous, transient, and fleeting impressions

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer noted that the project approach section provided a generally effective methodology to accomplish the project objectives. Adequate detail was provided on the approach and milestone slides with regards to the planned tasks and activities.

Reviewer 2:

Although the reviewer found the project approach somewhat risky, it was substantively innovative in its targeting of social media marketing. The project ensured a thorough amount of time was allocated for each influencer test drive (one month). However, the reviewer suggested that the project may have benefited from ta geting higher-profile, up-and-coming YouTube stars, whose videos and blogs are more widely viewed than smaller bloggers with a far more limited reach. Lastly, the reviewer suggested that a greater emphasis on making video and blog content visible to general internet/Google searches (strong focus on making posts searchable) would broaden exposure far beyond just followers of the Influencers/E Ambassadors.

Reviewer 3:

The reviewer asked how EV Ambassadors are selected, and if their age/income was in line with existing PHEV owners or intenders. The reviewer asked if the project team's initial research indicated that PHEV intenders are also active on social media. The reviewer noted that reaching a large number of people is great, but it is critical to know who is being reached, and if they can afford to buy PHEVs.

The reviewer acknowledged the value in using social media to tout the benefits of PHEVs, because it is a popular source of cultural information in today's society. However, the reviewer found the presentation was vague on how the influencers were chosen and wanted more analysis of the results. Finall , the reviewer commented that the project grossly overestimated the expected rate of engagement, and the reviewer expected a better understanding of the fundamentals of social media before undertaking a project like this. Thus the reviewer was a little dubious on the effectiveness of this approach.

Reviewer 4:

The reviewer believed that social media is best suited for low-cost, spur-of-the-moment purchases, such as recommending a restaurant after dining, a movie after going to the theatre, a night club after drinking, or avoiding the Metro subway because of an incident, etc. Larger purchases and investments, such as purchase of an AFV, are better suited to personal contact and word-of-mouth communication. The reviewer reiterated that sharing of good impressions does not necessarily lead to a conscious effort to make a purchase of, or rent, an AFV for the purpose of reducing emissions and use of petroleum-based fuels.

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

Reviewer 1:
The reviewer stated that good progress had been made towards achieving Phase One project goals for fiscal year (FY) 2015-2016. All initiatives and activities appeared to be on track for successful completion. Activities related to the program design, program website, selection of EV ambassadors, and first wave of Phase One demonstrations resulted in the majority of project metrics/targets being achieved with regards to program reach, views and engagement. The reviewer noted that no concerns had been identified

Reviewer 2:
The reviewer noted that to date the project had recruited about 50 Influencers/E Ambassadors, which was a strong number. The number of published content pieces and program views thus far was also strong. However, the reviewer stated that the degree of web audience engagement was far under project objectives. The Principal Investigator (PI) explained that this was due to a (rather grossly) misjudged expectation, and that the actual percent engagement was closer to industry standards. Still, the reviewer pointed out that the large difference between expected total program engagement (100,000) and engagement at the time of the presentation (13,600) raised the question of whether the applicant would have designed a substantively different type of project had the project team had previous knowledge about web marketing industry standards and what could reasonably be expected for web engagement.

Reviewer 3:
The reviewer said that the project's accomplishments and progress to date were underwhelming. Some project goals were exceeded, others were not even close. The reviewer commented that 44 people producing, on average 14 blogs, tweets and/or posts over the course of a month was hardly a feverish pace. The reviewer expressed concern regarding the inability to analyze the impact of the influencers, and questioned whether or not any PHEVs were sold as a result of the campaign.

Reviewer 4:
The reviewer observed that the PI showed a slide indicating that as of April 28, 2016, half of the target goals were met and half were not. The reviewer noted that the PI's claim of meeting or exceeding total program goals was true only by asserting that some of the original total program goals were set unrealistically high.

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 stated that an effective project team was assembled to carry out this project, as industry and Clean Cities Coalition partners provided an appropriate mix of expertise among team members. Roles of project team were defined and collaboration/communication among project partners appeared to be appropriate for the project of this scope. The reviewer noted that during the oral presentation, the presenter commented that Ford had not been very engaged in the program to date, besides providing the vehicles, but it appeared that they are more interested in Phase 2 involvement. The reviewer stated that it is important that the project's vehicle OEM is onboard with the direction and data associated with this project, to ensure the activities being carried out and data collected are valuable to them and will result in increased vehicle awareness/sales.

Reviewer 2:
The reviewer stated that the project would have benefited quite a bit from more OEM/Ford involvement, including from dealers.

Reviewer 3:
The reviewer stated that the team and partnership appeared to be fairly well-organized, and the project chose the kinds of influencers they were ta geting. However, glitches like the insurance issue, which forced the team to hire the EV Ambassadors, showed a lack of thorough planning, or ineffective project management. Also, the reviewer questioned whether the shift to fewer influencers with la ger followings for Phase 2 was planned from the beginning, or if it was in response to the results of Phase 1.

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector. This would include the potential to reduce barriers to large scale alternative fuel vehicle market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:

The reviewer noted that the project may contribute to reduced petroleum dependence, GHG emissions reduction and AFV market sustainability goals through raising consumer awareness of the availability and benefits of PEVs in several key Northeastern markets, through the use of social media influencers. Howeve , the reviewer stated that a weakness identified in this section of the presentation involved the lack of providing a methodology to defin demonstrate how the project metrics of reach, views, and engagement directly or indirectly translated into vehicle sales.

Reviewer 2:

The reviewer commented that there appeared to be no future for the program once the car loans are done, and no way of measuring the results in terms of how many PHEVs were sold as a result of this program. The reviewer suggested augmenting the influencer loans with some shorter test drives directly with E -intenders, and still tying it in with social media. For instance, set up in an Ikea parking lot on a Saturday morning, give short test drives, and gather data from an exit poll.

Reviewer 3:

The reviewer stated that there was no tracking or tracing of the impact of social media impressions on purchases or rental of AFVs. Furthermore, there was no measure of how long good memories of the experiences with AFVs were retained.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:

The reviewer stated that in lieu of funding for hardware (i.e., vehicles and fueling sites), the use of DOE funding to inform the public about the availability of PEVs was critically important to advance the market of these vehicles. As newer marketing methods are implemented, such as this project's use of social media, it is critical to understand how the industry calculates the benefits of these activities and how they translate into vehicle sales and market development.

Reviewer 2:

The reviewer stated that this project focused on an innovative and modern marketing approach, which is really the future of consumer outreach. The reviewer noted that more OEM involvement and greater state-of-the-art web marketing program design (e.g., targeting YouTube celebrities, realistic engagement targets, and searchable posts) would have improved the project.

Reviewer 3:

The reviewer stated that that the return on investment was lower than expected based on projected and actual media value. Spending money, time, and effort to develop and generate awareness for a website that adds little to the available online PHEV knowledge base has limited value beyond the life of the project. The reviewer noted that there are existing and well-established websites that give this information.

Reviewer 4:

The reviewer referenced prior comments regarding project objectives and approach.

Drive Electric Orlando: April Combs (Florida Department of Agriculture and Consumer Services/Office of Energy) - ti065

Presenter
April Combs, Florida Department of Agriculture and Consumer Services

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

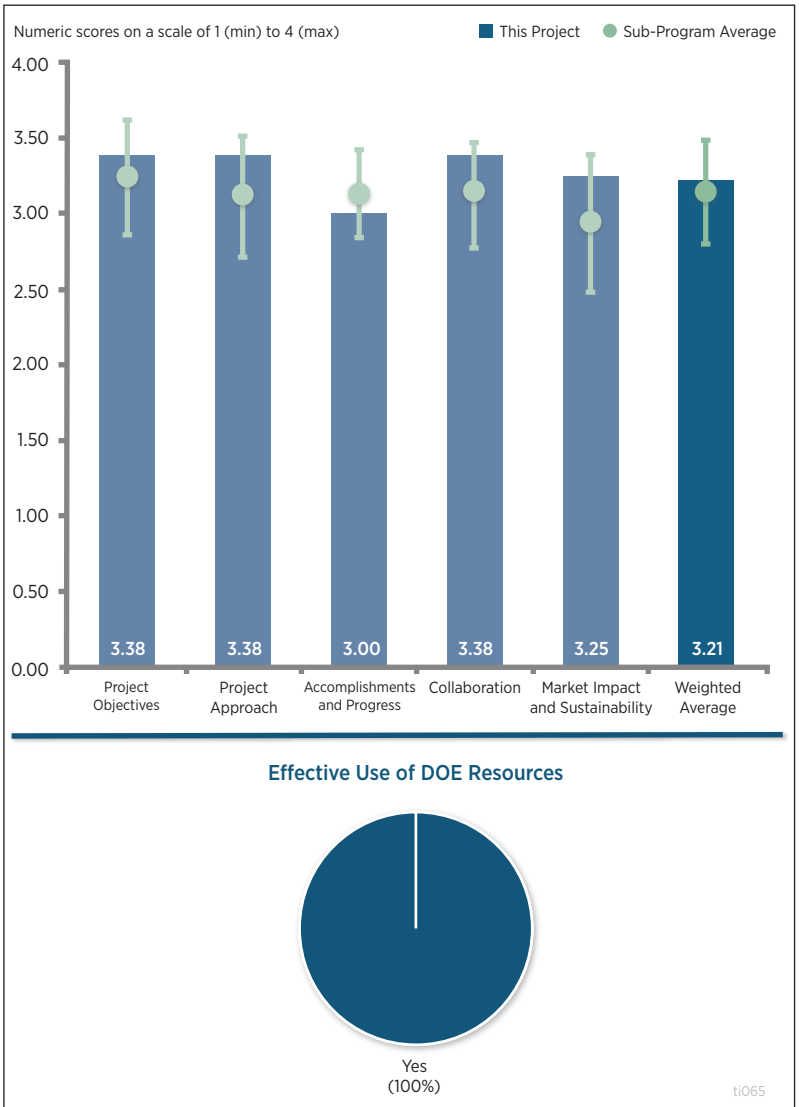

Figure 8-2 - Drive Electric Orlando: April Combs (Florida Department of Agriculture and Consumer Services/Office of Energy)

Reviewer 1:
The reviewer stated that this was an excellent project with excellent objectives at the right time and right place.

Reviewer 2:
The reviewer found that the well-researched objectives showed a clear understanding and analysis of the demographics of the target market area, such as the knowledge that most rental buyers make short trips. The reviewer stated that putting drivers behind the wheel of an EV for an extended test drive in real-world conditions was a great way to engage and influence their purchasing decision.

Reviewer 3:
The reviewer stated that the project objective and overview slides described the project's specific objectives, as well as how the project addresses specific barriers in the VTO's Multi-Year Program Plan 2011-2015. The reviewer added that project objectives appeared to be generally effective.

Reviewer 4:
The reviewer stated that putting consumers into a moderate-term rental experience was an excellent idea and project. However, the total number of rental experiences targeted during the project period was not clear (or the reviewer may have missed this figure)

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions

and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:
The reviewer said that the strategy to attract EV rental customers with perks (free charging, free drinks, admission, free Clear membership, etc.) are smart and effective. Furthermore, ensuring that the cost of a Volt rental was the same as a regular mid-size sedan was a strong measure to ensure optimum participation.

Reviewer 2:
The reviewer stated that the project approach section provided a detailed and effective methodology to accomplish the project objectives. Appropriate detail was provided on the approach and milestone slides regarding the planned tasks and activities.

Reviewer 3:
The reviewer stated that this was a solid approach with strong partners onboard from the start. The project planning seemed to have covered all bases in terms of which partners to seek, identifying a target-rich environment of rental customers, gathering driver feedback, and analyzing the results.

Reviewer 4:
The reviewer found the approach to be excellent, but better quality control over the training of the rental car agents was absolutely needed. The reviewer would like to have seen all drivers be informed about, and given an opportunity, to rent an electric car, if available, even if the customer wanted a conventional car.

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

Reviewer 1:
The reviewer stated that good progress had been made towards achieving Year 1 project goals. Activities related to project engagement with rental car, theme park, hotel, and travel partners resulted in initial progress towards engaging these entities and rental car customers to provide vehicles, charging, and incentives. All initiatives and activities appeared to be on track for successful completion and no concerns had been identified

Reviewer 2:
The reviewer noted that, to date, only one rental car company partner was involved, despite Orlando being the largest rental car market in the world. The reviewer stated that the project team had done a very good job attracting other various stakeholder partners.

Reviewer 3:
The reviewer noted that progress was good, and the project had proactively worked to attract more partners. However, the reviewer thought more attention could have been paid to actively marketing the availability of EV rentals; it appeared that the EV rentals were happening more by chance or by whim of the consumer who saw that they were available.

Reviewer 4:
The reviewer said that no target performance metrics were given for Year 1.

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 stated that the project team appeared well-coordinated. The project demonstrated numerous broad strategic stakeholder partnerships.

Reviewer 2:
The reviewer stated that an effective project team was assembled to carry out this project, with government, EV industry trade association, and Clean Cities Coalition partners involved, which provided an excellent mix of expertise among team members. Project team roles were defined and collaboration/communication among project partners appeared to be appropriate for a project of this scope. Additionally, the project interacted with a good mix of local stakeholders, which included city governments, infrastructure providers, utilities, automakers and other firms, service providers, and regulators, as well as Orlando-based rental car companies, theme parks, and hotels

Reviewer 3:
The reviewer was impressed, not only that the project leaders were able to engage as many hotels as they did, but that the team also went the extra mile to secure prime parking locations for re-charging the electric cars. The reviewer thought one potential improvement was the signage telling drivers where those electric charging spots are, particularly at parking lots that are so huge that it is hard to find those spots

Reviewer 4:
The reviewer was concerned that employee education among the partner companies was an issue, as these types of companies can have a high turnover rate, making it difficult to keep momentum going; howeve , the reviewer thought it sounded like the coalition was actively engaged in continuing education among the partners and was seeking ways to expand and enhance the program.

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector. This would include the potential to reduce barriers to large scale alternative fuel vehicle market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:
The reviewer said that the project offered an excellent way to expose a broad consumer base to electric vehicles and technology. As a pilot project (involving only 30 EVs in a massive rental car market), the market impact of the individual project was rather small; however, it did create a replicable template that can and should be broadened across Orlando and in other large rental car markets.

Reviewer 2:
The reviewer noted that the EV infrastructure will remain in place so the potential is there for sustaining the program into the future. The program recognized and is continuing to address the sustainability challenges, such as employee training at the partner companies. The reviewer thought that continuing to expand the charging network within the tourism corridor is great. The program had been both well-conceived and well-executed.

Reviewer 3:
The reviewer stated that there needed to be tracking or tracing of a customer's experience with renting an electric car to the customer purchasing an electric car or even renting one elsewhere or later. It was not possible to determine the near-term and longer-term impact of Drive Electric Orlando on customer purchase or rental of electric cars.

Reviewer 4:
The reviewer stated that the project may contribute to reduced petroleum dependence, GHG reduction, and AFV market sustainability goals by leveraging America's top tourism destination and rental car market to expose millions of visitors to EVs with the goal of, ultimately, turning renters into buyers. The reviewer identified as a weakness in this section of the presentation the lack of providing a methodology to define/demonstrate how the project rental metrics, directly or indirectly, translate into vehicle sales. As the project progresses into Year two, the customer feedback surveys should provide important data related to the customer experience and potential for EV purchases.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:
The reviewer stated that the coalition had leveraged its resources very effectively, attracting a strong network of volunteer partners. The reviewer considered this a good use of funds.

Reviewer 2:
The reviewer stated that in lieu of funding for hardware (i.e., vehicles and fueling sites), the use of DOE funding to inform the public on the availability of EVs was critically important to advance the market of these vehicles. While the industry's "butts in seats" programs/activities are deployed across target markets, it is critical to understand how the industry calculates the benefits of these activities and how they translate into vehicle sales and market development.

Reviewer 3:
The reviewer stated that the project made a solid effort to expose EVs in a significant way to a very la ge potential consumer base. The success of the current project should be followed up by an effort where Enterprise can share highlights of its EV rental program with other rental companies in Orlando. An information exchange workshop among rental car companies could be a good next step to keep the momentum going, encourage other rental companies to join in, and help spur more charging infrastructure.

Reviewer 4:
The reviewer wished that the visitor arriving in Orlando could also experience electric buses and see electric trucks supporting the backbone of the area. The presence of electric cars should be extended to all vehicles—buses, trucks, vans, etc.

Alternative Fuel Vehicle Curriculum Development and Outreach Initiative: Judy Moore (West Virginia University Research Corporation) - ti066

Presenter
Judy Moore, West Virginia University

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

Reviewer 1:
The reviewer stated that training underserved audiences (tow and salvage, collision, fueling and maintenance, etc.) was an excellent objective.

Reviewer 2:
The reviewer thought the project had solid objectives. Thinking to reach these underserved audiences and having the knowledge to recognize all of the ancillary people and positions who touch and have an effect on the life cycle of these vehicles showed the strength of this partnership.

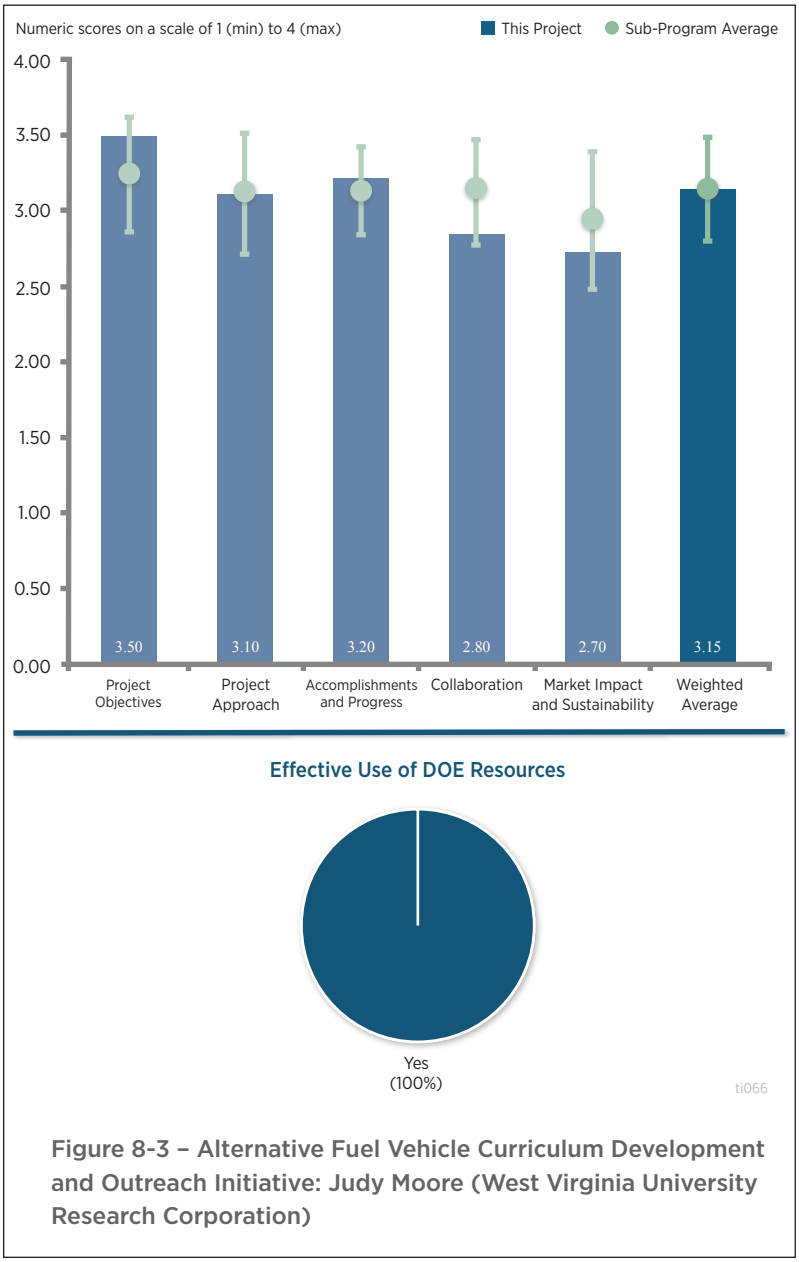

Figure 8-3 – Alternative Fuel Vehicle Curriculum Development and Outreach Initiative: Judy Moore (West Virginia University Research Corporation)

Reviewer 3:
The reviewer stated that the project objective and overview slides described the project's specific objectives deliverables, as well as how the project addressed specific barriers in the VTO's Multi-Year Program Plan 2011-2015. Project objectives appeared to be generally effective.

Reviewer 4:
The reviewer stated that the instructional designers seemed to have taken into account targeting the lowest common denominator for the educational level of the audience—in particular, the 8th grade level of reading/comprehension.

Reviewer 5
The reviewer thought that overall, the project addressed barriers in outreach to unique stakeholders, but was in the very early stages of deploying the material.

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:
The reviewer thought the project approach seemed to be effective and contributed to achieving the majority of project objectives.

Reviewer 2:
The reviewer thought that this partnership had a strong background in education and had developed an all-encompassing approach to get the word out to the right people. The inclusion of online, in-person, and event-based training covered all the bases, and this curriculum integrated well with existing training programs from the same group.

Reviewer 3:
The reviewer stated that the project's approach followed a well-established National Alternative Fuels Training Consortium (NAFTC) curriculum development format. The Odyssey Day activity was not well described in terms of how the products of this project would be specifically marketed or distributed at those events

Reviewer 4:
The reviewer stated that the project approach (relevance) section provided an effective methodology to accomplishing the project objectives. Despite the fact that the revised presentation template for 2016 was not followed, appropriate detail was provided on the approach, impact and milestone slides regarding the planned tasks and activities. The reviewer identified the lack of a table with fiscal year (FY) two Milestones as one weaknes

Reviewer 5:
The reviewer would like to have seen a state department of transportation traffic operations and state department of transportation highway incident response organization as a consultant. The project team did not seem to take into full account potential bridge, tunnel, and highway restrictions on AFVs or towing of AFVs.

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

Reviewer 1:
The reviewer stated that the program appeared to be on schedule and had set attainable goals for deployment. Milestones were clearly identified and progress was well-documented

Reviewer 2:
The reviewer found that good progress has been made towards achieving Year one project goals. Activities related to curriculum development, marketing, and outreach were all underway and appeared to be on track for successful completion. The reviewer had no identified concerns

Reviewer 3:
The reviewer noted that the project schedule appeared to be generally on track.

Reviewer 4:
The reviewer stated that at the current stage of the project, the accomplishments and progress were satisfactory.

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 thought that the project made good use of a Clean Cities Coalition advisory committee, as well as other fleet stakeholders, to inform curriculum development

Reviewer 2:
The reviewer stated that an effective project team was assembled to carry out this project, with industry stakeholders and multiple Clean Cities Coalition partners involved, which provided an excellent mix of expertise among team members. The roles of the project team were defined and collaboration/communication among project partners appeared to be appropriate for a project of this scope.

Reviewer 3:
The reviewer was delighted that the project sought out and included as stakeholders/partners the Automotive Recyclers Association (ARA). However, the reviewer did not see the Towing and Recovery Association of America (TRAA), North American Towing Academy (NATA), or the International Institute of Towing and Recovery (IITR).

Reviewer 4:
The reviewer stated that this was a strong team with deep experience in curriculum development and knowledge of AFVs, along with a well-established nationwide network of schools and trainers. The reviewer would like to have seen more collaboration/sharing with other grantees who have created similar curriculum programs to maximize the effect of both. There were some areas of overlap in the intended audience and delivery methods, as well as areas that were unique to this program.

Reviewer 5:
The reviewer commented that it was unfortunate the project was not leveraging with other similar projects within the VTO portfolio, regardless of how the information is disseminated. The reviewer thought that this could also be extended to the project's hydrogen modules, which did not seem to match up with current hydrogen deployment activities. It was also unclear who was participating on the advisory committee. The reviewer suggested that one stakeholder of interest could be the insurance industry. Finally, the reviewer asked how international activities could be best leveraged.

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector. This would include the potential to reduce barriers to large scale alternative fuel vehicle market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:
The reviewer stated that this team had a proven track record of excellent training programs, and has built in the ability to update the curriculum as technology evolves and new vehicles enter the market.

Reviewer 2:
The reviewer stated that the project can have tremendous effectiveness and contribute to overcoming most barriers and informing appropriate audiences to the AFV market expansion. The reviewer noted that it was still early to determine the degree of impact.

Reviewer 3:
The reviewer commented that by creating brand-new, standing NAFTC courses, the products of this project were positioned to have an enduring shelf-life. However, it was not entirely clear how the new courses will be marketed to the various new underserved audiences that are targeted.

Reviewer 4:
The reviewer saw a need for providing emergency responder training on AFVs, but said it was a very long stretch that such training would significantly improve the market for AFVs and sustainability. The reviewer had not seen

the survey data, but had never heard a consumer ask if emergency responders were prepared to deal with incidents involving AFVs before buying one.

Reviewer 5:

The reviewer thought that the project may contribute to reduced petroleum dependence, GHG emissions reduction, and AFV market sustainability goals by developing and delivering four new training courses and the associated marketing and outreach materials to support them, which will provide multiple new, underserved audiences with technical experience working with AFVs and advanced technology vehicles. The reviewer identified as a weakness that because the 2016 presentation format template was not used, the presentation did not specifically address market impact and sustainability with any level of detail.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:

The reviewer found that this team was judicious in use of funds and achieved maximum impact for every dollar spent.

Reviewer 2:

The reviewer wondered whether the Advanced Technology Vehicle Training for Towing and Roadside Assistance course could also be targeted to first responders, as it will contain content very relevant to that audience as well

Reviewer 3:

The reviewer commented that that Federal funds were being used wisely in support of this project. However, the reviewer wondered why the DOT-National Highway Traffic Safety Administration (NHTSA) was not funding this project instead of DOE (possibly due to DOT funding constraints).

Reviewer 4:

The reviewer stated that the use of DOE funding to develop/deliver training and associated outreach/marketing for these underserved audiences is critically important and necessary. The project will provide these audiences with technical experience working with AFVs and advanced technology vehicles, thus filling a critical gap in educational opportunities, reducing apprehension and resistance to supporting these new fuels/technologies, and breaking down barriers. There appears to be some overlap between this project and the National Fire Protection Association (NFPA) project, and DOE should work with the project teams to minimize duplication [DOE Program Clarification: Each training project has a di ferent target audience and focuses on different geographic regions in the country. So, duplication and overlap of training initiatives are minimized. DOE project officers with oversight for this work also coordinate to further ensure that information and resources are broadly leveraged while each project remains separate and distinct.].

Nationwide AFV Emergency Responder, Recovery, Reconstruction and Investigation Training: Andrew Klock (National Fire Protection Association) - ti067

Presenter
Andrew Klock, National Fire Protection Association

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

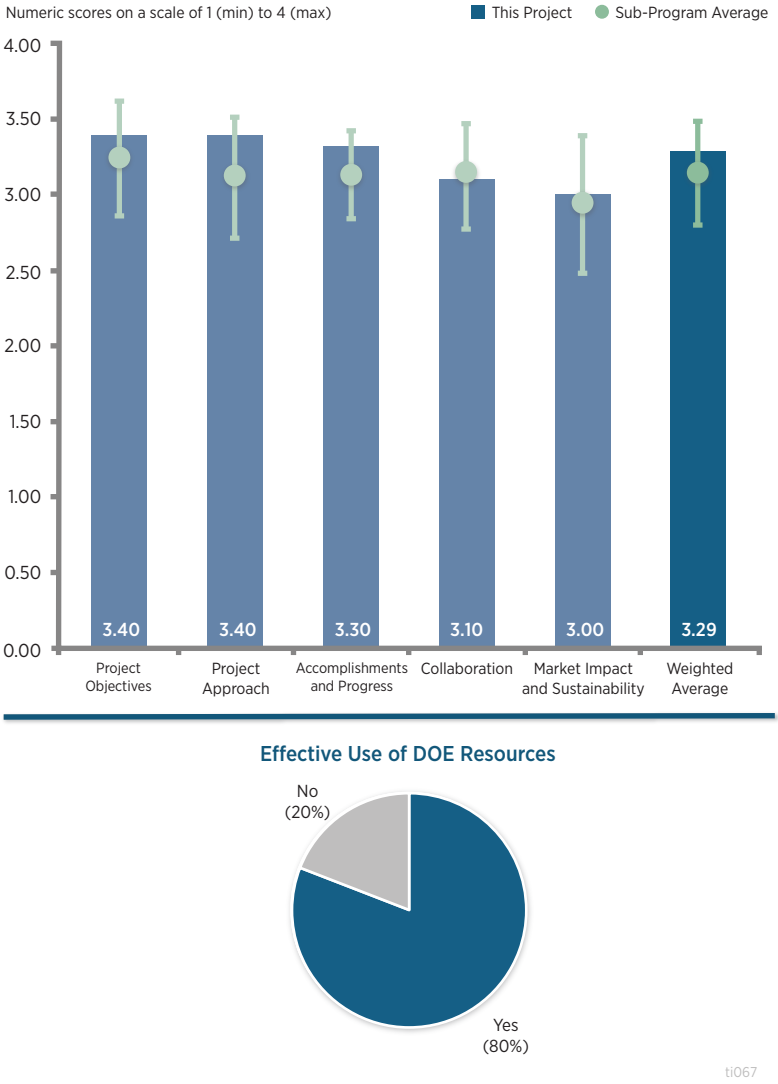

Figure 8-4 – Nationwide AFV Emergency Responder, Recovery, Reconstruction and Investigation Training: Andrew Klock (National Fire Protection Association)

Reviewer 1:
The reviewer found the development and execution of free Train-the-Trainer (T-t-T), classroom, and online AFV safety training for fire professionals and responders was a highly valuable activity. The objective of creating stronger relationships between NFPA and OEMs to bolster safety data sharing was critical.

Reviewer 2:
The reviewer agreed that there is definitely a need for training in the eme gency medical services (EMS), fire, and salvage communities. This partnership, anchored by the NFPA, had the right partners and depth of relevant experience to produce this kind of specialized training.

Reviewer 3:
The reviewer stated that the project objective and overview slides described the project's specific objectives, which appeared to be generally effective.

Reviewer 4:
The reviewer was surprised but satisfied with the inclusion of biodiesel in the scope of alternative fuels covered. The reviewer was impressed with the comprehensiveness of the passenger car makes/models covered.

Reviewer 5:
The reviewer found that overall, the project addressed barriers in outreach to unique stakeholders, but was in the very early stages of deploying the material.

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:
The reviewer found that the project included a comprehensive approach and thorough strategy for implementation.

Reviewer 2:
The reviewer stated that the project approach seemed to be effective and contributed to achieving the majority of project objectives.

Reviewer 3:
The reviewer thought the project approach/relevance section provided a detailed and effective methodology to accomplish the project objectives. Significant detail was provided on the approach and milestone slides wit regards to the planned tasks and activities, and risks/barrier analysis.

Reviewer 4:
The reviewer particularly liked the fact that the project was making the instructional materials online and free of charge. The reviewer stated that safety is everyone's business regardless of whether it is the public or private sector; there should be no charge for safety advice. The reviewer would have liked to have seen a state department of transportation traffic operations and state department of transportation highway incident response o ganization as consultants. The project team did not seem to take into full account potential bridge, tunnel, and highway restrictions on AFVs or towing of AFVs.

Reviewer 5:
The reviewer stated that this program seemed to take a fuel-specific approach, as opposed to a vehicle-specifi approach. Although a vehicle-specific guide was available from the anchor o ganization, it was not highlighted in the presentation. The reviewer thought that the scope and breadth of partnerships with industry trade groups, like salvage and towing associations, could have been expanded to help address their stated barrier of disseminating information. The project team obviously had a strong presence and credibility within the fire and EMS communit .

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

Reviewer 1:
The reviewer found that the progress to date and the numbers were impressive.

Reviewer 2:
The reviewer stated that the project was on pace with stated goals, and video components were especially well crafted.

Reviewer 3:
The reviewer commented that effective progress had been made towards achieving Year 1 project goals. Activities related to the formation of the Technical Advisory Panel, OEM partnership development, fire service and investigation classroom module development, and video development were completed. The reviewer added that all initiatives and activities appeared to be on track for successful completion. The reviewer had no concerns identified

Reviewer 4:
The reviewer stated that at the current stage of the project, the accomplishments and progress were satisfactory.

Reviewer 5:
The reviewer commented that the developed curriculum materials were very high quality (especially video modules). However, the reviewer noted that the project was 50% complete, and no classroom trainings had yet been held at time of AMR review presentation submission (though they have begun in June).

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 the project made good progress in establishing AFV OEM partners to participate in curriculum development.

Reviewer 2:
The reviewer noted that an effective project team was assembled to carry out this project, with government, industry, codes and safety organizations, and Clean Cities Coalition partners involved, which provided an excellent mix of expertise among team members. Project team roles were defined and collaboration/communication among project partners appeared to be appropriate for a project of this scope.

Reviewer 3:
The reviewer had similar comments to the project out of West Virginia University. The reviewer was delighted that the project sought out and included as stakeholders/partners the ARA. However, the reviewer did not see the TRAA, NATA, or the IITR.

Reviewer 4:
The reviewer found it unfortunate that the project was not leveraging with other similar projects within the VTO portfolio, regardless of how the information is disseminated. The reviewer thought it was nice to see the project leveraging the right folks on hydrogen, the Pacific Northwest National Laboratory (PNNL), and the California Fuel Cell Partnership (CaFCP). The reviewer added that one stakeholder of interest could be the insurance industry, and asked how international activities could be best leveraged.

Reviewer 5:
The reviewer would have liked to see more collaboration/sharing with other grantees who created similar curriculum programs, to maximize the effectiveness and reach of both. There were areas of overlap between the two projects in terms of subject matter and intended audience, and each brought a unique approach or angle to their projects. Better collaboration between grantees could have served the end-user better and more fully advanced DOE's objectives.

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector. This would include the potential to reduce barriers to large scale alternative fuel vehicle market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:
The reviewer thought that the project had good potential to contribute to reduced petroleum dependence, GHG emissions reduction, and AFV market sustainability goals by determining best practices and disseminating knowledge from OEMs, subject matter experts (SMEs), and national laboratories to emergency responders/ investigators.

Reviewer 2:
The reviewer stated that the NFPA is a well-established organization with deep ties to the fire/EMS community and a full slate of training and curriculum projects, with which this project will integrate nicely.

Reviewer 3:
The reviewer stated that the T-t-T model and other online training tools provided a reasonable strategy for promoting curricula sustainability and replication. Other emergency responder audiences—besides fire professionals—are allowed to participate in classroom trainings; however, no specific strategy for recruiting their attendance was presented by the PI.

Reviewer 4:
The reviewer commented that the project could have tremendous effectiveness and contribute to overcoming most barriers and informing appropriate audiences about the AFV market expansion. The reviewer noted that it was still early to determine the degree of impact.

Reviewer 5:
The reviewer did see a need for providing emergency responder training on AFVs, but said it was a very long stretch that such training would significantly improve the market for AFVs and sustainability. The reviewer acknowledged perhaps not seeing the survey data, but the reviewer had never heard a consumer ask if emergency responders were prepared to deal with incidents involving AFVs before buying one.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:
The reviewer stated that this was a solid partnership, a well-crafted project, and a great use of resources.

Reviewer 2:
The reviewer stated that the use of DOE funding to educate the nationwide safety communities will help keep responders and the public safe, promote AFV acceptance, and avoid serious high profile events, which is critically important and necessary. There appeared to be some overlap between this project and the West Virginia University project and DOE should have ensured that these two projects had complimentary versus duplicative efforts.

Reviewer 3:
The reviewer said that the NFPA and West Virginia University projects appear to be very similar, and that DOE should work with project managers to minimize overlap and duplication of work being supported with Federal funds. Second, the reviewer wondered why the DOT-National Highway Traffic Safety Administration (NHTSA) was not funding this project instead of DOE (possibly due to DOT funding constraints) [DOE Program Clarification: Each training project has a di ferent target audience and focuses on different geographic regions in the country. So, duplication and overlap of training initiatives are minimized. DOE project officers with oversight for this work also coordinate to further ensure that information and resources are broadly leveraged while each project remains separate and distinct.].

Safe Alternative Fuels Deployment in Mid-America (The SAF-D Project): Kelly Gilbert (Metropolitan Energy Center, Inc.) - ti068

Presenter
Kelly Gilbert, Metropolitan Energy Center, Inc.

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

Reviewer 1:
The reviewer stated that the project had a strong objective of removing financial and logistical barriers to deploying AFV safety training to fire and rescue responders in Kansas and Missouri.

Reviewer 2:
The reviewer stated that, overall, the project addressed barriers in outreach to unique stakeholders, but was in the very early stages of deploying the material.

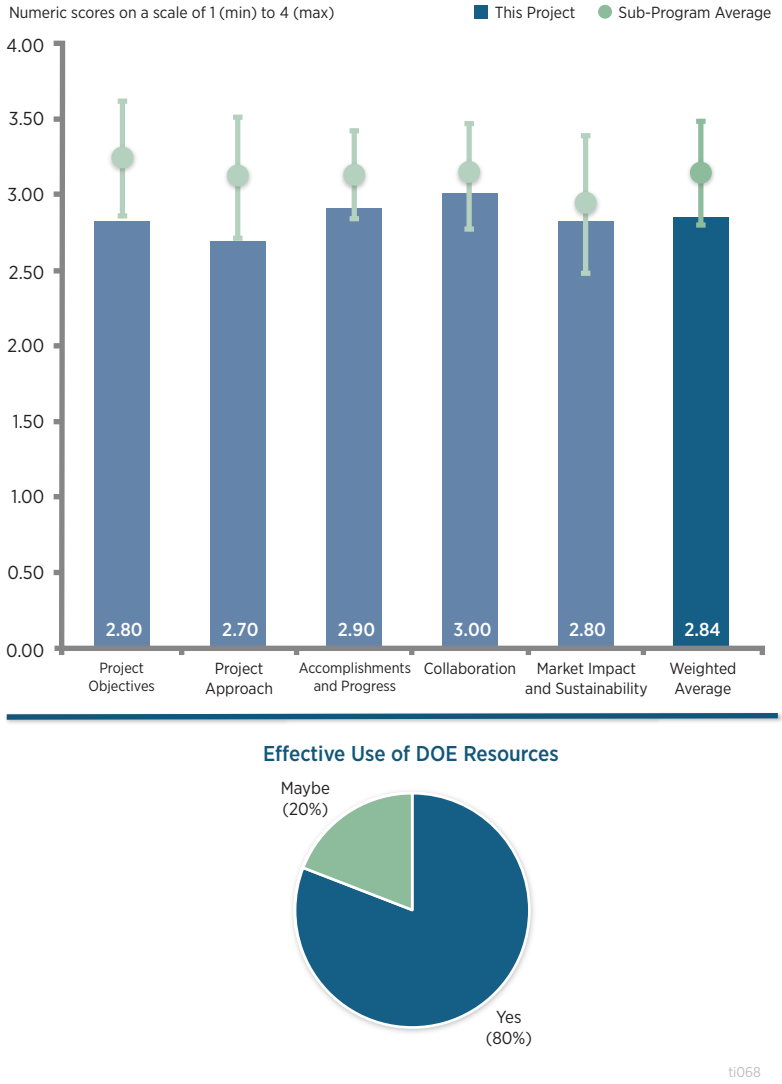

Figure 8-5 – Safe Alternative Fuels Deployment in Mid-America (The SAF-D Project): Kelly Gilbert (Metropolitan Energy Center, Inc.)

Reviewer 3:
The reviewer stated that the project objective and overview slides described the project's specific objectives, as well as how the project addressed specific barriers in the VTO's Multi-Year Program Plan 2011-2015. The reviewer noted that the project objectives appeared to be generally effective.

Reviewer 4:
The reviewer commented that the project objectives were certainly valid and fit within DOE s stated area of need. The reviewer was not convinced that the regional nature and limited scope of the project justified the need to spend resources to develop new training that exists or is in development on the national level.

Reviewer 5:
The reviewer said that the project did not include an assessment of the needs in the mid-America area or a business case analysis. The reviewer said that an assessment should have been performed to determine how many different types of AFVs there are in Kansas and Missouri, how many vehicles there are of each type, and where they are primarily concentrated (i.e., urban, suburban or rural and, if urban, which cities). Second, the reviewer thought it was presumptuous to say that Kansas and Missouri needed emergency response training on AFV incidents. An

assessment should have been performed to determine where there are AFVs, and which agencies in the areas lack the training to deal with incidents involving such vehicles. The reviewer also asked if there are enough AFVs in Kansas and Missouri to justify such training. For example, if an area has only one or two such vehicles, the reviewer asked if hazmat could deal with such incidents.

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer noted that the project approach was smart by leveraging existing training infrastructure that is already widely established and used to dispense/disseminate training to fire professionals and first responder

Reviewer 2:

The reviewer stated that the project approach seemed to be effective and contributed to achieving the majority of project objectives.

Reviewer 3:

The reviewer stated that the project approach section provided an effective methodology to accomplish the project objectives. The project team provided appropriate detail on the approach and milestone slides with regards to the planned tasks and activities.

Reviewer 4:

The reviewer thought that the need for this type of training is undeniable, but added that effective programs already existed or were being developed by other grantees with stronger backgrounds in this specific area. Some questions remained on exactly how the online portion will be made interactive, despite the interactive part being touted heavily in the presentation as a differentiator between this project and others.

Reviewer 5:

The reviewer expressed concern that the Safe Alternative Fuels Deployment in Mid-America (SAF-D) Project appears to duplicate work being done by NFPA and West Virginia University under their projects. The SAF-D Project should have been aware of the other two curricula and worked to avoid duplication and/or pointed out how its curriculum differs from the other two [DOE Program Clarification: Each training project has a di ferent target audience and focuses on different geographic regions in the country. So, duplication and overlap of training initiatives are minimized. DOE project officers with oversight for this work also coordinate to further ensure that information and resources are broadly leveraged while each project remains separate and distinct.].

The reviewer stated that contrary to what was indicated on Slide 7, the SAF-D Project did not leverage previous DOE investments. In addition, the reviewer thought that Slides 7 and 15 needed to be corrected: Intellectual property (patented) developed with U.S. Government funds may be allowed royalty-free use by the U.S. government as so designated. Documents and instructional materials developed with U.S. government funds may not be copyrighted and are in the public domain.

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

Reviewer 1:

The reviewer stated that the project was working through clear milestones, though a substantial amount of work remained to be conducted in the remaining project period.

Reviewer 2:

The reviewer thought that at the current stage of the project, the accomplishments and progress were satisfactory.

Reviewer 3:
The reviewer stated that good progress had been made towards achieving Year 1 project goals. Activities related to establishing teaming arrangements and classroom curriculum development were underway and appear to be on track for successful completion. The reviewer identified no concerns

Reviewer 4:
The reviewer stated that the project had set attainable goals for itself, but the reviewer got the sense that the project team was lagging behind in development of the curriculum, particularly the online portion.

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 stated that the project had a strong core of partners with relevant experience in the subject matter, especially the North American Fire Training Directors (NAFTD) and state training organizations.

Reviewer 2:
The reviewer stated that an effective project team was assembled to carry out this project, with State Fire and Rescue Training Institutes in Missouri and Kansas, and the Kansas City Clean Cities Coalition involved, which provided an appropriate mix of expertise among team members. Project team roles were defined and collaboration communication among project partners appeared to be appropriate for a project of this scope.

Reviewer 3:
The reviewer stated that the project's interdisciplinary project team appeared well coordinated to execute the project. Some further information on the project's curriculum development partner (capacities, experience, and role) would have been helpful for reviewer understanding.

Reviewer 4:
The reviewer thought it is unfortunate that the project was not leveraging other similar projects within the VTO portfolio, regardless of how the information is disseminated.

Reviewer 5:
The reviewer commented that the only partner that made the SAF-D different or unique from the similar efforts of NFPA and West Virginia University was NAFTD. However, it was not clear if the responsibility for national dissemination of the training was going to fall wholly on NAFTD or what NAFTD was going to do. The reviewer stated that this definitely has to be clarifie

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector. This would include the potential to reduce barriers to large scale alternative fuel vehicle market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:
The reviewer thought that the project did a good job targeting rural fire departments and responder professionals. The project incorporated a T-t-T component that was intended to replicate and advance training material dissemination beyond the project period.

Reviewer 2:
The reviewer stated that the project may have contributed to reduced petroleum dependence, GHG emissions reduction, and AFV market sustainability goals by developing and delivering training courses for fire and public safety personnel to train on alternative fuel safety.

Reviewer 3:
The reviewer stated that the project could have tremendous effectiveness and contribute to overcoming most barriers and informing appropriate audiences to the AFV market expansion. It is still early to determine the degree of impact.

Reviewer 4:
The reviewer stated that integrating this curriculum into existing training programs and including T-t-T components would ensure that this curriculum has a shelf-life well beyond the project period. The reviewer was also concerned that not having the depth of experience or the inventory of related training programs of other grantees may limit the long-term effectiveness of this project, as technology evolves and new models enter the market.

Reviewer 5:
The reviewer did see a need for providing emergency responder training on AFVs, but said it was a very long stretch that such training would significantly improve the market for AFVs and sustainability. Perhaps the reviewer had not seen the survey data, but the reviewer had never heard a consumer ask if emergency responders were prepared to deal with incidents involving AFVs before buying one.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:
The reviewer stated that this program was disseminating valuable information into a targeted market, and would definitely help further the DOE s stated objectives.

Reviewer 2:
The reviewer stated that the use of DOE funding to develop/deliver training for fire and safety officials wa critically important and necessary. Once the training programs are incorporated into state fire training centers, adoptions of gaseous fueled vehicles will accelerate due to fewer objections from well-prepared critical emergency and mechanical services personnel.

Reviewer 3:
The reviewer noted that another reviewer commented about Kansas University Fire retaining all copyright to developed course materials. Although Kansas University is expected to grant free use licenses to Clean Cities and fire safety trainers, a valid question was raised as to whether or not the government should actually be free to distribute or deliver any developer materials as it chooses to beyond the project period.

Reviewer 4:
The reviewer questioned why three projects are being funded for the same purpose. The reviewer also asked how this project is sufficiently di ferent from the other two to justify the funding [DOE Program Clarification: Each training project has a different target audience and focuses on different geographic regions in the country. So, duplication and overlap of training initiatives are minimized. DOE project officers with oversight for this work also coordinate to further ensure that information and resources are broadly leveraged while each project remains separate and distinct.].

Initiative for Resiliency in Energy through Vehicles (IREV): Cassie Powers (National Association of State Energy Officials) - ti069

Presenter
Cassie Powers, National Association of State Energy Official

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

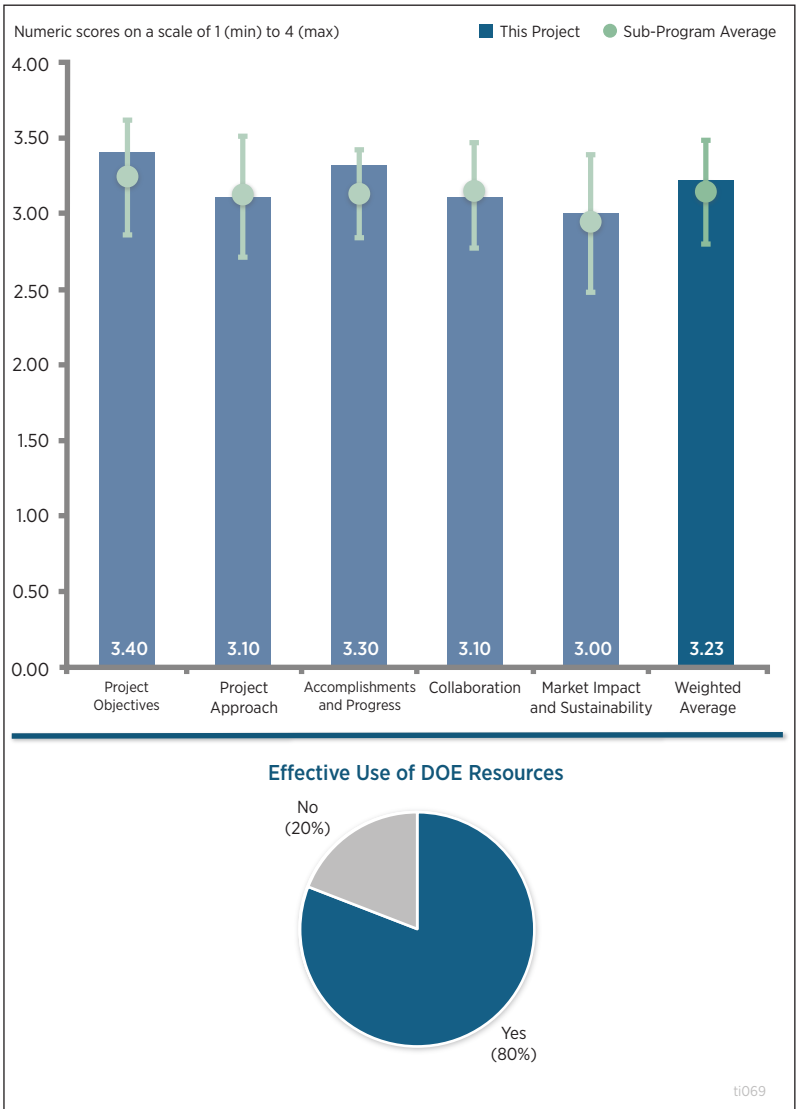

Figure 8-6 – Initiative for Resiliency in Energy through Vehicles (IREV): Cassie Powers (National Association of State Energy Officials)

Reviewer 1:
The reviewer stated that the project had a strong central objective to educate and coordinate local/state/regional emergency response and planning entities on the incorporation of alternative fuels into their long-term plans.

Reviewer 2:
The reviewer stated that this project targeted an under-served audience, and addressed a crucial need to coordinate strategies among regional and national organizations. The reviewer thought it provided an innovative approach to increasing the use of AFVs on a large scale.

Reviewer 3:
The reviewer believed that the project objectives were focused on supporting the VTO mission and the project had a direct and substantial impact on addressing technical barriers.

Reviewer 4:
The reviewer stated that the project objective and overview slides described the project's specific objectives, as well as how the project addressed specific barriers in the VTO's Multi-Year Program Plan 2011-2015. The reviewer noted that the project objectives appeared to be generally effective.

Reviewer 5:
The reviewer found it difficult to evaluate how much impact results from the use of AFVs during an emergency when those emergencies are infrequent. This uncertainty makes it in turn difficult to evaluate how much reduction

in emissions, and in the use of petroleum-based fuels resulted from the use of AFVs during emergencies. This type of evaluation was not undertaken by this particular project. The reviewer opined that because emergencies are so infrequent, the use of AFVs during emergencies would have hardly any appreciable effect on reduction of emissions and use of petroleum-based fuels.

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that compiling critical fleet data and o ganizing existing information in new ways to help emergency preparedness organizations and officials integrate AFV into their long-term planning was a solid approach. The project identified a unique need, appeared to be well-researched, and had a solid plan to disseminate this information to key people. Finally, the reviewer believed the Initiative for Resiliency in Energy through Vehicles tool to be simple to use and easy to update.

Reviewer 2:

The reviewer stated that the project approach seemed to be effective and contributed to achieving the majority of the project's objectives.

Reviewer 3:

The reviewer found that the project approach section provided an effective methodology to accomplishing the project objectives. Appropriate detail was provided on the approach and milestone slides with regards to the planned tasks and activities.

Reviewer 4:

The reviewer stated that co-locating AFV safety workshops with existing national events for emergency planners was a smart approach. The project involved a comprehensive approach, assessed existing emergency plans among 20 largest U.S. municipalities, created tools and resources, educated stakeholders, and laid the groundwork for incorporating alternative fuels into emergency plans nationwide. The reviewer noted that criteria or methodology for selecting cities and regions (for workshops and pilots) were not entirely clear.

Reviewer 5:

The reviewer did not find the approach to this project to be well thought out and strategized. At the time of the presentation, the project seemed to target all 50 states across the nation, even when it may not have been appropriate to do so in some places. The reviewer commented that the project could be much better focused starting on geographic regions of the country that both encounter emergencies (e.g., hurricanes, tornados, floods, earthquakes, etc.) and have AFVs and fueling infrastructure already in place. Furthermore, the reviewer stated that the scope seemed to be narrowed to alternative fuel automobiles. The reviewer found absolutely no reason why alternative fuel vans, trucks, and buses should have been ignored or excluded. The reviewer referenced more detailed comments in the Collaboration and Coordination section.

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

Reviewer 1:

The reviewer stated that the case studies and reports on how AFVs have been incorporated into existing emergency plans were very valuable. The project appeared to be making steady progress towards achieving objectives.

Reviewer 2:

The reviewer found that significant progress had been made towards achieving Year 1 project goals. Activities related to establishing the project steering committee and tools/resource development were underway, and appeared to be on track for successful completion. The reviewer identified no concerns

Reviewer 3:
The reviewer stated that at the current stage of the project, the accomplishments and progress were satisfactory.

Reviewer 4:
The reviewer stated that the project established attainable goals and appeared to be on schedule. The reviewer worried that coordinating with a large number of emergency planning groups and convincing them to get on board with the inclusion of AFVs in their master plans will not be an easy task.

Reviewer 5:
The reviewer noted that no target performance goals were given for Year 1.

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 found the project was based on a highly cooperative structure among a broad range of states, emergency managers, and alternative fuel communities.

Reviewer 2:
The reviewer stated that the core partners in this project had strong ties and credibility within the emergency planning community. It appeared that the team was enjoying excellent collaboration and coordination among its members.

Reviewer 3:
The reviewer commented that an effective project team was assembled to carry out this project, with International Association of Emergency Managers (IAEM), National Governors Association (NGA), alternative fuel industry trade organizations, and seven Clean Cities Coalitions involved, which provided an excellent mix of expertise among team members. The roles of the project team were defined and collaboration/communication among project partners appeared to be appropriate for a project of this scope.

Reviewer 4:
The reviewer stated that the project seemed to have effective collaboration with industry to continue to build on what has been started.

Reviewer 5:
The reviewer strongly recommended the inclusion of additional stakeholders and stronger collaboration and coordination among project partners. In being resilient to an emergency, public utilities, such as electric, gas, water supply, sewage, telephone, internet, and communications need to be included. Alternative fuel trucks of public utility companies can play a critical role in recovery and restoration after a widespread emergency.

The reviewer also commented that state trucking associations needed to be involved. Trucks bring necessary provisions such as fuel, food, and other staple items for people, as well as much needed supplies and equipment for recovery and restoration after a widespread emergency. Thus, the reviewer thought alternative fuel trucks needed to be considered.

Finally, the reviewer said that buses needed to be involved, as they are needed for evacuation of residents and bringing in relief workers. Furthermore, the reviewer said that the transit bus fleets are the most aggressive adopters of alternative fuel (besides the refuse industry), so transit agencies needed to be involved as stakeholders and partners, and the American Public Transportation Association (APTA) should be made a national stakeholder and partner.

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector. This would include the potential to reduce barriers to large scale alternative fuel vehicle

market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:
The reviewer thought that the PI highlighted several great examples of how communities were able to leverage alternative fuels in emergency management (Florida Power and Light's use of biodiesel; Pacific Gas and Electric conducting power-takeoff with bucket trucks; New Jersey shore communities using heavy-duty natural gas vehicles [NGVs] during post-hurricane power disruptions, etc.). The reviewer indicated that the project had good potential to help communities/states share information on these successful cases and examples.

Reviewer 2:
The reviewer noted that the project could have tremendous effectiveness, contributing to overcoming most barriers, and informing appropriate audiences about the AFV market expansion. The reviewer noted that it was still early to determine the degree of impact.

Reviewer 3:
The reviewer stated that the project had potential to contribute to reduced petroleum dependence, GHG emissions reduction, and AFV market sustainability goals. This would be accomplished by creating customized tools and providing information for emergency management decision-makers to examine the potential costs, benefits, and trade-offs of incorporating alternative fuels into their plans.

Reviewer 4:
The reviewer commented that disaster plans are not revised frequently, so any inclusion of AFVs in these plans will remain for a long time. The reviewer trusted that NASEO will continue to monitor AFV fleets and provide updated information to relevant parties as needed.

Reviewer 5:
The reviewer referenced prior comments from Question 1. The reviewer did not think this project will have any appreciable impact on the market for AFVs and on sustainability because of the infrequency of emergencies.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:
The reviewer found the project to be a great idea, and was well-planned and executed.

Reviewer 2:
The reviewer stated that there were a lot of expanding activities among the larger transportation planning community focusing on climate resiliency. This project represented a good start towards integrating alternative fuels and AFVs into this emerging topic area.

Reviewer 3:
The reviewer found that the use of DOE funding to develop customized resources and tools for emergency management officials, to increase the prevalence of alternative fuels in existing and future state and local emergency response and planning operations, was appropriate. The reviewer also found that DOE funding was necessary to reach new audiences that may not otherwise realize the role alternative fuels could play in their emergency response plans.

Reviewer 4:
The reviewer did not think that this project makes the best use of DOE funds. The reviewer thought that if DOE wanted to cover the union of emergencies and AFVs, it should have looked at getting fire departments, rescue services, ambulances, police departments, and other first responders to deploy more AFVs. The reason is that first of all, the kinds of emergencies that these first responders handle are more regula , and thus, would have greater

impact on emissions reduction and petroleum-based fuel use than irregular emergencies that fall under the province of emergency managers. Secondly, the reviewer pointed out that there is a lot of idling that needs to be reduced in the conventional vehicles used by these first responders. Therefore, replacing them with AFVs would significantly reduce emissions. The reviewer suggested a program to incentivize natural gas fire trucks

EcoCAR 3: Kristen Wahl (Argonne National Laboratory) - ti070

Presenter
Kristen Wahl, Argonne National Laboratory

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 reducing reliance on petroleum based fuels and reducing emissions. This includes the impact the project has on addressing the technical barriers from the Vehicle Technologies Office (VTO) Multi-Year Program Plan.

Reviewer 1:
The reviewer stated that the project represented a strong ongoing advanced technology vehicle workforce development activity.

Reviewer 2:
The reviewer stated that the objectives of workforce development, demonstration of energy-efficient powertrains, alternative fuels and innovative technologies, and their impact on reducing environmental impact, supported the overall VTO goal of reducing dependence on petroleum-based fuels.

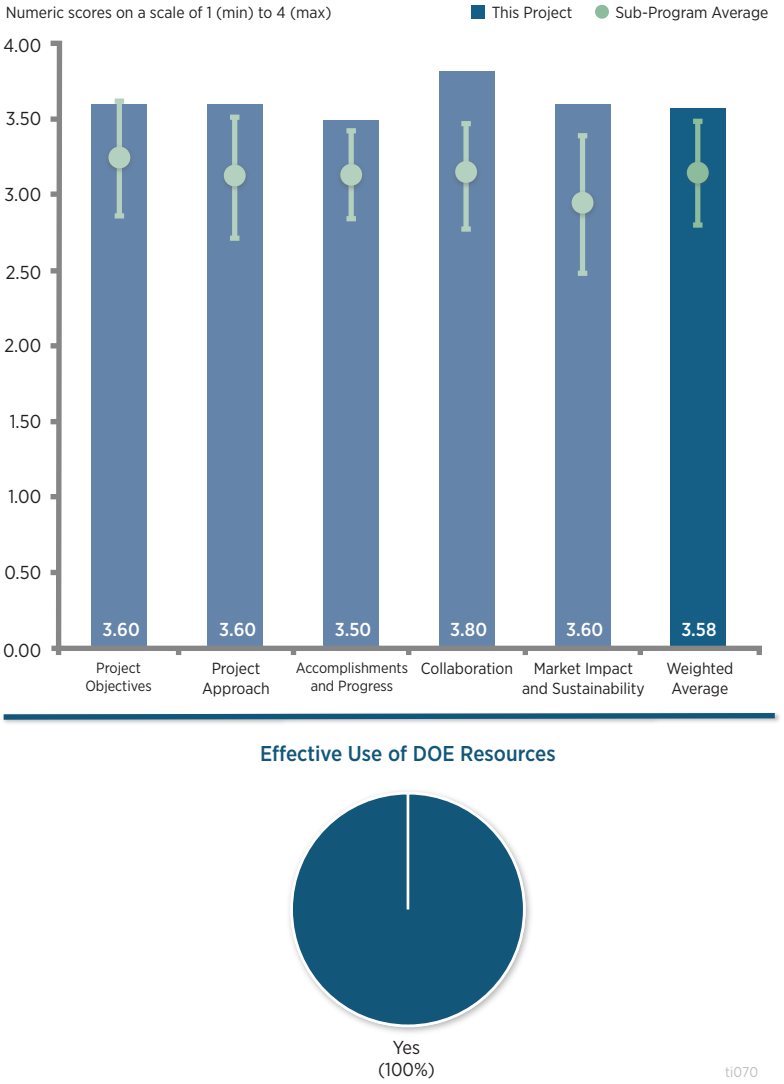

Figure 8-7 – EcoCAR 3: Kristen Wahl (Argonne National Laboratory)

Reviewer 3:
The reviewer commented that this project clearly supports VTO's objectives, particularly in addressing the lack of trained engineers and scientists and the lack of advanced vehicle technology curricula. The project has a strong collaboration with industry, government, and universities. It is very impressive that since 1988, more than 17,000 graduates of Advanced Vehicle Technology Competitions (AVTC) have worked in the automotive industry and that more than 80% of AVTC graduates work in the automotive industry. This competition provides a strong impact by training students to become ready for work in industry. The reviewer remarked that for Slide 3, it is hard to gauge how good the number is of 53% of AVTC alumni that have credit for producing intellectual property. Please show what the number is for non-AVTC alumni.

Reviewer 4:
The reviewer noted that the project had a number of objectives that clearly addressed barriers to the VTO and DOE goals. The EcoCAR3 competition activities addressed workforce development directly, through the students involved in the training and hands-on experience during the competition, as well as less directly by developing curricula that is made openly available to other academic institutions.

Though the presentation reported on a number of quantifiable outcomes, such as the number of Science, Technology, Engineering, and Mathematics (STEM) events and the number of program graduates since the beginning of the AVTC program, it was not clear if there were project targets or objectives for these outcomes on an annual/competition cycle basis. The reviewer commented that these could be useful in understanding the year-to-year objectives and how much progress is being made towards them.

Reviewer 5:

The reviewer noted that the leading university-level engineering competition project was a Workforce Development Program, so it did not develop or demonstrate commercial-intent petroleum and emissions reducing technologies. That said, this program squarely addresses a crucial U.S. automotive industry (OEMs and Tier system manufacturers) need to develop the next generation of automotive engineers and related necessary disciplines (e.g., marketing, business, communications, project management, etc.) in the United States. This directly addressed the program's barriers of a lack of trainer engineers and scientists, and a lack of advanced vehicle technology (AVT) curricula.

Question 2: Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure, emissions reductions and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that the multi-year vehicle development process modeled after the auto industry was an excellent way to prepare future engineers to be able to walk into their first position with an OEM and would allow them to provide near immediate contributions to the OEM.

Reviewer 2:

The reviewer commented that the student curriculum was well designed, and followed a four-year development timeframe, mirroring the typical vehicle development timescale occurring in the auto industry. The reviewer noted that the project's curriculum was no longer just a mechanical engineering activity, but it invoked a much wider range of other technical and business/professional skills that are key in the auto industry.

Reviewer 3:

The reviewer stated that the EcoCAR3 approach of using a collegiate competition to train future AVT project teams, and also to develop curricula and demonstrate innovative technologies, supported both the project objectives and the DOE/VTO objectives of enabling AVTs by addressing issues related to workforce development, education, and training.

The reviewer found that the competition's plan of modeling the development process of the real-world auto industry, by following the multi-year Vehicle Development Process, and including not just engineers but also project and communication managers as part of the teams, and developing a multi-disciplinary curriculum, should make for an effective approach to addressing broader workforce development barriers.

Reviewer 4:

The reviewer said that the competition focuses on reducing petroleum use, total energy usage, and emissions on a variety of vehicle platforms. The project has a multifaceted approach on working both the technical aspects of the vehicles and the communications efforts of reaching out to the local communities. The only area that this reviewer sees that could be improved is that only 16 universities are selected. While this is understandable due to the huge scope of this competition, there could be a way to expand the scope of EcoCAR by having universities work together. The reviewer suggested that maybe there could be a lead university that has the car, but several other universities that support the effort by taking the curricula and doing activities that can be done offsite, for example computer design and additional communication efforts. The project could become even more interdisciplinary if this was done.

Reviewer 5:

The reviewer stated that as a workforce development program, the program does not deploy petroleum-reducing and other sustainable vehicle technologies. However, the program's student participants' outreach and public

interactions support deployment of these technologies during the project. The students' impact while at work in industry post-project that the program enabled will be much greater because of the program. This reviewer explained that the combined group of vehicles use most fuels, powertrain architectures, options, etc., which allows for outreach to a wide range of audiences. The program's design squarely addressed a crucial U.S. automotive industry (OEMs and Tier system manufacturers) need to develop the next generation of automotive engineers and related necessary disciplines (e.g., marketing, business, communications, project management, etc.) in the United States. The program evolved to mimic the automotive design process (timing, steps, computational tools, experimental tools, etc.), which will allow students to transition into industry and contribute from the start. The reviewer stated that the interaction between industry (vehicle OEMs, suppliers, computational tool developers, etc.) was very good and helpful for improving the project and students' education/training. The technologies and vehicles were developed with a performance goal, but not a prescribed solution path. The reviewer commented that this was good and gave the teams freedom to explore more broadly than OEMs, which developed creativity and unique solutions. The reviewer found that the Advanced Driver Assistance Systems (ADAS) activity (new in 2016) was a nice addition, given the market interest and development of connected/autonomous vehicles. The reviewer noted that being a four-year program has created challenges for information and experience retention, and student motivation, as students cycle out of and into the program based on when they start college. This was not mentioned as a limitation/issue, but this reviewer expressed interest in knowing how the program (and universities) address this.

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

Reviewer 1:
The reviewer found that the progress in this project was excellent in year two of the program, including vehicle integration, new progress management, communications programs, as well as media and public relations activities.

Reviewer 2:
The reviewer stated that the project's revised safety focus (improved structural modification waiver process, inspections, and systems safety activity) was well considered and added substantial value to the EcoCAR curricula.

Reviewer 3:
The reviewer remarked that the project has a broad reach and has many accomplishments. In addition, it appears that the project team is continually trying to improve the project, with the reviewer citing the new ADAS work as an example.

Reviewer 4:
The reviewer evaluated based on the impact on developing students into highly-skilled employees for the automotive industry, not on direct petroleum/emissions reduction. The reviewer noted that this was the 11th generation of DOE-sponsored engineering design/business competitions (since 1988). Over this period, the program claimed over 17,000 students who have participated in the program. The presenter commented that this large number underestimated the impact because it only includes the core group of dedicated students on each team. Teams always have a much larger number of people who play a smaller role, but are also impacted by the project. The result was a much larger number of impacted students (over 100,000). The reviewer noted that the program outreach (both by the Argonne National Laboratory [ANL]-led EcoCAR3 headquarters (national) and by teams (in their local markets)) increased the awareness of, and interest in, the program and the sustainable vehicle technologies used by the teams to the broader market. This included the general population (consumers and students, to get them excited about working in the industry when they are older). The Model-Based Design Curriculum and Applied Automotive Engineering Curriculum were a good way to allow students at universities who were not in the competition to learn some of the same skills (for $0).

Reviewer 5:
The reviewer found that substantial accomplishments and progress were reported, and the competition was running on-time based on the provided schedule. In addition to the activities directly related to the competition stages, other

supporting accomplishments were reported, such as the addition of an ADAS activity and an innovation initiative developed in partnership with the National Science Foundation (NSF).

The focus on STEM outreach will help broaden the impacts of the work, particularly with the emphasis on diverse, underserved audiences. The reviewer stated that because the milestones reported were primarily timeline based, it was difficult to evaluate how the accomplishments measure against performance measures

The reviewer commented that there were some areas where it would be useful to include more quantitative outcomes for the current year, or for the competition to date. For example, though the project reported having over 17,000 graduates since 1988, the total number of core competitors for this competition (either this year or for this competition cycle) was not reported.

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

Reviewer 1:

The reviewer said that the collaborations for EcoCAR are truly outstanding. It is very impressive to have the support of so many key industrial companies and universities. In addition, this project links to the Clean Cities Program, providing over 100 interns per year. The reviewer commented that the amount of additional cost-share that is provided for this project ($915 million) is staggering.

Reviewer 2:

The reviewer thought that the collaboration and coordination in this project was outstanding. The 16 university teams were able to work with a variety of OEMs and suppliers that helped to increase their knowledge base and provided an excellent source of contacts as the students move into the work force.

Reviewer 3:

The reviewer stated that student vehicle teams were 100 people in size and ranged across a breadth of disciplines, which taught students very important collaboration and team building skills. General Motors (GM) and OEM involvement with the project appeared to be very strong.

Reviewer 4:

The reviewer noted that the project had a very large number of partners (30) in addition to the competing university teams, and this broad level of collaboration was focused on, and important for, meeting the project objectives. Based on the reported outcomes, the collaboration of all these partners appeared to be very well managed and coordinated.

The reviewer commented that given the limited time for the presentation and the large number of partners involved, it was understandable that only a few partners' specific roles were discussed, but an indication of what organizations were involved in which activities (e.g., mentoring, hardware supplies) would be of interest.

Reviewer 5:

The reviewer stated that there was strong collaboration between DOE, GM, 16 universities, and more than 30 government and industry sponsors, and noted that the coordination work to accomplish this was impressive. The program's success and track record likely made it an easier sell generation. The reviewer stated that the presenter was clearly leading a team at ANL for this scale of project, but it was unclear how big the team is. The ANL/DOE team and the teams interacted on a regular schedule (workshops, planning sessions, and competition). The presenter did not indicate that there were any coordination issues. The reviewer said that it would be good to know why the vehicle OEM has been GM since 1999 (maybe earlier). The reviewer questioned if the other domestic OEMs (Ford and Fiat Chrysler Automobiles) were not interested.

Question 5: Market impact and sustainability—the degree to which the project has already contributed, as well as the potential to continue to contribute in the future, to a sustainable alternative fuel vehicle market, alternative fuel market expansion, and reduced petroleum dependence/greenhouse gas emissions in the transportation sector.

This would include the potential to reduce barriers to large scale alternative fuel vehicle market penetration, making information about alternative fuels and petroleum reduction opportunities widely available to target audiences, and ability for the project to be replicated in other geographic areas or with other technologies.

Reviewer 1:
The reviewer said that the market impact is strong. It is hard to fully quantify the results, as so many students have developed skills and passions for sustainability in this program and have gone on to work for the automotive industry. The reviewer noted that there are over 17,000 lives that have been impacted by this project. It is so important to ignite a flame in a student, and competitions like this one can do it. The reviewer remarked that it would be interesting to hear some personal stories of how this project impacted their lives and their careers.

Reviewer 2:
The reviewer stated that the project continued to build on its long history of advancing both advanced and AFV technologies, and developing the workforce needed to support and grow the industry. The integration of ADAS and connected and automated vehicle (CAV) technologies into the EcoCAR curricula was timely and very valuable.

Reviewer 3:
The reviewer stated that this project, as well as previous student competitions, definitely contributed to alternative fuel market expansion and reduced petroleum dependence. This was achieved by developing curricula and graduating knowledgeable engineers to work in the AFV industry.

Reviewer 4:
The reviewer stated that the market impact and sustainability was strong, but indirect. The program's most direct market impact was on developing students into highly-skilled employees for the automotive industry, not on direct petroleum/emissions reduction. The program claimed over 17,000 core students who have participated in the program since 1988 (this number increases to over 100,000, a large number, when non-core students are included). The students developed through the program enter industry and work to develop the next generation of sustainable vehicle technologies that DOE targets and consumers need.

Reviewer 5:
The reviewer commented that this project supported the sustainability goals by focusing the competition on energy efficient and alternative fuel technologies. Furthermore, the program used environmental impact as part of the competition criteria, as listed in the back-up slides. Reduction in energy consumption, petroleum usage, and criteria and GHG emissions were some of the things evaluated in the competition. The reviewer added that although the project did not directly impact the market, it addressed important barriers to market expansion by supporting the future workforce for advanced vehicle technologies and addressing education issues.

Question 6: Use of resources—are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion to support the broader goal of petroleum displacement and greenhouse gas reductions?

Reviewer 1:
The reviewer commented that this project is truly a win-win-win for universities, companies, and government. This is an excellent use of DOE funds, and the reviewer said that it would be great to see competitions like this in other areas where DOE has not established them.

Reviewer 2:
The reviewer commented that the funds used for EcoCAR3 were definitely being used for a wonderful program. The DOE should continue to fund these types of projects.

Reviewer 3:
The reviewer stated that this project had provided substantial results for the DOE resources provided. The reviewer added that this project was able to significantly leverage the funding from DOE. In addition to the direct funding by DOE, this project had sponsors that, since FY 2012, have funded about a third to half of the budget. On top of

that, in-kind support to the competition, cash, and in-kind support to the competing universities totaled over $900 million.

Reviewer 4:

The reviewer stated that DOE funds were being well-used and heavily-leveraged with industry funding. The presenter noted that the actual industry cost-sharing was much higher if all of the donated industry time (mentoring and other interactions), software tools, etc., were accounted for. The reviewer suggested fully-accounting for all of this somehow to strengthen the impression of how well industry funding has been leveraged.

The reviewer suggested that the EcoCAR program consider leveraging some of the curricula that have been developed through other university vehicle competitions that are focused on connected and automated vehicles, as well with DOT-sponsored University Transportation Centers.

Acronyms and Abbreviations

ADAS	Advanced Driver Assistance Systems
AFDC	Alternative Fuels Data Center
AFV	Alternative fuel vehicle
AMR	Annual Merit Review
ANL	Argonne National Laboratory
APTA	American Public Transportation Association
ARA	Automotive Recyclers Association
AVT	Advanced vehicle technology
AVTC	Advanced Vehicle Technology Competitions
BETO	Bioenergy Technologies Office
CaFCP	California Fuel Cell Partnership
CAV	Connected and automated vehicle
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
EERE	Office of Ene gy Efficiency and Renewable Ene gy
EMS	Emergency medical services
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 1992
EV	Electric vehicle
FOA	Funding opportunity announcement
FY	Fiscal year
GGE	Gasoline Gallon equivalents
GHG	Greenhouse gas
GM	General Motors
H_2	Hydrogen
IAEM	International Association of Energy Managers
ICE	Internal combustion engine
IITR	International Institute of Towing and Recovery
IREV	Initiative for Resiliency in Energy through Vehicles
MOU	Memorandum of Understanding

NAFTC	National Alternative Fuels Training Consortium
NAFTD	North American Fire Training Directors
NATA	North American Towing Academy
NFPA	National Fire Protection Association
NGA	National Governors Association
NGV	Natural gas vehicle
NHTSA	National Highway Traffic Safety Administration
NPS	National Park Service
NSF	National Science Foundation
OEM	Original equipment manufacturer
PEV	Plug-in electric vehicle
PHEV	Plug-in hybrid-electric vehicle
PI	Principal Investigator
PNNL	Pacific Northwest National Laboratory
R&D	Research and development
SAF-D	Safe Alternative Fuels Deployment in Mid-America
SMART	Systems and Modeling for Accelerated Research in Transportation
SME	Subject matter expert
STEM	Science, Technology, Engineering, and Mathematics
TI	Technology Integration
TRAA	Towing and Recovery Association of America
T-t-T	Train-the-Trainer
USDA	U.S. Department of Agriculture
VTO	Vehicle Technologies Offic