1. Hybrid and Vehicle Systems Technologies

Hybrid and vehicle systems research provides an overarching vehicle systems perspective to the technology research and development (R&D) activities of the U.S. Department of Energy's (DOE's) vehicle research programs, and identifies major opportunities for improving vehicle efficiencies. The effort evaluates and validates the integration of technologies, provides component and vehicle benchmarking, develops and validates heavy hybrid propulsion technologies, and develops technologies to reduce the parasitic losses from heavy vehicle systems. Analytic and empirical tools are used to model and simulate potential vehicle systems, validate component performance in a systems context, benchmark emerging technology, and validate computer models. Extensive collaboration with the technology development activities is required for success. The results of hybrid and vehicle systems activities are used to estimate the national benefits and impacts of DOE-sponsored technology development, and successfully transfer developed technology to industry.

In August 2009, the DOE announced the selection of ten projects totaling $425 million for development, deployment, and validation of hybrid vehicles, and deployment of charging stations across the nation. American Reinvestment and Recovery Act (ARRA)-funded transportation electrification activities will aid in the deployment of technologies that help to reduce petroleum consumption. Activities include deployment of 18,000 public and private charging stations in major metropolitan areas across the country, and deployment of truck stop electrification infrastructure at 50 sites across interstate corridors. Additional deployment activities include development, validation, and deployment of light- and medium-duty electric drive vehicles.

Subprogram Feedback

DOE welcomed optional feedback on the overall technical subprogram areas presented during the 2013 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 who volunteered to provide subprogram overview comments responded to a series of specific questions regarding the breadth, depth, and appropriateness of that DOE Vehicle Technologies Office (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 subprogram area adequately covered? Were important issues and challenges identified? Was progress clearly presented in comparison to the previous year?

Question 2: Are plans identified for addressing issues and challenges? Are there gaps in the project portfolio?

Question 3: Does the subprogram area appear to be focused, well-managed, and effective in addressing the DOE Vehicle Technologies Office's needs?

Question 4: Other Comments.

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

Subprogram Overview Comments: Lee Slezak (U.S. Department of Energy) – vss000

Question 1: Was the sub-program area adequately covered? Were important issues and challenges identified? Was progress clearly presented in comparison to the previous year?

Reviewer 1:
The reviewer believed that DOE (Slezak) and other staff had done an excellent job in developing programs to further electric propulsion technology integration into production vehicle fleets.

Reviewer 2:
The reviewer said well done.

Reviewer 3:
The reviewer asserted that the presentations comprehensively covered the work underway. Year-over-year progress was shown through completed vehicle tests.

Reviewer 4:
The reviewer expressed that yes, it was adequately covered. The deployed commercialized version of the Autonomie vehicle modeling and simulation platform was a good service to the U.S. Automotive industry. This reviewer added that the Vehicle and Systems Simulation and Testing (VSST) and large database were very useful.

Reviewer 5:
The reviewer simply stated yes.

Reviewer 6:
The reviewer expressed that this was a general VTO overview presentation with an emphasis on new program activity for 2013. The overview adequately covered the VTO program activity.

Reviewer 7:
The reviewer would have liked to see more information on trucks and what ideas the group had for post-SuperTruck efforts.

Reviewer 8:
The reviewer indicated a good overview of Vehicle and Systems Simulation (VSS), including the important issues. This reviewer did not attend the plenary but saw the overview presentation at the start of the VSS sessions on May 14th. Recent accomplishments were noted, but this reviewer did not recall a specific comparison between Fiscal Year (FY) 2013 and FY 2012.

Reviewer 9:
The reviewer reported that all main components of the sub-program were addressed. However, this reviewer added that there was no clear identification of the risks, challenges, and issues with the program. In addition, there was no differentiation between current and previous year accomplishments. This person concluded that more explanation of the different areas of accomplishments would have been helpful.

Question 2: Are plans identified for addressing issues and challenges? Are there gaps in the project portfolio?

Reviewer 1:
The reviewer voiced that the FY 2013 Emphasis slide was a good summary of plans to address vehicle efficiency improvement and electrification. The focus areas seemed to cover the gamut.

Reviewer 2:
The reviewer stated well done.

Reviewer 3:
The reviewer noted that the testing plans were focused on real-world issues and that the work was well prioritized.

Reviewer 4:
The reviewer thought the programs were very broadly scoped and saw no real gaps.

Reviewer 5:
The reviewer remarked that plans had been identified and gaps had not been observed.

Reviewer 6:
The reviewer mentioned big trucks.

Reviewer 7:
The reviewer commented that the gaps were based on budgetary limitations. However, the use of the available budget was advancing research on critical technological challenges.

Reviewer 8:
The reviewer asserted that there were plans identified for addressing issues and challenges. This person also noted that there were gaps, and stated that modeling for the wireless charging of magnetic fields, etc. [along with analytical work and testing support for Society of Automotive Engineers (SAE) J2954 validation], would have been beneficial to add.

Reviewer 9:
The reviewer observed that there was a mention of areas for emphasis, but that there were no such clear plans that addressed issues and challenges.

Question 3: Does the sub-program area appear to be focused, well-managed, and effective in addressing the DOE Vehicle Technologies Program R&D needs?

Reviewer 1:
The reviewer observed that the program covered a wide range of activities and did so comprehensively. The projects were very focused on objectives supportive of the overall program.

Reviewer 2:
The reviewer said that Slezak and this group had proven a high level of competence and execution delivery. This reviewer added that it was a great team.

Reviewer 3:
The reviewer asserted that yes, it was properly focused.

Reviewer 4:
The reviewer stated yes.

Reviewer 5:
The reviewer affirmed that yes, the sub-program area appeared to be focused, well managed, and effective in addressing the DOE VTO R&D needs.

Reviewer 6:
The reviewer asserted that the programs were well managed to the extent that the contractors would allow. From this reviewer's experience, it was believed that some of the big original equipment manufacturers (OEMs) were unmanageable.

Reviewer 7:
The reviewer agreed that, in general, the managers were accomplishing quite a lot in addressing DOE needs, given the overall budget. One concern would be the total number of projects becoming too large, given how many different activities were underway.

Reviewer 8:
According to this reviewer, it was the overview of the VTO Program, so it set the R&D agenda. This person added that individual programs needed to be evaluated to answer this question.

Reviewer 9:
The reviewer indicated that the program had identified to some extent the areas of focus. This reviewer needed more information on how the program was managed. The program needed to better highlight its accomplishments in the different areas of interest.

Question 4: Other Comments

Reviewer 1:
The reviewer acknowledged that DOE was making a positive difference and further encouraged DOE to keep up the good work.

Reviewer 2:
The reviewer highlighted that much could be done that was not able to fit into the current budget limitations. This program has provided useful research that has attacked and found solutions for many vehicle challenges. It should be expanded, as there are many additional challenges to overcome to continue to reduce imported petroleum.

Reviewer 3:
The reviewer voiced that supporting the VSS activity was generally money well spent by DOE, especially in the benchmarking, electrification, and heavy-duty truck research areas.

Reviewer 4:
The reviewer stated that the VSS program included an impressive portfolio of projects related to plug-in vehicle technologies. These focused on both passenger and heavy-duty commercial vehicles. Developments under these programs would certainly help to reduce dependence on imported oil and reduce pollution.

Reviewer 5:
Without being overly critical, the reviewer hoped that the contractors were giving significantly more information directly to DOE than was presented in these 20-minute reviews. This reviewer saw such a difference in presentation detail between the Advanced Power Electronics (APE), Energy Storage (ES), and true technology development programs when compared to the VSS type. This reviewer believed it had more to do with the contractors than DOE, as they were trying to keep too much confidential, which led this reviewer to query why public funds would be spent. This reviewer understood the stimulus or seeding functions necessary to promote the technology growth, and added that DOE was doing a good job and should keep it up.

Reviewer 6:
The reviewer noted some general comments. In the current climate, with the OEMs unable or unwilling to make significant investments in developing and validating many of the advanced technologies, this sub-program funding performed a vital function in helping the United States maintain its edge in the automotive sector. Understandably, the focus was primarily on hybrids, plug-ins, and the like, but this reviewer wondered if the goal of petroleum displacement could also be served by including (in the test matrix) other vehicles with conventional powertrains equipped with advanced features such as adjustable grille shutters, active warm-up strategies, etc. If true benefits of these features could be quantified, especially in comparison with hybrid powertrains, it might help validate some of the analyses' (such as Autonomie's) predictions while also providing consumers with useful, unbiased data on the true benefits of the various technologies. In general, the National Laboratories have been very eager to share the knowledge gleaned from the various DOE-funded projects. In interactions with various universities, this reviewer seemed to find several projects that had very similar goals and content to DOE-funded projects. These projects were funded by other government agencies such as the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC). Perhaps wishful thinking, but this reviewer

would love to ensure that there was no needless repetition of the same project. This reviewer did not necessarily agree entirely with Argonne National Laboratory's (ANL's) decision to let LMS handle Autonomie. This person was hoping that it did not go the way of the Advanced Vehicle Simulator (ADVISOR), adding that time would tell.

Reviewer 7:

The reviewer noted that the presentation could have added more background information on the objective of the program (e.g., what was done and why, what was achieved, the management plan, and future goals).

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 to 4)*. 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.

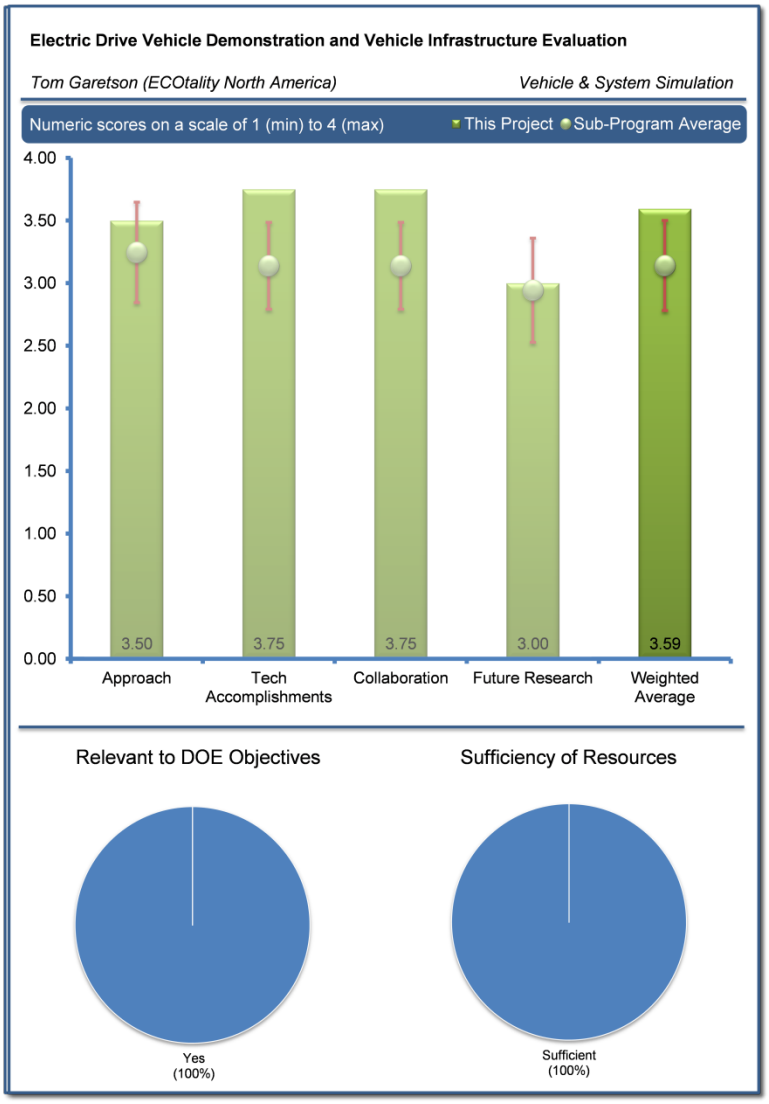
Presentation Title	Principal Investigator and Organization	Page Number	Approach	Technical Accomplishments	Collaborations	Future Research	Weighted Average
‡ Electric Drive Vehicle Demonstration and Vehicle Infrastructure Evaluation	Tom Garetson (ECOtality North America)	1-9	3.50	3.75	3.75	3.00	3.59
‡ Advancing Transportation Through Vehicle Electrification - PHEV	Abdullah Bazzi (Chrysler LLC)	1-13	3.40	3.60	3.60	3.20	3.50
‡ Interstate Grid Electrification Improvement Project	Jon Gustafson (Cascade Sierra Solutions)	1-17	3.17	3.17	3.17	2.67	3.10
‡ Advanced Vehicle Electrification and Transportation Sector Electrification	Greg Cesiel (General Motors)	1-21	2.80	3.20	3.20	3.00	3.08
‡ Smith Electric Vehicles: Advanced Vehicle Electrification + Transportation Sector Electrification	Robin Mackie (Smith Electric Vehicles)	1-25	3.50	3.17	3.17	3.20	3.25
‡ ChargePoint America	Kumar Gogineni (CharegPoint, Inc.)	1-30	2.75	3.00	3.00	2.25	2.84
‡ Class 8 Truck Freight Efficiency Improvement Project	Derek Rotz (Daimler Trucks North America LLC)	1-33	3.80	3.40	3.40	3.60	3.53
‡ Technology and System Level Demonstration of Highly Efficient and Clean, Diesel Powered Class 8 Trucks	Scott Newhouse (Peterbilt)	1-36	3.80	3.60	3.60	3.80	3.68
‡ SCAQMD: Plug-In Hybrid Electric Medium-Duty Commercial Fleet Demonstration and Evaluation	Matt Myasato (SCAQMD)	1-39	3.00	3.17	3.17	2.67	3.06
Medium and Heavy-Duty Vehicle Field Evaluations	Kevin Walkowicz (National Renewable Energy Laboratory)	1-43	3.50	3.25	3.25	3.25	3.31
DOE's Effort to Reduce Truck Aerodynamic Drag through Joint Experiments and Computations	Kambiz Salari (Lawrence Livermore National Laboratory)	1-46	3.25	3.25	3.25	2.50	3.16
Plug-in Hybrid (PHEV) Vehicle Technology Advancement and Demonstration Activity	Greg Cesiel (General Motors)	1-49	2.75	2.75	2.75	2.25	2.69
Ford Plug-In Project: Bringing PHEVs to Market	Julie D'Annunzio (Ford Motor Company)	1-52	3.60	3.60	3.60	3.40	3.58
Idaho National Laboratory Testing of Advanced Technology Vehicles	Jim Francfort (Idaho National Laboratory)	1-56	3.25	3.75	3.75	3.25	3.56
Advanced Vehicle Testing & Evaluation	Tom Garetson (ECOtality North America)	1-59	2.75	3.25	3.25	2.75	3.06
Advanced Technology Vehicle Lab Benchmarking - Level 1	Henning Lohse-Busch (Argonne National Laboratory)	1-62	3.83	3.67	3.67	3.33	3.67
Advanced Technology Vehicle Lab Benchmarking - Level 2 (in-depth)	Eric Rask (Argonne National Laboratory)	1-66	3.67	3.50	3.50	3.00	3.48

Presentation Title	Principal Investigator and Organization	Page Number	Approach	Technical Accomplishments	Collaborations	Future Research	Weighted Average
Electric Drive and Advanced Battery and Components Testbed (EDAB)	Barney Carlson (Idaho National Laboratory)	1-70	2.50	2.75	2.75	3.00	2.72
Codes and Standards to Support Vehicle Electrification	Ted Bohn (Argonne National Laboratory)	1-73	3.80	3.40	3.40	3.00	3.45
SuperTruck - Development and Demonstration of a Fuel-Efficient Class 8 Tractor & Trailer	Dale Oehlerking (Navistar)	1-77	2.40	2.40	2.40	2.20	2.38
Vehicle Mass and Fuel Efficiency Impact Testing	Jim Francfort (Idaho National Laboratory)	1-80	3.50	3.00	3.00	3.00	3.13
CoolCab Test and Evaluation and CoolCalc HVAC Tool Development	Jason Lustbader (National Renewable Energy Laboratory)	1-83	3.17	3.33	3.33	2.83	3.23
Development and Demonstration of a Fuel-Efficient Class 8 Highway Vehicle	David Koeberlein (Volvo)	1-87	3.40	2.80	2.80	3.20	3.00
Improving Vehicle Fuel Efficiency Through Tire Design, Materials, and Reduced Weight	Timothy Donley (Cooper Tire)	1-90	3.50	2.50	2.50	3.25	2.84
A Materials Approach to Fuel-Efficient Tires	Peter Votruba-Drzal (PPG)	1-93	2.75	2.75	2.75	3.00	2.78
System for Automatically Maintaining Pressure in a Commercial Truck Tire	Robert Benedict (Goodyear)	1-96	3.75	3.75	3.75	3.50	3.72
Next Generation Environmentally Friendly Driving Feedback Systems Research and Development	Matthew Barth (University of California at Riverside)	1-99	3.25	2.75	2.75	2.33	2.82
Look-Ahead Driver Feedback and Powertrain Management	Rajeev Verma (Eaton Corporation)	1-102	2.75	2.50	2.50	2.75	2.59
Advanced HD Engine Systems and Emissions Control Modeling and Analysis	Zhiming Gao (Oak Ridge National Laboratory)	1-105	3.17	3.00	3.00	2.67	3.00
HEV, PHEV, EV Test Standard Development and Validation	Mike Duoba (Argonne National Laboratory)	1-109	4.00	3.50	3.50	3.25	3.59
Grid Connectivity R&D	Ted Bohn (Argonne National Laboratory)	1-112	3.75	3.50	3.50	3.25	3.53
INL Efficiency and Security Testing of EVSE and DC Fast Chargers	Jim Francfort (Idaho National Laboratory)	1-115	3.00	3.00	3.00	3.00	3.00
Electric Drive Vehicle Climate Control Load Reduction	John Rugh (National Renewable Energy Laboratory)	1-117	3.25	3.50	3.50	3.75	3.47
Advanced Transmission Impact on Fuel Displacement	Namdoo Kim (Argonne National Laboratory)	1-120	3.00	3.25	3.25	3.25	3.19
Government Performance and Results Act (GPRA)	Jake Ward (Department of Energy)	1-123	3.25	3.25	3.25	3.25	3.25
Thermal Electric Generation Study with GM - Phase 2	Ram Vijayagopal (Argonne National Laboratory)	1-126	3.33	3.00	3.00	3.00	3.08
Wireless Charging	Allan Lewis (Hyundai)	1-128	2.80	2.80	2.80	2.40	2.75
Wireless Charging	John Miller (Oak Ridge National Laboratory)	1-131	3.40	3.20	3.20	3.00	3.23
Dynamic Wireless Power Transfer Feasibility	Perry Jones (Oak Ridge National Laboratory)	1-135	2.67	2.67	2.67	2.50	2.65
Analysis of In-Motion Power Transfer for Multiple Vehicle Applications	Jeff Gonder (National Renewable Energy Laboratory)	1-139	3.40	3.40	3.40	3.20	3.38
Autonomous Intelligent Plug-in Electric Vehicles (PEVs)	Andreas Malikopoulos (Oak Ridge National Laboratory)	1-142	3.17	3.00	3.00	2.67	3.00

Presentation Title	Principal Investigator and Organization	Page Number	Approach	Technical Accomplishments	Collaborations	Future Research	Weighted Average
Heavy Duty Powertrain System Optimization and Emissions Test Procedure Development	Paul Chambon (Oak Ridge National Laboratory)	1-146	4.00	3.00	3.00	3.00	3.25
PHEV Advanced Series Genset Development/Demonstration Activity	Paul Chambon (Oak Ridge National Laboratory)	1-148	2.75	3.25	3.25	2.75	3.06
Battery Energy Availability and Consumption during Vehicle Charging across Ambient Temperatures and Battery Temperature (conditioning)	Eric Rask (Argonne National Laboratory)	1-151	3.00	2.80	2.80	2.60	2.83
Fuel Consumption Benefits from Low Temperature Combustion (LTC) of Gasoline CI Technology using EIL	Neeraj Shidore (Argonne National Laboratory)	1-154	2.80	3.00	3.00	2.60	2.90
Nanofluids for Cooling Power Electronics for HEV	Dileep Singh (Argonne National Laboratory)	1-157	3.50	2.75	2.75	3.25	3.00
DC Fast Charge Impacts on Battery Life	James Francfort (Idaho National Laboratory)	1-160	3.25	3.33	3.33	3.00	3.27
Fast Charge Technology Adoption Challenges	Anthony Markel (National Renewable Energy Laboratory)	1-163	3.00	3.00	3.00	2.75	2.97
Zero Emission Heavy Duty Drayage Truck Demonstration	Brian Choe (SCAQMD)	1-165	3.40	3.20	3.20	3.00	3.23
Zero Emission Cargo Transport - Houston #1	Christine Smith (Houston-Galveston Area Council)	1-168	3.25	3.50	3.50	3.25	3.41
Zero Emission Cargo Transport - Houston #2	Christine Smith (Houston-Galveston Area Council)	1-170	3.25	3.25	3.25	3.00	3.22
† EV Roadmap V2.0	Fred Wagner (Energetics, Inc.)	1-172	3.50	3.50	3.50	3.50	3.50
† Fleet DNA	Kevin Walkowicz (National Renewable Energy Laboratory)	1-175	2.50	3.00	3.00	2.00	2.75
† AC Model Development	Jason Lustbader (National Renewable Energy Laboratory)	1-178	4.00	2.50	2.50	3.50	3.00
† APEEM Components Analysis and Evaluation	Paul Chambon (Oak Ridge National Laboratory)	1-181	3.33	2.67	2.67	2.33	2.79
† Vehicle to Grid Communications Field Testing	Richard Pratt (Pacific Northwest National Laboratory)	1-184	3.00	3.00	3.00	2.00	2.88
Overall Average			3.25	3.14	3.14	2.94	3.14

† denotes poster presentations
‡ denotes ARRA funded projects

Electric Drive Vehicle Demonstration and Vehicle Infrastructure Evaluation: Tom Garetson (ECOtality North America) - arravt066



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer noted that the Electric Vehicle (EV) Project has incorporated a very good approach, starting with a significant amount of upfront planning, including organization of regional stakeholders, developing long-range plans, and establishing EV microclimates for each deployment area. The reviewer felt that the use of a certified contractor network was a good decision to develop a cadre of skilled and experienced installers and to leverage their experience within the project to better understand, resolve, and communicate barriers to installation of EVSE (EV supply equipment). The project is placing EVSE in a wide variety of geographic locations with Level 2 EVSE in residential, commercial, and public applications as well as direct current fast chargers (DCFC) in public applications. A wireless, internet-based network is used to cost-effectively collect vehicle and charging infrastructure data and send it to Idaho National Laboratory (INL) for compilation. The project is also coordinating with elements of the Smart Grid to help identify and resolve issues therein with regards to electric vehicle charging and control.

Reviewer 2:

The reviewer commented that the principal investigator (PI) provided an excellent overview of the project and descriptive statistics on installations, vehicles, and chargers in a very clear presentation. The reviewer appreciated the clear description of barriers, but would have liked to hear more about how the barriers were resolved, or not resolved.

Reviewer 3:

The reviewer noted that the PI spoke on a very large and complex project that appeared to be well-managed in its implementation. On the other hand, the reviewer did not get a sense that the speaker was presenting an overall objective like the lessons learned for deployment of EVs or market drivers that could encourage EV use. The reviewer critiqued the PI's presentation in that it appeared to be focused on the intimate details of the day-to-day operations of the project. This reviewer indicated that while that is extremely important, it is not a result that is important to the taxpayer for investing in such a venture. The reviewer suggested that in the next presentation, the PI should seek to consolidate the tons of excellent data, experience, lessons learned, etc., into a transferable lesson package that could be used to assist DOE, state governments, commercial ventures, and other stakeholders in understanding what works or does not work in the world of EVs.

Reviewer 4:

The reviewer was very impressed with the data collection and analysis aspects of this project, despite commenting that the tables and figures on the slides were too small to read at the original size, and too low-resolution to read when magnified. The reviewer did criticize two aspects. First, the reviewer said that there was no information provided in the presentations about what locations were chosen for public charging. The reviewer said that a sample map showed many stations located at sites that this reviewer considered less than ideal. The reviewer admitted to having a general concern about siting on all infrastructure deployment projects, claiming to have seen very poor siting choices in the field. Second, the reviewer expressed a concern that driver behavior in the study will be taken as typical. The reviewer observed that early adopters of EVs may behave differently from mass-market consumers, citing that the EV-related research at University of California (UC) Davis have observed EV drivers playing range games.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer noted that the EV Project has deployed cars and chargers and has been collecting interesting data, which the reviewer commented is an effective use of Federal funds.

Reviewer 2:

The reviewer observed that the project appears to be on track, and that the logistical and technical work on this project is very impressive.

Reviewer 3:

This reviewer said that there was huge progress in implementing a demonstration program, with lots of data venues and excellent ideas.

Reviewer 4:

The reviewer cited that the EV Project is roughly on schedule despite suffering delays from slower than expected vehicle sales and adoption. An impressive amount of data has been and is being collected to the tune of 68 million miles accumulated on vehicles, over 1.6 million charging events, and 14.1 gigawatt-hours (GWh) of electrical energy consumed. The reviewer also noted that upwards of 12,000 EVSE have been installed including 73 DC fast chargers collecting data on nearly 6,000 Nissan LEAFs and 2,000 General Motors (GM) Volts. A broad communications network has been established with web portals and mobile applications. Quarterly reports have been issued for nearly two years looking at compiled data in a variety ways. A number of white papers have been developed and posted on topics of importance and interest. A number of barriers to deployment of EVSE have been identified, studied, and in some cases largely resolved. However, the reviewer indicated three questions of interest. First, it is mentioned that EVSE access fees (time-based) are now being studied to demonstrate value to charger hosts and evaluate business model sustainability. The reviewer asked whether other types of potential fee structures, such as those based purely on energy transferred, mixed time or energy transferred fees, etc., were also being considered. According to the reviewer, it seemed that the most beneficial type of fee structure may vary significantly depending upon the host application. Second, the reviewer also said that it is mentioned that fast charger connector standards and demand charges are barriers. The reviewer inquired ECOtality's recommendations for potential solutions or workarounds for these problems were, and suggested examples such as lower power ratings for DCFC or possibly some local energy storage. Third, according to the reviewer, in last year's presentation, it was mentioned that commercial permitting was a barrier, but it was not mentioned this year. The reviewer wanted to know whether permitting is still a problem or has largely been solved.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

The reviewer observed that in addition to the research partners, who appear to interact seamlessly, the job of getting businesses, consumers, and municipal agencies all working together has been done extremely well.

Reviewer 2:
Partners appear to be well integrated into the project, according to the reviewer.

Reviewer 3:
This reviewer cited an excellent set of stakeholders.

Reviewer 4:
The reviewer observed that the EV Project is working on Smart Grid evaluation with San Diego Gas and Electric (SDG&E) including submetering, the impact of EV charging on distribution infrastructure, and communication strategies for demand response. The reviewer also noted that the EV Project team is also working with the Oregon and Washington State Departments of Transportation (DOTs) on signage issues, as well as thousands of plug-in EV (PEV) drivers and hosts. According to the reviewer, it is mentioned in the Overview that ten utilities and two universities are also part of the collaboration, but that no supporting documentation is provided. The reviewer observed that a significant number of presentations and publications have been developed and presented. The reviewer advised that it may be good to consider broadening ties with various end user communities such as commercial building and mall owners, large retail establishments and corporations, municipal planning entities, etc. Additionally, the reviewer also suggested that it is probably good to periodically probe the end user community to determine if the information being provided is as useful and convenient to use as possible.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer noted that the project is nearly complete, but project management and future plans seem solid.

Reviewer 2:
The reviewer observed that the future plan seems to be to continue to collect data, which is good, because people might behave differently once the bloom is off the rose. The reviewer expressed some concern as to how ten-year projections are to be made.

Reviewer 3:
The reviewer claimed not to understand the future work here, other than put more vehicles on the road (in this demo).

Reviewer 4:
According to the reviewer, future work appeared to be largely focused on Smart Grid-related barriers including utility generation and demand response including geographic information system (GIS) -based data for distribution and clustering effects. Additionally, a significant amount of effort is to be put into information dissemination, noted the reviewer. The reviewer noted that this is all good, but if not already planned, it seems very important to continue putting considerable effort into resolving other aforementioned barriers and identifying, developing, and communicating the best business case scenarios.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer said that the way to see if something is going to work is to get out there and try it, and that this project is doing that in a big way. It should be interesting to see petroleum savings per vehicle long-term, according to the reviewer.

Reviewer 2:
The reviewer wrote that this project directly supports the overall DOE objective of petroleum displacement, by encouraging use of electric vehicles in multiple cities across the U.S.

Reviewer 3:

The reviewer noted that it was an excellent project that just needs to realize its full potential as a national demonstration leading the way for EV expansion.

Reviewer 4:

The reviewer commented that PEVs have the potential to significantly reduce the Nation's dependence upon oil for transportation. The reviewer added that the development of a cost-effective, ubiquitous, self-sustaining EV charging infrastructure is a key enabler to achieving this vision. Understanding PEV and charge infrastructure utilization is a key to building market momentum for PEVs, the reviewer wrote.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

The reviewer observed that this was a big project financially and by scale. The reviewer noted that it was not possible to evaluate the efficiency of spending without seeing detailed accounts, but that it seems pretty good.

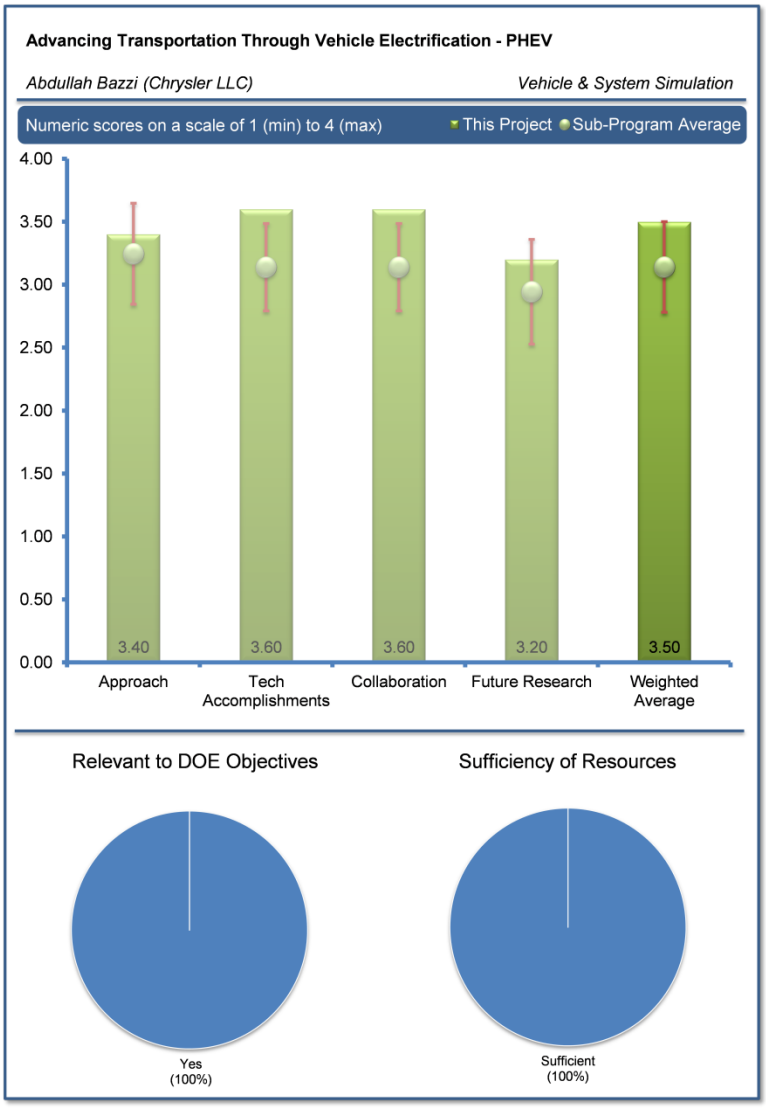
Reviewer 2:

The resources appeared to be sufficient, according to this reviewer.

Reviewer 3:

The reviewer noted that the project is 50% cost shared and sufficiently funded.

Advancing Transportation Through Vehicle Electrification - PHEV: Abdullah Bazzi (Chrysler LLC) - arravt067



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer summarized that the project was to leverage advanced vehicle technologies to reduce vehicle fuel consumption and emissions. Bi-directional grid connectivity was established along with an export 40 ampere (A) [6.6 kilowatt ()] auxiliary power panel, the reviewer cited, also noting that a fleet of 140 pickup trucks were deployed in Phase I of the effort. Phase II upgraded 24 of the vehicles with new lithium-ion (Li-ion) batteries and demonstrated them in diverse geographies and climates.

Reviewer 2:

The reviewer said that this project at least learned something, though not discussed in this presentation.

Reviewer 3:

The reviewer assessed the project approach to build a set of demonstration vehicles, acquire real-world data and analyze these data to determine where design improvements can be made, and then building a second set of vehicles, to be a good approach. The reviewer warned that it was not clear, however, why there is such a large difference between the planned fleets for Phase I and Phase II, and asked why there would be more vehicles built for Phase I. Also, the reviewer wondered why there was a plan to have 140 vehicles but there are data from only 111 vehicles. The reviewer indicated that there is also a skew towards charge-sustaining (CS) mode driving by the vehicle users. The reviewer said that having it well over half the time is different from real-world data from other data sets for personal vehicles, and so these data are slightly less applicable, according to the reviewer.

Reviewer 4:

The reviewer commended a great approach but noted that the organization of the presentation made it difficult to get the full-approach picture early on. By the end of the presentation, the reviewer claimed to have achieved a better idea of the details of the approach and what Chrysler was hoping to accomplish. The reviewer noted that Chrysler is developing a significant number of vehicles and acquiring an impressive amount of data to better understand use and opportunities. The reviewer felt the Gantt chart was helpful but that there was not significant time for the presenter to go into the details of each task.

Reviewer 5:

The reviewer noted that it is unfortunate that the battery cell voltage/temperature imbalance issues occurred, but good that lessons learned from Phase 1 are being used to improve the design in Phase 2. The reviewer commented that perhaps in hindsight the overall approach could have benefited from more bench testing of candidate battery cells and management systems over a variety of

environmental conditions prior to vehicle deployment. The reviewer said that it is also good that significant experience is being gained working with utilities on reverse power flow and smart charging research, development and demonstration. The reviewer cautioned that it is unclear, though, how well the demonstration partner mix aligns with the expected customer distribution for a potential full production run.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

According to the reviewer, deployment partners have driven a significant number of miles which contributes significantly to better understanding of the usage characteristics of these vehicles as well as the behavior of the advanced technologies in the vehicles. The reviewer felt this data will feed well into Phase II. The reviewer cited as an example that the project team was able to track cell imbalance issues in the field and provide important information for better battery cell technology and control for Phase II. The reviewer noted that 111 out of 140 vehicles have been deployed, and that the reasons for not deploying all 140 seem reasonable. The reviewer concluded that everything else seems on target with initial fuel economy (FE) results exceeding projections.

Reviewer 2:

The reviewer applauded good mileage accumulation and on-road experience obtained with deployed vehicles. The reviewer noted that it is also good that supplemental functions (charge scheduling, reverse power flow and map-based FE system) were developed. Regarding vehicle performance, the reviewer felt it would be nice to know how well adjusted laboratory FE predictions aligned with the real-world experience. The reviewer also deemed it important to quantify the real-world/adjusted FE penalty from the lower-power replacement battery cells in Phase 2. The stated FE improvements from the map-based system are quite high, according to the reviewer, who deemed this a good achievement, though it also suggests that there might be room for improvement of the baseline control strategy (in the absence of driving route information). The presenter stated that green jobs were created and sustained thanks to this project funding, but that it would have been nice to have the number of jobs quantified.

Reviewer 3:

The reviewer applauded that the vehicle fleet has impressive participation and frequent utilization, as well as that a new Phase II battery has been implemented, helping resolve the issues experienced in the Phase I battery system. The reviewer noted that significant lessons learned can be extracted from the data analysis from the Phase I battery pack, but that unfortunately, the reduction in capacity reduced the equivalent all-electric range from 20 miles to 14 miles. This vehicle is the only V8 pickup truck to achieve Advanced Technology Partial Zero Emissions Vehicle (AT-PZEV) compliance, according to the reviewer. The reviewer pointed out that the program has helped the Chrysler/Fiat group nurture their in-house expertise in hybrid electric/plug-in/vehicle electrification technologies, which are core-competency areas for the company.

Reviewer 4:

The reviewer indicated that it appeared as though Phase I met its milestones and objectives, although an explanation for why 29 vehicles were not built is warranted. The reviewer went on to say that it appears as though Phase II is meeting its milestone targets. The reviewer advised that some more analysis being presented on the relative performance between the vehicles deployed in hot and cold regions would have been very interesting.

Reviewer 5:

The reviewer was uncertain about which of this project's technical accomplishments had not already been learned by others before, with the exception of the reverse flow capability.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

The reviewer praised an outstanding collaboration with development partners, suppliers, and demonstration partners. The reviewer sought to learn whether the collaboration with Michigan State University (MSU) leveraged the Energy and Automotive Research

Laboratory. A Chrysler/Cummins powertrain was recently integrated into one of MSU's test cells to perform hybrid electric research, comparing conventional, series, and parallel hybrid configurations, the reviewer added.

Reviewer 2:

The reviewer noted significant partnerships on development as well as demonstration, and that the collaboration was a nice and important mix to maximize success. More specifically, Chrysler has leveraged the expertise of universities and others for the development of technologies and collection of data, according to the reviewer, who went on to cite that Phase 2 deployment partners were also extensive and included 24 vehicles.

Reviewer 3:

Chrysler appears to have engaged with a variety of partners and the collaborative efforts have largely been successful, according to the reviewer. The reviewer said that it would have been informative to understand what transpired in the relationship with the first battery manufacturer (perhaps by keeping the company anonymous), but it is understandable why these details had to remain private.

Reviewer 4:

The reviewer highlighted that the project included a significant number of partners and collaborators, and overall coordination seems to be very good. The reviewer cautioned that it was not clear how well the demonstration partners represent the target customer mix for a production version of the vehicle. Also, according to the reviewer it was stated that feedback from the UC Davis driver and fleet manager interviews resulted in design improvement recommendations, but it was not clear what those were or if they were acted upon.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:

The reviewer noted that the majority of future work will be in Phase 2, and that the plan forward looks very good and right on track. The Phase 1 findings are leading to improved technology to be evaluated in Phase 2, according to the reviewer.

Reviewer 2:

The reviewer felt that the plans for Phase II appear to be sound and there will likely be good information on plug-in hybrid electric vehicles (PHEVs) derived from this phase of the project. The reviewer said it would have been useful to know what the future plans are for the PHEV design developed during this project specifically.

Reviewer 3:

The reviewer observed that 24 vehicles are being upgraded with the Phase II battery packs. The reviewer suggested that it may be beneficial to try to determine the discrepancy between the real world FE observed and that determined using the federal test procedures due to the magnitude of the difference.

Reviewer 4:

The reviewer summarized that future work plans include upgraded battery implementation and deployment in 24 of the demonstration vehicles, and continued system optimization/refinement/lessons learned through testing and field deployment. The reviewer stated that one of the system design objectives identified as complete in the summary was proving that the system solution represents optimal cost-benefit trade-offs, however the reviewer claimed that the presentation did not include details of what this involved or whether the optimized design would next be implemented into a production vehicle.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:

The reviewer noted that PHEVs have a significant fuel savings potential, and this project reported achieving a roughly 50% real-world FE improvement relative to the FE from comparable conventional vehicle operation.

Reviewer 2:
The reviewer opined that once again, we need products to support technology growth.

Reviewer 3:
The reviewer affirmed that the work is providing new knowledge and data which are very important for more widespread introduction of this technology.

Reviewer 4:
The reviewer said that trucks are an interesting application of PHEV technology, and there is certainly substantial opportunity to reduce petroleum consumption in this area. The reviewer stated that it will be interesting to follow Chrysler's plans to see how this project informs future vehicle programs.

Reviewer 5:
The reviewer noted that the PHEV developed under this effort has demonstrated a significant reduction in fuel consumption and includes all-electric mobility as well. The reviewer felt that more details on the electric drive system would be beneficial to gain a better understanding of the powertrain architecture.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

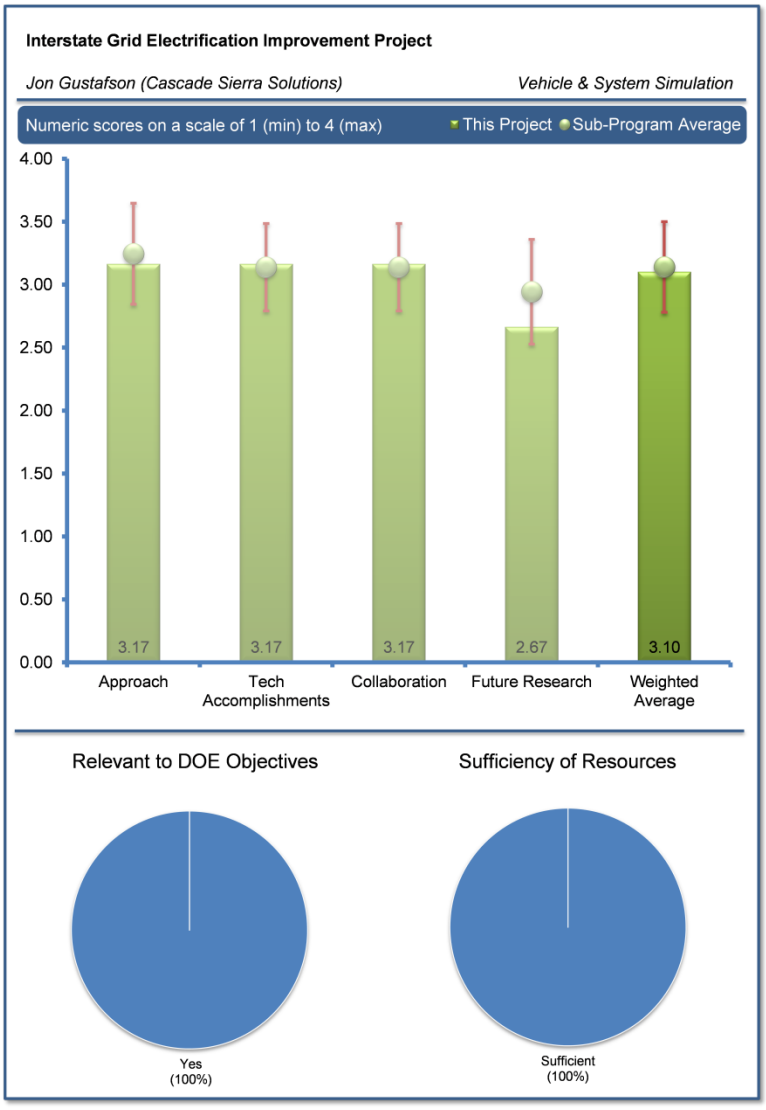
Reviewer 1:
The cost of developing such a large number of prototype vehicles and all of the included systems is large and probably warrants the large expenditure for this project, according to the reviewer.

Reviewer 2:
The reviewer said the project is on track, and that a lack of resources is not apparent from the presented material.

Reviewer 3:
According to the reviewer, the project has been supported by very significant DOE as well as cost share contributions. The reviewer opined that the expenditure seems sufficient, or perhaps on the high side given the battery issues encountered, limited deployment and uncertain production future for the developed vehicles.

Reviewer 4:
The reviewer said that it is difficult to understand whether resources are sufficient or insufficient for such a large project with only a 20-minute presentation, but went on to assume that the resources are sufficient.

Interstate Grid Electrification Improvement Project: Jon Gustafson (Cascade Sierra Solutions) - arravt070



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer indicated that the approach is systematic and likely to achieve the objective of installing these systems in areas where they are most useful and likely to be utilized.

Reviewer 2:

The reviewer commented that in this effort, plug-in receptacles at up to 50 truck stops, and electrified accessories on up to 5,000 heavy duty trucks, are being deployed. The reviewer went on to add that rebates are being used as incentives for adopters of these technologies, and collected data is being analyzed to determine how many gallons of fuel were saved per trip mile and overall.

Reviewer 3:

The reviewer observed that the project is about idle reduction using on-board technology (5,000 rebates) and electrified sites (50 sites). According to the reviewer, the project does not have a means to capture the usage of on-board technology that does not plug in into shore power sites. The reviewer suggested that a statistical sampling of the non-plugged in technology should be included to assess the petroleum displacement. The reviewer also noted that the project should identify a baseline fleet for comparison so that improvements can be quantified. The reviewer pointed out that it is also unknown if trucks are completely off idle when plugged in, for example, when a trailer refrigeration unit (TRU) is being engaged.

Reviewer 4:

The reviewer said that the project approach is sound, and that ensuring that sites around the country and of different types are included should allow for meaningful results. The reviewer noted that one area that could be improved upon is the suite of vehicle technologies that were selected for the project and the associated rebates, asking whether the technologies could be ranked and targets for adoption created. The reviewer noted that the rebates could be manipulated to incentivize the vehicle owners to purchase the technologies in which the DOE has the most interest.

Reviewer 5:

The reviewer commented that the Year 1-4 goals and approach address barriers and appear to enlist the necessary partners to further this technology. Cascade Sierra Solutions (CSS) is recruiting truck stops and owners of 5,000 heavy-duty (HD) trucks to ensure sufficient users for statistical evaluation of new technologies enabled by grid power, which the reviewer characterized as a very comprehensive plan. However, the reviewer also noted that it was confusing that the slides in the presentation were different from those supplied to reviewers.

Reviewer 6:
The reviewer remarked that this project is organized well and executing per the approach, but cautioned that the PI did not seem to provide sufficient proof of the data being collected and how it will be analyzed.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
The reviewer expressed that progress appears to be good and proceeding well.

Reviewer 2:
The reviewer cited good progress on site installation and rebates.

Reviewer 3:
The reviewer commented that most equipment and truck stop receptacles have been installed, which are technologies that permit the truck drivers to keep their engines off while parked and still enjoy climate control and other amenities in their vehicles, reducing overall fuel consumption and emissions. According to the reviewer, to date, utilization of the equipment is reported to be very low, leading the reviewer to suggest that the PI consider restricting some of the best parking spots for users of the technology. The reviewer also asked what else could be done to increase user awareness and further promote adoption of the new technologies.

Reviewer 4:
The reviewer observed that all milestones appear to have been met. However, the reviewer did note that the progress on the Year 3 task is unclear, and wondered about the status of the outreach and collaboration with utilities and highway planners.

Reviewer 5:
The reviewer commended CSS for using the team extremely well in setting this important project up for success, and noted that truck stop electrification (TSE) is a technology that needs this attention as it is a sound, viable solution that has not been getting attention. The reviewer expressed concern about how to improve the use of the parking spots during the project.

Reviewer 6:
The reviewer noted good progress on having sites up and running, 92% up and running with about 80% of target trucks outfitted with onboard systems, and promotion underway to get the word out on this program. The reviewer also applauded a nice technology mix summary, and suggested that more information on the reasoning behind the selection and deployment of technologies would be very helpful, citing possibilities such as technology deployment based on routes or other factors and truck owner interest. The reviewer also cautioned that U.S. maps with current and future truck stops seem inconsistent with 92% up and running, and that the confusion may be attributed to the difference between the data in the presented talk and the presentation supplied to reviewers.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer agreed that numerous partnerships have been established with equipment manufacturers and truck stops for adoption of these technologies.

Reviewer 2:
The reviewer noted that recruitment of truck stops and truck owners is excellent and on track. The reviewer added that nice partnerships across the U.S. include major truck stop owners which if successful have potential to enable penetration of this technology.

Reviewer 3:
The reviewer applauded a really good accomplishment on this project.

Reviewer 4:
The reviewer observed that there appears to be good collaboration with project partners. The reviewer then opined that it was a bit unclear from the presentation what the division of labor on the data analysis and reporting will be between National Renewable Energy Laboratory (NREL) and Cascade Sierra Solutions.

Reviewer 5:
The reviewer said that the team should try to better coordinate with non-rebate users of electrified truck stops and also coordinate with rebate users to assess on-board technology.

Reviewer 6:
The reviewer commented that collaboration does not appear to be a major feature of this project and should be pursued more strongly.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The proposed future work seems to address previous concerns, according to the reviewer.

Reviewer 2:
The reviewer noted that the cost effectiveness of these technologies needs to be determined and perhaps this project is a good way to do so.

Reviewer 3:
The reviewer noted that the Future Work slide has a comprehensive list of future plans. The reviewer asked whether there is any work being done on the policy side to make the return on investment (ROI) more attractive to vehicle owners and truck stop owners. The reviewer also wondered about the effect if the ROI business modeling results in too long a period of return.

Reviewer 4:
The reviewer indicated that the ROI for each technology will be computed and reported for truck owners, truck stops, and utility power providers. The reviewer went on to ask whether demand for the new technologies is expected to continue without the rebates.

Reviewer 5:
The reviewer wanted to know more details on the future plans, commenting that they appeared only on a single slide which was passed through very quickly. More specifically, the reviewer desired to know about more details on statistics planned for understanding future opportunities and market penetration.

Reviewer 6:
The reviewer referred to earlier comments on analysis of data and ensuring good understanding of the availability of the parking spots for electricity.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer stated that any technology which substitutes another energy source (electricity) does contribute to the DOE petroleum displacement goal.

Reviewer 2:
The reviewer commented that the project most definitely addresses the introduction of technologies which would have a direct impact on reducing use of oil and emissions.

Reviewer 3:
The reviewer noted that the project should enable a large decrease in truck stop idling if adopted on a large scale.

Reviewer 4:
The reviewer stated that the trucking industry is a huge consumer of petroleum, and this project is a productive addition to the effort to reduce this consumption through electrification.

Reviewer 5:
The reviewer cited that this project is helping to promote anti-idle technologies for heavy truck applications, explaining that user loads while at truck stops are supported by grid electricity rather than by idling the engine, consuming fuel.

Reviewer 6:
The reviewer agreed that the project supports DOE's petroleum displacement goal absolutely. However, the reviewer also noted that TSE is perceived as not a good solution by truckers and many fleets with which the reviewer has interacted, speculating that this is due to past failures and the barrier of needing to have the infrastructure match the tractor availability. Today, auxiliary power units (APUs) and other solutions do not require parking in a designated place, according to the reviewer. The reviewer opined that the DOE is right to support an alternative technology that is promising.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer stated that the resources for this project are substantial and appear sufficient to meet the schedule in a timely manner.

Reviewer 2:
The reviewer said the resources seem sufficient, with no reason to think otherwise.

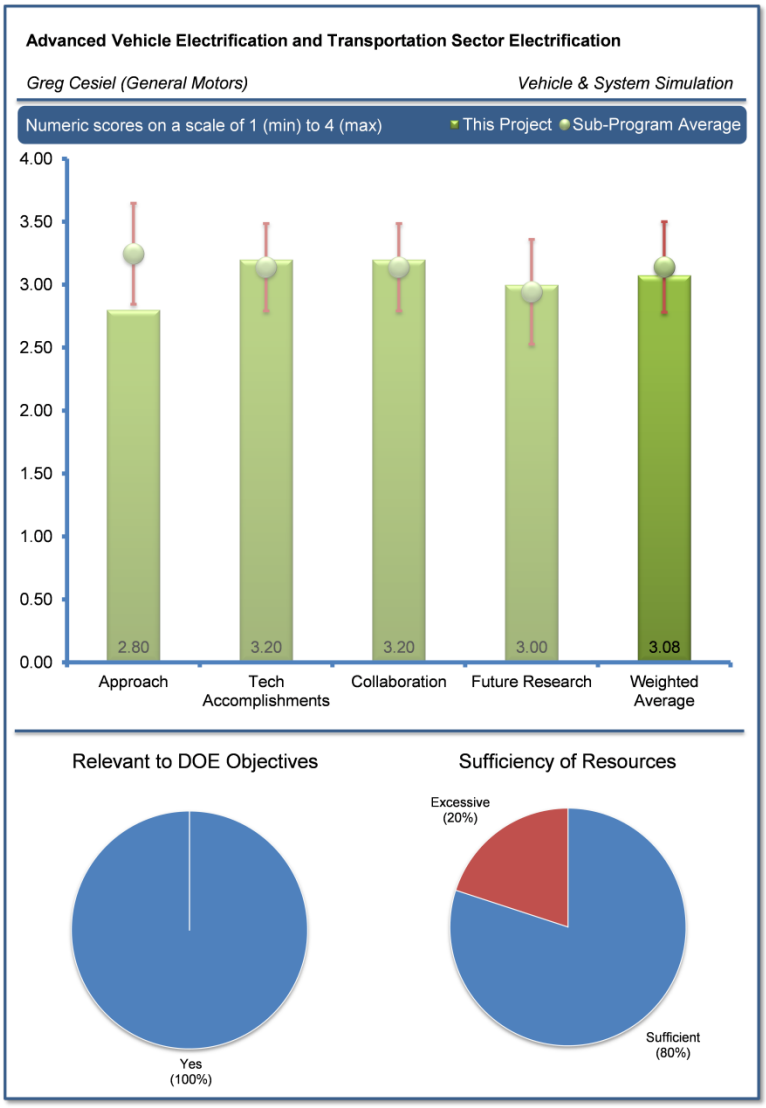
Reviewer 3:
The reviewer noted that the funding seems sufficient.

Reviewer 4:
The reviewer commented that the resources appear to be appropriate for the scope of the project.

Reviewer 5:
The reviewer affirmed that the project is on track, and that a lack of resources is not apparent from the presented material.

Reviewer 6:
The reviewer felt that it was very difficult to evaluate whether the funding resources for this activity are excessive or insufficient, because with a project this size, that would take more than a 20-minute presentation.

Advanced Vehicle Electrification and Transportation Sector Electrification: Greg Cesiel (General Motors) - arravt071



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer applauded the excellent presentation, organized approach, and clear objectives, deeming it a very good project.

Reviewer 2:

The reviewer commented that there was more data available thru OnStar telematics that would be useable by analysis operations outside of GM that could help to develop usage models of EV or EREV (extended-range EV) operators, and that also would not be considered critical information. The reviewer questioned that this information is not available through the project.

Reviewer 3:

The reviewer felt that the approach of using the unique features in OnStar to acquire data is interesting. The reviewer said that comparison with data from other projects should provide insight to how PHEVs are used in a variety of applications. The reviewer noted that the smart charging aspect of the project is complementary; however, because PHEVs, and the Volt in particular, are not expected to use fast charging, it seems inapplicable to this project to conduct this investigation.

Reviewer 4:

The reviewer summarized the project as a broad-ranging task covering diverse areas including vehicle components and subcomponents, telematics, and EV charging infrastructure placement, and special projects including battery secondary use assessment, fast charging including standards development support, and smart grid charging / communications. The reviewer commented that the areas being assessed are good and ones in which more understanding is truly needed: infrastructure is being assessed in home, business, and public applications and includes Level 1 and Level 2 charging. The reviewer characterized this as good, as Level 1 may be a satisfactory (and more cost-effective) option in many deployment scenarios and has not been looked at much in other studies. Nonetheless, the reviewer commented that only relatively superficial information is provided to truly assess the overall task approach. The reviewer cited that, for example, not much is provided to assess the degree to which specific technical barriers are being addressed (or even what they actually are), nor to understand the degree to which the project is integrated with other efforts.

Reviewer 5:

The reviewer asserted that it is very difficult to evaluate this project, because it is unclear what GM actually did, beyond modifying the OnStar software to enable INL to collect appropriate data to evaluate Volt performance and charging data. The reviewer felt that there

was insufficient information to be able to tell what was done in the vehicle-to-grid (V2G) test. The reviewer opined that the presentation was a cross between a GM commercial and a rehash of data processed by INL, and the presenter was unable to answer technical questions.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
The reviewer stated that grid impacts understanding would fundamentally improve the general understanding of EV grid impacts.

Reviewer 2:
The reviewer noted very promising results and the creative means to access the data, but feared that the privacy concerns of OnStar could interfere with the overall project effectiveness.

Reviewer 3:
The reviewer commented that it appears as though all of the vehicles have been deployed, the data are being collected, and the secondary usage sub-projects are complete, with the smart charging nearing completion. The reviewer added that more details are warranted on how the fast charging sub-project is expected to be conducted and completed in 2013.

Reviewer 4:
The reviewer summarized how the project has achieved a number of technical accomplishments, including validation of key vehicle components and subcomponents, completion of Federal Motor Vehicle Safety Standards (FMVSS) and compliance testing, and development of the Volt's smartphone application. The reviewer also noted that the study on battery secondary uses has been completed, demonstrating technical feasibility, and that installation of charge stations was completed in February 2013. The reviewer reported that GM is looking at two methods for smart charging, including a non-AMI (advanced meter infrastructure) solution and the other a home area network (HAN) solution using AMI, programmable logic controller (PLC), and OnStar. According to the reviewer, a particularly interesting activity under smart charging development is the effort of GM/ Onstar to work with other OEMs to create an OEM server concept to allow automakers to come to agreement on the best standardized approach to communicate with their respective EVs. The reviewer opined that this is a significant issue which if solved would dramatically facilitate roaming and control of EVs across networks as well as associated authentication, authorization, and accounting issues. However, the reviewer indicated that no cost breakdown is provided for specific activities, which makes it difficult to truly assess progress achieved in relation to cost expenditures.

Reviewer 5:
The reviewer reported that modification of the OnStar system and integration with INL data collection was successfully accomplished. The reviewer also opined that the real-world data collected will certainly help GM optimize their vehicle designs. The reviewer speculated that the data would probably be used to help GM design another car, but that there was too much proprietary information that the presenter could not divulge for the reviewer to evaluate progress or the utility of the work.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer commended the PI on great coordination with appropriate resources, calling it nice work.

Reviewer 2:
The reviewer observed that there appeared to be good cooperation with utilities and INL on data collection.

Reviewer 3:
The reviewer noted that this project is coordinating with Electric Power Research Institute (EPRI) and nine different utilities in various capacities (not well elaborated), as well as North Carolina (NC) State University for charging infrastructure analysis in a parking structure. The reviewer observed that the utilities appear to be involved in a number of smart grid, smart charging, demand

response, battery secondary use, and renewable related activities in support of EV infrastructure and GM. For the targeted activity areas of this project, collaboration seems sufficient, according to the reviewer.

Reviewer 4:
The reviewer stated that it appears as though substantial collaboration with utility partners has taken place, and the addition of INL and EPRI along with NC State University make the collaborative partnerships diverse.

Reviewer 5:
Although the reviewer noted that a number of partners are listed, the reviewer inquired whether there is more interaction and sharing of pertinent data within the partner community. Citing that the funding for this program was to support electrification of vehicles, with data from the program being valuable, the reviewer felt that at a minimum GM should provide comparison of the DOE program results to non-program vehicles. This would greatly improve the return on investment of the DOE's funding, according to the reviewer.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer said that standards development and secondary use of the battery are interesting as well as bi-directional power flow.

Reviewer 2:
The reviewer felt the proposed future work seems largely on point, and that the emphasis should remain on lowering the cost and improving the performance of the vehicle and improving interoperability through the smart grid while driving down costs.

Reviewer 3:
The reviewer opined that the plans for future work are sparse. The reviewer commented that the project objectives will be met and the Gen 2 of the Volt will be developed, but that details on the latter are warranted.

Reviewer 4:
The reviewer would like to see additional refinement of data to reflect in-design changes to the second-generation (Gen 2) Volt and general information made available to the public for all EV manufacturers to benefit.

Reviewer 5:
The reviewer noted that the project team will continue what the team is already doing, which the reviewer deemed was not very informative.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer agreed that the program absolutely aligned with the goals of petroleum displacement.

Reviewer 2:
The reviewer said the Volt is a superior embodiment of the DOE's goal for petroleum displacement in personal vehicles, and this project appears to be supporting further development of the Volt and further understanding of customer behavior and preferences with respect to PHEVs.

Reviewer 3:
The reviewer noted that the availability of fully tested/vetted/demonstrated vehicles is a pre-requisite for mass market adoption of vehicles that do not depend on petroleum.

Reviewer 4:

The reviewer commented that PEVs have the potential to significantly reduce the Nation's dependence upon oil for transportation. Continued technology advances in plug-in vehicles, cost reductions, and improvements in interoperability of the smart grid are essential to the continued penetration of PEVs into the marketplace, according to the reviewer. The development of a cost-effective, ubiquitous, self-sustaining EV charging infrastructure is also a key enabler to achieving this vision, the reviewer said, adding that understanding PEV and charge infrastructure utilization is a key to building market momentum for PEVs.

Reviewer 5:

The program aligns with DOE petroleum displacement goals, according to the reviewer.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

The resources appear to be adequate.

Reviewer 2:

The reviewer said this project is 50% cost shared and that resources are sufficient.

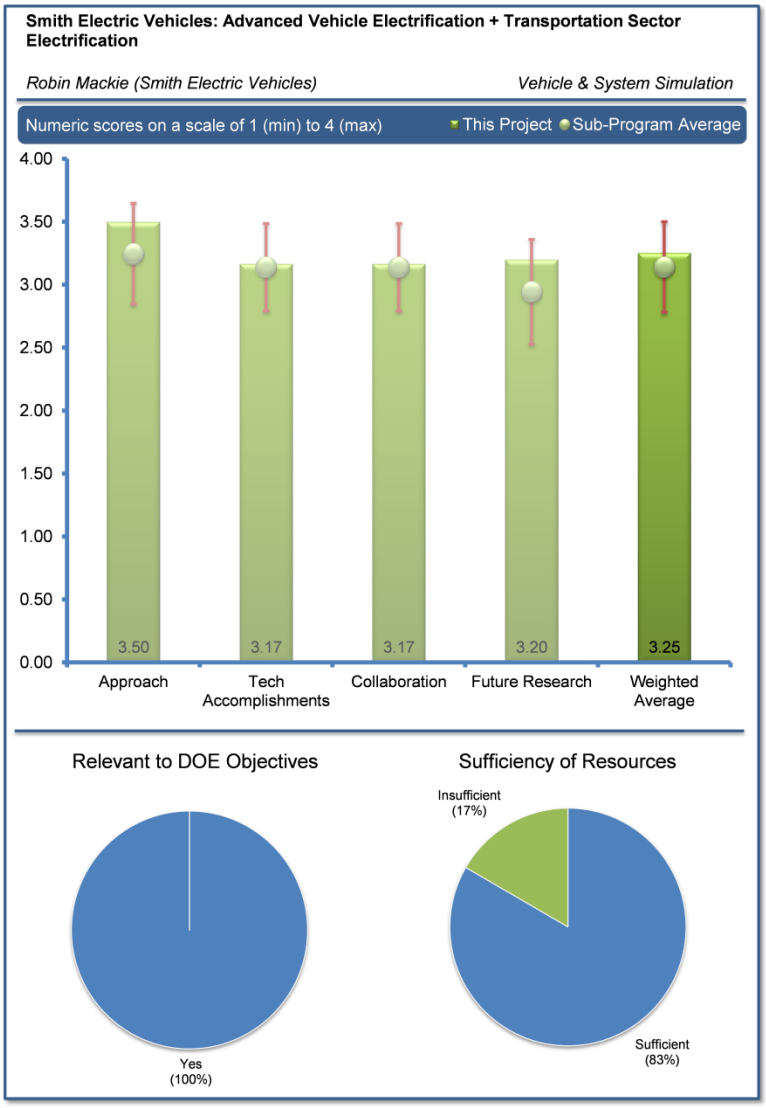
Reviewer 3:

The reviewer trusted that all of the development and validation GM did not describe was worth the money.

Reviewer 4:

The reviewer felt that the cost of providing 146 vehicles and 278 EVSE units that were already in or nearing production at the onset of the project appears (to this reviewer) to be less than that the funding established for the project. The reviewer expressed that the project will likely result in useful outcomes and provide interesting data, but that it could probably have been done for less money.

Smith Electric Vehicles: Advanced Vehicle Electrification + Transportation Sector Electrification: Robin Mackie (Smith Electric Vehicles) - arravt072



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer praised an excellent presentation, well-rounded project, and a good niche market application for EVs. The reviewer cited that the PI appeared experienced and well in control of a complex project that has good objectives and vision for application of government funds.

Reviewer 2:

The reviewer applauded a unique business funding strategy to pass the grant to coalition members, but satisfies the need to expand the fleet to meet the 510 vehicle deployment. Battery updates mid-project will provide an additional opportunity to compare previous field testing, according to the reviewer.

Reviewer 3:

The reviewer noted that the outstanding feature of this work, in contrast to other projects, was made clear in the presentation: the customer needs dictated the capabilities that were provided in the vehicle. This sensible tactic enabled optimum performance for each use and avoided the mismatch that would have caused significant technical difficulties, according to the reviewer. The reviewer also praised the volume of data being collected as the other excellent feature. The reviewer suggested that these data be retained for more detailed analysis than required for the project, as they should provide useful insights into details about EV operation.

Reviewer 4:

The reviewer commented that the approach for this project is well-explained and delineated, covering financial, business, technical, knowledge transfer, and regulatory elements. A clear definition of the DOE funding allocation is provided, according to the reviewer, and a broad geographic deployment of vehicles has been established. The approach seems very logical and well-focused, said the reviewer.

Reviewer 5:

The reviewer commented that the company is performing the work and are capable of addressing the technical barriers. According to the reviewer, the project is well designed with respect to deployment of vehicles, Smith Link, Smith Drive, and Smith Power. The reviewer summarized that the company's approach was to maintain fundraising activity to support corporate goals; complete knowledge transfer from Smith UK to Smith USA; secure U.S. purchase commitments and participation agreements to support the

demonstration project; establish technical teams and U.S. team; and compliance. The reviewer noted the company was successful in its approach but did not know how well it has succeeded in the fundraising activity. The reviewer did voice a criticism that there was not a clear picture on the financing or how the company will complete the project.

Reviewer 6:

The reviewer stated the technical approach for this project appears sound. However, the reviewer noted it appears as though Smith was depending on the initial public offering (IPO) for additional funding for the project. The reviewer criticized that the project success and schedule should not have been dependent on such an unreliable funding source.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer said that getting hundreds of electric vehicles into successful commercial operation is an impressive accomplishment. The vehicle design is being improved and optimized based on early experience, according to the reviewer.

Reviewer 2:

The reviewer stated that, considering setbacks from various supply chain partners, the accomplishments are acceptable. The reviewer did cite the success with driving down the cost utilizing funding to make the vehicle cost-competitive is a very good use (and aligns with the intended use) of the program.

Reviewer 3:

The reviewer summarized the project as a commercial deployment of a commercial vehicle fleet with an operating data collection system planned for vehicle and customer information.

Reviewer 4:

The reviewer noted that the project is basically on track except for some slippage due to the listed reasons. However, the reviewer acknowledged that Smith appears to have worked through the issues and are achieving project milestones, if somewhat delayed.

Reviewer 5:

The reviewer judged that the technical targets for this project are very well delineated and detailed. The reviewer noted that 422 of the scheduled 510 vehicles have been delivered, with the remaining 88 having received order commitments. The level of vehicles supplied (82%) and project expenditures (85%) are largely in harmony, said the reviewer, and the Gen 2 Smith Drive and Smith Power supply chain established- production level Smith Drive components have been received from a volume supplier to help drive down costs. The reviewer further noted that the shuttle bus and stepthrough van vehicles have been developed and introduced. Smith Link established and utilized across Smith for service support, engineering, business development, R&D, duty cycle analysis, diagnostics, and customer fleet performance, according to the reviewer. The reviewer also cited that the project is somewhat behind schedule do to the Smith IPO, supplier quality and commercial issues. Redesign of the Smith Power Batteries Strategy is underway to accommodate an interim generation solution to reduce reliance on a previous supplier, according to the reviewer, and the cell-agnostic modular battery system has been delayed due to existing supplier quality issues. Finally, the reviewer observed that jobs created are somewhat lagging at 58% of project target.

Reviewer 6:

The reviewer noted that the company successfully introduced the Newton Shuttle bus and delivered Newton step-through van; developed and improved the Global Positioning System (GPS)-based operational monitoring system and Gen 2 all-electric vehicle (AEV) drive and battery systems; created 131 new U.S. jobs; and a cost reduction strategy is in place. The company is making progress towards accomplishing the overall project and DOE goals, according to the reviewer, who went on to describe the main concerns as follows. First, the reviewer questioned whether going forward the company has enough financing to complete the project, observing that the company still has to deploy 88 vehicles with the approximate cost of each vehicle at $54,000 and the remaining $4.7 million budget as just enough to deploy the stations. Second, the reviewer said that the company will run into issues if they are

not successful with the cost reduction. Third, the reviewer noted that the goal is to create 225 jobs but questioned whether the company can create jobs with the remaining budget. The reviewer indicated that the picture on the financing and how the project team will complete the project was unclear.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer cited excellent and broad ranging collaborations with multiple entities in the United States and United Kingdom (UK) for duty cycle forecasting modeling, E-van ultra-efficient system development, electric motors using non-rare earth magnets, hydrogen fuel cell range extender for an AEV, AEV school buses, and V2G charging systems and performance analysis. The reviewer described this as tapping a wide variety of partners for collaboration in academia, industry, National Laboratories, government agencies, and in at least one case, leveraging funding from another program [i.e., UK., Department for Transport (DFT), and Technology Strategy Board (TSB) funded program].

Reviewer 2:
The reviewer stated that the project has collaborations on the research side as well as on the utilization side.

Reviewer 3:
The reviewer described commendable cooperation with the UK as well as a nicely broad base in the United States, including universities, key suppliers and the federal government.

Reviewer 4:
The reviewer noted how the company has collaborated and coordinated with other institutions on the project, listing the following: work on the Duty Cycle Forecast Model with the Kansas University Center for Research; the E-Van Ultra Efficient System development with the UK, DFT, and TSB-funded program; the high-efficiency drivetrain, with Bristol University (UK); the controller programming, with Leicester University (UK); collaboration with QM Power on an Advanced Research Projects Agency - Energy (ARPA-E) project to develop electric motors using non-rare earth magnets; a Smith, DOE, NREL and GM joint project to demonstrate a hydrogen fuel cell range extender on an AEV; partnership with Trans Tech to deliver AEV school buses to school districts; the partnership with NREL, Burns & McDonald, Schneider Electric, and TARDEC to develop Vehicle-to-Grid charging systems; and finally, TARDEC V2G Performance Analysis, done in collaboration with the Missouri University of Science and Technology.

Reviewer 5:
The reviewer noted that big data acquisition and recording allows partners to look at vehicle usage and operating procedures (driver skill) to be analyzed and return information to users to increase efficiency and raise adoption.

Reviewer 6:
The reviewer mentioned a variety of collaborations, especially for ancillary programs of the project, but cautioned that there does not appear to be much in the way of collaborations on the main project, the re-design of the Smith EV. The project would perhaps benefit from more partners in this area, according to the reviewer.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer stated that the most commendable part on the future work is the training of 95 new workers that go on to spread the training to other potential users, builders and suppliers.

Reviewer 2:
The reviewer indicated the company has a plan in place for future work for deployment of vehicles, Smith Link, Smith Drive and Smith Power, but that again the main concern is financing.

Reviewer 3:

The reviewer reported that the project work will continue on its current course. However, the reviewer indicated that the real question is future economics, questioning whether anybody would buy one of the vehicles without a hefty DOE cost share.

Reviewer 4:

The reviewer observed that Smith appears to have a vision for completing its redesign and how to achieve market success. The reviewer also warned that the battery, motor, and data collection/presentation development will all be required to make this vehicle attractive to the consumer.

Reviewer 5:

The reviewer voiced that the proposed future work appears on target. Overall, the thrust is to continuously improve the performance of Smith Drive and Smith Power components; drive down costs by improved design, modularity/flexibility/scalability, and supplier competition, according to the reviewer. The reviewer noted the move toward prismatic and pouch configurations while reducing reliance on single cell providers. A significant cost reduction (28%) is targeted by Q4 2013, cited the reviewer, who characterized it as overall, a classic engineering design and implementation project. The reviewer warned that it is important to keep this focus on continuous quality and cost improvements throughout the entire system. As one outside area for possible consideration in the future, the reviewer asked whether it would be feasible to explore some element of DC fast charging (different levels of DCFC are becoming available) coupled with very conducive driving cycles that may permit vehicles to meet some customers' requirements / expectations with significantly lower battery pack capacity. The reviewer suggested this may be worth exploring especially as the Federal funding for vehicle purchases is expended and the cost challenges become more acute.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:

The reviewer applauded excellent work on a niche market with what appears to be a well-designed quality product.

Reviewer 2:

The reviewer remarked that not only does the use of these vehicles directly displace petroleum, but old diesels, such as school buses, are being displaced, reducing criteria pollutant emissions.

Reviewer 3:

The reviewer offered that deploying the 510 EVs will reduce the dependence on oil.

Reviewer 4:

The reviewer said that the slide depicting the 23 tanker trucks of diesel nicely showcases the impact of this program and highlights of the opportunity of optimizing this area of the industry with appropriate driveline optimizations.

Reviewer 5:

Plug-in electric vehicles, including medium-duty (MD) electric vehicle commercial applications, have the potential to significantly reduce the nation's dependence upon oil for transportation and improve air quality, especially in congested urban areas, according to the reviewer. The reviewer noted that medium-duty commercial vehicles are subject to a wide variety of duty cycles and applications with many potential niches suitable to electric drive. Continued technology advances in the performance of medium-duty electric vehicles and most especially cost reductions are key to enabling this market, the reviewer said.

Reviewer 6:

Electrification of delivery vehicles supports the overall DOE goals of reduction in petroleum consumption, said the reviewer, adding that this project is a positive step towards these goals.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The resources appeared to be sufficient, according to this reviewer.

Reviewer 2:
The reviewer said that hopefully appropriate numbers of staff will help to identify quality risks in supply chain issues without continued impact to the deliverables of this project.

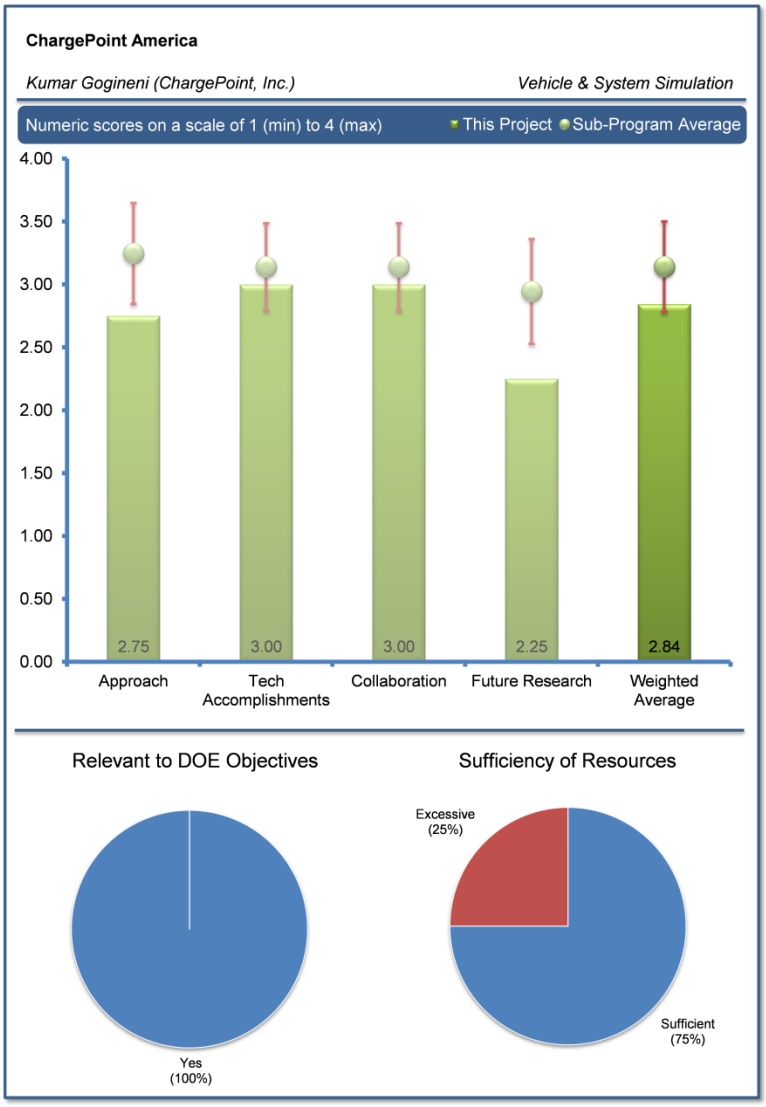
Reviewer 3:
The reviewer said there is substantial re-design and development occurring during this project, and the funding of the project appears appropriate for this endeavor.

Reviewer 4:
The reviewer noted this project is 54% cost shared, with 87% of DOE funding going to AEV buyers participating in the DOE Electric Fleet Data Collection Program; only 13% of DOE funding goes to support project development costs. The reviewer advised that if necessary, it may be reasonable to consider additional targeted funding to support this project if continued project progress is achieved and market interest is clearly demonstrated.

Reviewer 5:
The reviewer highlighted that most of the money subsidized vehicle purchases. The reviewer also asked how much costs will come down so that companies/school districts can afford such vehicles in the future.

Reviewer 6:
As per the presentation, the company seemed to have enough resources to complete the project, according to the reviewer, but going forward, the reviewer could not gauge whether the company has enough financing for resources.

ChargePoint America: Kumar Gogineni (ChargePoint, Inc.) - arravt073



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer remarked on being impressed by the number of charging units installed, and clearly the residential ones went to people who bought vehicles. The reviewer extended this observation to note that similarly, commercial establishments either bought vehicles or thought chargers would draw customers, and asked whether there is a tabulation of which of each kind. The reviewer asked how the public locations were chosen, and professed to be very concerned that insufficient attention is being paid to where stations would really be needed and what type they should be. The reviewer considered Level 2 charging in airport long-term parking to be an example of poor planning. According to the reviewer, given the cost, there should be some concern for utilization, unless the chargers are just to give EV owners confidence (as the UC Davis study implies).

Reviewer 2:

The reviewer commented that the approach to this effort seems reasonable although only a modest amount of information is provided in this regard. The reviewer summarized that deployments in 10 metro areas have been conducted including residential, commercial, and public installations. The reviewer noted that the project includes an excellent distribution of deployment applications including public parking and garages, workplace, retail, utilities, airports, educational institutions, and multi-family dwelling units, with all data sent to INL for collection and analysis, and quarterly reports provided on project results.

Reviewer 3:

The reviewer reported that varied markets with low percentages in any one area forced them to learn the implementation process in many different areas, which is inefficient, and adds to the initial cost.

Reviewer 4:

The reviewer criticized a somewhat uninspiring presentation, noting that similar to one other project this appears to be focused on the details of managing the project or task of installing 4,600 charging stations and reporting back the usage. The reviewer felt unsure if the objective of accelerating the development and production of electric vehicles has been met, or whether it is an expensive charge station installation program at nearly $7,250 per station. The reviewer asked whether this did not just prove that the payback for a station cannot be met at any reasonable period. The reviewer commented that certainly it shows that improvements must be made to make EV charging viable.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
The reviewer pointed out that the idea was to deploy chargers, which are out there, collecting data.

Reviewer 2:
The reviewer affirmed an interesting deployment and impacts for multi-dwelling units, and added that this may be an area of interest for DOE national permitting activity.

Reviewer 3:
The reviewer acknowledged reasonable technical progress in achieving the goal of 4,600 charging stations, but inquired as to the recommendations for reducing the infrastructure costs on a global as well as local basis.

Reviewer 4:
The reviewer observed that the project is on schedule with all deployments (approximately 4,600) completed, 900,000 charging events recorded, and 6,355 megawatt-hours (MWh) of energy consumed. An interesting synopsis of observations is provided for residential, commercial, and multi-dwelling unit applications, according to the reviewer, who added that this is the type of information for which more understanding is needed.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer commended a good job obtaining additional funding from partners.

Reviewer 2:
The reviewer observed that the project has collaborations with a variety of vehicle manufacturers but does not mention any coordination with utilities, municipalities, nor other broad groups of end users. The project secured a $3.4 million dollar grant from the California Energy Commission (CEC) for residential, commercial, and multiple-dwelling unit (MDU) installations, as well as a small grant from the Association of Bay Area Governments for deployment of ports in MDUs.

Reviewer 3:
The reviewer wanted to know whether the many organizations involved in the project were satisfied.

Reviewer 4:
The reviewer noted that the data coordination seems to be working quite well, and that everyone seems to have the same graphs. The reviewer opined that unfortunately, many of them are illegible, and there is insufficient explanation of the differences between them or their significance. The reviewer asked whether time-of-day pricing or free charging were in effect, and wanted to know how charge taken compared to battery capacity. Another question from the reviewer was about what types of sites were used most. The reviewer expressed concern with getting all of the useful insights possible from the data.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer offered that the project could use analysis that includes lessons learned on the installations, operations, design for lower cost, etc.

Reviewer 2:
The reviewer commented that the team was going to do more of the same, and that there was nothing more to add.

Reviewer 3:
The reviewer observed that with the project in its final phase, the only plans are to collect more data, with no comments on how to utilize data to help overcome barriers observed in the future.

Reviewer 4:
The reviewer opined that the plan for future work is very sketchy beyond data collection. The reviewer felt it would be beneficial to know what ChargePoint's specific plans are for data analysis (what is going to be focused on) and information dissemination. The reviewer asked whether there is a specific strategy underway, who are going to be the principal target audiences, and what is going to be the focus. Additionally, the reviewer inquired as to whether any thought has been given to ways to further improve the form and usefulness of information and dissemination approaches for specific end user communities.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer stated that PEVs have the potential to significantly reduce the nation's dependence upon oil for transportation. The development of a cost-effective, ubiquitous, self-sustaining EV charging infrastructure is a key enabler to achieving this vision, according to the reviewer, who went on to state that understanding PEV and charge infrastructure utilization is a key to building market momentum for PEVs.

Reviewer 2:
The reviewer pointed out that the vehicles need to be charged to displace petroleum, so installing chargers is important, although many users would be just fine plugging into the wall at home, so Level 2 may not be needed for PHEVs.

Reviewer 3:
The reviewer expressed that it would be good for the VTO to provide a level comparison between the EVSE provided from various vendors, and how locations or other parameters might have an impact on their public use.

Reviewer 4:
The reviewer commended good relevance, but requested that the result be used to return more to the sponsor than tons of data.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

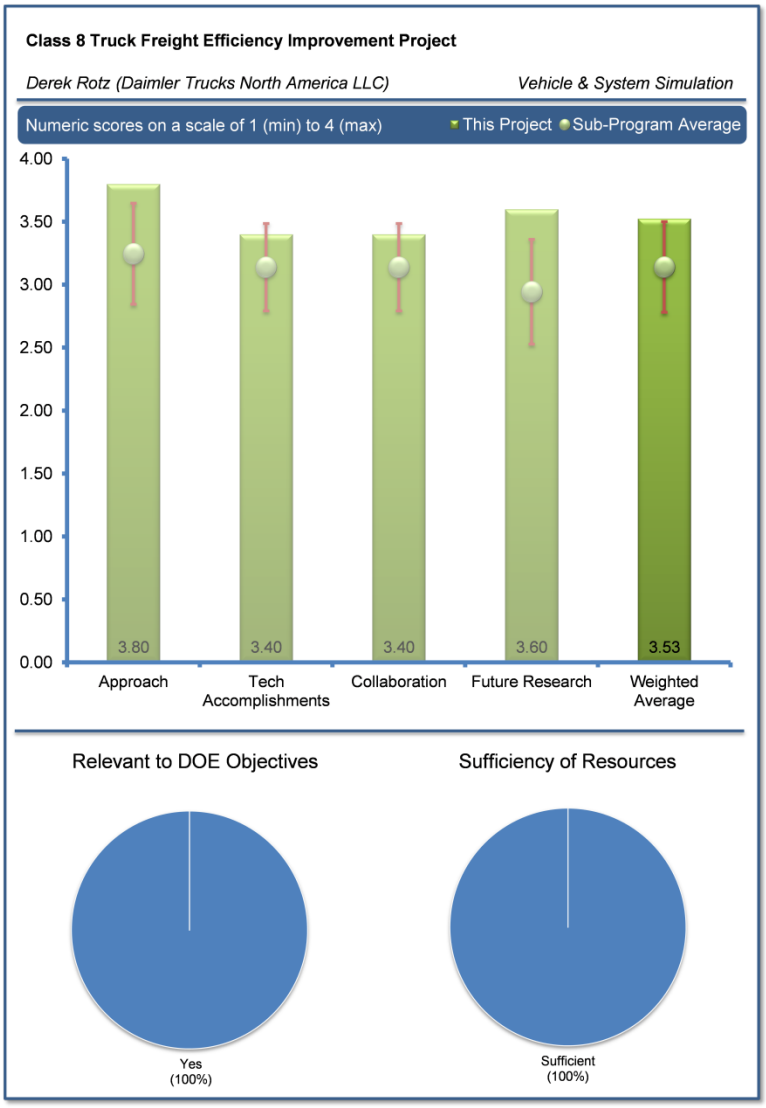
Reviewer 1:
The reviewer cited that the money for this project was needed to support the installation of lots of equipment.

Reviewer 2:
The reviewer pointed out that as the deployment of the project appears to be complete, the resources required to continue the project seem adequate.

Reviewer 3:
The reviewer stated that this task is 50% cost shared, and the resources are sufficient.

Reviewer 4:
The reviewer cited a high cost on average per station installation.

Class 8 Truck Freight Efficiency Improvement Project: Derek Rotz (Daimler Trucks North America LLC) - arravt080



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer expressed that Daimler has reached an excellent balance of work done on this project and available funds, particularly using this project to complete not otherwise planned in their normal R&D efforts. The reviewer applauded the team taking commercialization very seriously and not just throwing a bunch of technologies in to meet the 50% goal. The reviewer also cited how this team appears to be taking these concepts more quickly into their product launch plans than others, ensuring one of the program goals of creating jobs in the United States.

Reviewer 2:

The reviewer described a straightforward engineering approach using simulation analyses in the early phases of the work to be followed by actual hardware truck builds.

Reviewer 3:

The reviewer noted a comprehensive technical approach to the entire vehicle system using a number of computational tools, with the project on schedule.

Reviewer 4:

The reviewer cited a good evaluation (analytical roadmap) to quantify opportunities of all options.

Reviewer 5:

The reviewer agreed that the project offers a complete technology package covering detailed aerodynamic improvement plan, hybrid, and vehicle and powertrain integration plan. The reviewer noted it should be on the way to meeting the targets. However, the reviewer felt it is not clear how a hybrid can help an on-highway truck operation.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer found that the team is making decisions and progressing on designs well. The reviewer observed that the project team used its tinker trucks to confirm subsystems before putting them onto the final vehicle. The reviewer also noted that the team engaged R&D in Germany sufficiently.

Reviewer 2:
The experimental validation of expected results is progressing, according to the reviewer.

Reviewer 3:
The reviewer mentioned that a comprehensive technical plan allowed Daimler to meet the key program milestones in time. The aerodynamic improvement with the inclusion of a tractor and trailer is impressive, the reviewer said, adding that truck assembly with many technologies is moving forward.

Reviewer 4:
The reviewer applauded an excellent utilization of computational tools for system design and integration. In addition, the reviewer cited that the physical system testing has met milestones. As mentioned in the presentation, hybrid system key-on is a couple of months behind, but barriers appear well managed, according to the reviewer.

Reviewer 5:
Progress appears to be adequate to overcome one or more barriers albeit rather slow to occur, according to the reviewer.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer commended a comprehensive and binned list of collaborations within their respective expertise.

Reviewer 2:
The reviewer indicated that Slide 16 shows key collaborations are in place. The reviewer commended the nice utilization of work with the university and laboratories.

Reviewer 3:
The reviewer noted that many partners are involved in the program, but that each party's involvement in the program would be clearer if each were properly acknowledged in a slide that is associated with its contribution.

Reviewer 4:
According to the reviewer, collaboration apparently does exist among the partners, albeit again somewhat slow.

Reviewer 5:
The reviewer observed that this is always a challenge and appears that the team Daimler put together is doing this. The reviewer professed to being slightly concerned that this team is driving much if not all of the work and maybe not completely utilizing all the expertise at the supplier organizations, but the reviewer admitted that there was no solid evidence to confirm this.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer noted that Daimler has a good plan to evaluate the technologies and is utilizing their fleet partner to ensure data collection and feedback on the designs.

Reviewer 2:
The reviewer stated that the technology benefits are well understood and laid out. The plan is in motion and should be achieved, according to the reviewer.

Reviewer 3:
The reviewer said that actually building the trucks will show that indeed the barriers are being overcome and the presentation should be improved to clarify which results are from simulations and which are from actual truck system level builds.

Reviewer 4:
The reviewer commended a good plan to continue to validate aero, powertrain and engine and waste heat recovery (WHR). The reviewer added that a build-up of demonstrator vehicles is needed.

Reviewer 5:
The reviewer observed that the future plan shows the roadmap of how the final program target can be reached.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer commented that improving truck FE does indeed support the overall DOE objective of petroleum displacement.

Reviewer 2:
The reviewer said that from the work completed, and the work proposed, it appears that the stretch goals may well be met and demonstrated.

Reviewer 3:
The reviewer stated that Daimler is number one in market share and is already demonstrating leadership in this area, citing the Revolution truck at 9+ miles per gallon (mpg).

Reviewer 4:
The reviewer claimed that if successful, the project could result in commercial product(s) that will improve freight efficiency.

Reviewer 5:
The reviewer cited the 50% improvement in freight efficiency as the best indication of the project supporting the overall DOE objectives of petroleum displacement.

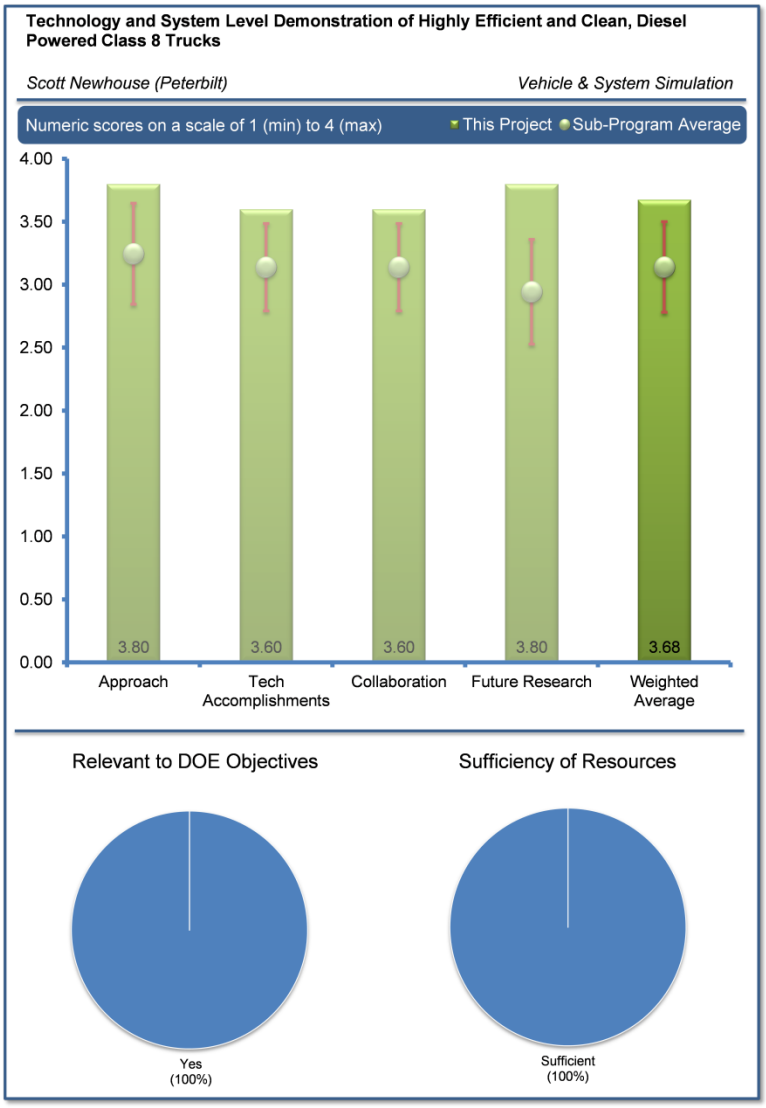
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The resources appear sufficient, according to the reviewer.

Reviewer 2:
The reviewer opined that 40% of the remaining funding should be adequate to complete the program and meet the program targets.

Reviewer 3:
The reviewer observed that the resources for this project are substantial and do appear sufficient to achieve the stated milestones, although perhaps not in a timely fashion.

Technology and System Level Demonstration of Highly Efficient and Clean, Diesel Powered Class 8 Trucks: Scott Newhouse (Peterbilt) - arravt081



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer indicated that this was the most complete technical package seen for a long time.

Reviewer 2:

The reviewer indicated that targets had been met and/or exceeded, and were on schedule. The reviewer added that more than 60% gains in freight efficiency were shown using near to production technologies. The approach, which focused on production capable technologies, has shown to be effective.

Reviewer 3:

The reviewer said that the approach was a straightforward and systematic engineering approach but with added risk from the utilization of optional advanced devices such as the solid oxide fuel cell and Li-ion start battery. The reviewer noted that this apparently has been rewarded by gaining operational experience with such advanced systems as well as enabling achievement of the project objectives.

Reviewer 4:

The reviewer noted that there was good collaboration with engine OEMs. The reviewer added that other suppliers and collaborators were involved for a comprehensive approach.

Reviewer 5:

The reviewer observed much better understanding of the approach this year compared to prior ones. Peterbilt shared much more about their concepts and the results were impressive. The reviewer described using the fleet to a high extent, and their drivers in particular, as outstanding.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer indicated that the results of this program were absolutely outstanding.

Reviewer 2:
The reviewer said that all goals were met (or exceeded) and were on time.

Reviewer 3:
The reviewer indicated that to date, technical objectives have been achieved and are on schedule. This means that the barriers were being addressed and overcome.

Reviewer 4:
The reviewer noted that demonstration of efficiency targets were ahead of schedule.

Reviewer 5:
This reviewer seeks confirmation of the vehicle level goals a bit more. The reviewer thought that the 68% freight efficiency improvement was impressive in that the changes to the vehicle were not so dramatic, and encouraging that there was this much opportunity without huge, but still big, change.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer noted that from the successful results, it appeared that the proper tier suppliers were selected (results are indicative of sufficient coordination).

Reviewer 2:
The reviewer said that the overall project has required intensive collaboration among many suppliers as well as involvement of the end users for acceptability. The reviewer went on to say that this was the primary reason for the successful achievement of the objectives.

Reviewer 3:
The reviewer pointed out that the team seemed to be reaching a good balance of collaboration and progress. The reviewer said that the project used specific skill sets of partners rather than doing too much on its own. The reviewer also noted that it seemed that there was less coordination between Peterbilt and Cummins in the presentations, but added that this could be due to the powertrain integration having been mostly done last year.

Reviewer 4:
The reviewer noted that Slide 4 showed good collaboration with suppliers.

Reviewer 5:
The reviewer noted that Slide 4 on participants was misleading with such a long list. The reviewer added that it should list partners that were supported as subcontractors funded by the program, like all other competitor programs.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer commented that the Demo 2 vehicle appeared to be on track and solid oxide fuel cell (SOFC) dropped in favor of lithium battery. The reviewer added that the project should be sure to include detailed plans on battery sizing and durability.

Reviewer 2:
The reviewer said that the future plan pointed to the direction that the program goals would be delivered.

Reviewer 3:
The reviewer indicated that the focus on refining production capable technologies was largely promising.

Reviewer 4:
The reviewer noted that the follow-on work planned to conduct cost/benefit analyses of individual devices and technologies to enable earliest commercial introduction.

Reviewer 5:
The reviewer suggested to exploit the relationship with the fleet partner as the final prototype is tested, being sure to collect solid data as well as quantitative driver inputs.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer pointed out that greater than 60% freight efficiency gains have been demonstrated and that these were outstanding numbers.

Reviewer 2:
The reviewer noted that the project was very relevant and that Cummins, with the largest engine market-share, could use their knowledge to influence all truck-makers.

Reviewer 3:
The reviewer said that improvement of freight delivery FE does indeed support the DOE objective of reducing petroleum consumption.

Reviewer 4:
The reviewer said that well over DOE's 50% improvement targets on freight efficiency absolutely supported the overall DOE objectives of petroleum displacement.

Reviewer 5:
The reviewer noted that if successful, the project could provide a commercial product which increases freight efficiency.

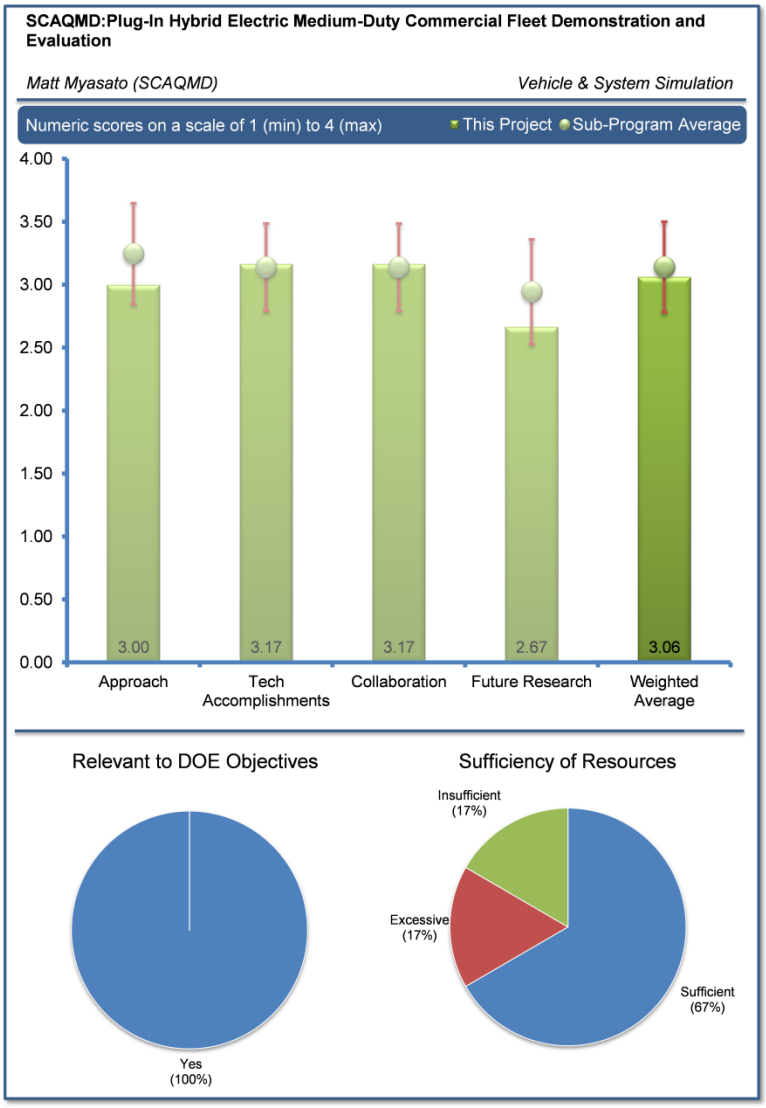
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer commented that the resources for this project were substantial and appeared totally capable of meeting the milestones in the time schedule laid out.

Reviewer 2:
The reviewer said that the results relative to the promise of production viability indicated success.

Reviewer 3:
The reviewer said that the remaining funding should be adequate to deliver the final program goals.

SCAQMD:Plug-In Hybrid Electric Medium-Duty Commercial Fleet Demonstration and Evaluation: Matt Myasato (SCAQMD) - arravt083



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer noted that the objective of a nationwide demonstration of 400 trucks using a production ready, commercialize-able PHEV system and developing a production ready smart charging capability would provide for an excellent set of data on this technology.

Reviewer 2:

The reviewer said that it was really nice to see a project that combined a propulsion hybrid with a worksite hybrid. The reviewer hopes that the vehicle deployments and the data analysis will both exploit the different features and clarify for users and others, just what features are most beneficial in different uses and situations.

Reviewer 3:

This reviewer noted that the project had a good approach to identify the impact on a number of vehicle applications, but that the actual efficiency improvements would be difficult to quantify without laboratory environment testing. The reviewer said that simulation results would have been nice prior to vehicle and application selection to ensure appropriate selections of applications.

Reviewer 4:

This reviewer indicated that the original project plan appeared to have been infeasible, and thus there had not been much progress in four years. The reviewer said that the current plan uses a VIA design that is already proven for a part of the project, which should make the objectives more attainable. The reviewer added that the Odyne system also appeared feasible and that the barriers to project success do not appear insurmountable.

Reviewer 5:

The reviewer indicated that the organization has an approach to deploy 280 MD PHEVs and develop production ready Class 2-7 PHEV system. The reviewer added that the organization has identified the technical barriers but does not know if the project will be able to address the barriers. The reviewer noted that three-and-a half years have passed since the project got started, and that based on the presentation it showed that the project was not well-designed.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer noted that the PHEV systems have been developed and that the project is currently evaluating prototypes in the field.

Reviewer 2:
This reviewer pointed out that the organization has made some progress towards achieving overall project and DOE goals; but that based on the presentation, it was clear that the organization did not make much progress in the last three-and-a-half years. The reviewer went on to say that the organization did not present any performance indicators that were met.

Reviewer 3:
This reviewer noted that the program delays due to multiple supplier issues have reduced the project's accomplishments. The reviewer added that good program recovery planning would still enable adequate vehicle numbers and appropriate vehicle use.

Reviewer 4:
This reviewer acknowledged that the setbacks (that could have been provided in more detail during the presentation) have limited the progress of this project severely. The reviewer added that the VIA design was already complete outside of this project, and so this aspect of the project appeared to be on course for success. The reviewer noted that it was not clear from the presentation what the progress of the Odyne hybrid system was, and so it was difficult to gauge the level of progress there.

Reviewer 5:
This reviewer indicated that it was difficult to do much evaluation at such an early project stage. The reviewer said that the hope is that the uses for these trucks will be appropriately selected so that sufficient power is available without the need for over-design.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer noted that the team, as assembled, covered the development and deployment aspects of the truck development quite well. The reviewer added that it would be important to select appropriate users or utilities and collect the data required to optimize future vehicles based on lessons learned.

Reviewer 2:
The reviewer noted that collaborations and partnerships had been formed in this project with a variety of private and public entities that should provide for success of the project.

Reviewer 3:
This reviewer said that the project collaborations seemed extensive and appropriate. The reviewer added that the hardware developers were proven in the industry but that it was not clear, however, who the fleet partners would be.

Reviewer 4:
This reviewer identified that the organization has collaborated and coordinated with other institutions: CEC – Funding Partner; EPRI – Program Management and Fleet Coordinator; VIA Motors – Hybrid System Developer; Odyne Systems – Hybrid System Developer; So Cal Edison – Battery and Vehicle Testing; JCS – Battery Supplier; Pathway Technologies – Smart Charging Router; and the Electric Utility Industry.

Reviewer 5:
This reviewer noted that leveraging the use of fleet partners to obtain data on nearly 400 vehicles would help to quantify emissions reduction as well and petroleum displacement in the many applications represented. The reviewer went on to say that gathering supplemental funding from partners indicated value to industry.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer stated that there appeared to be a sound project plan to move forward. The reviewer then asked what media would be used to disseminate the project findings.

Reviewer 2:
The reviewer pointed out that the team planned to complete the project as planned. The reviewer urged the team to take care in matching users to vehicles, and to assure sufficient data collection for analysis.

Reviewer 3:
The reviewer stated that the organization has shown a plan for future work to: complete system and calibration validation testing for the VIA Motors and Class 6/7 applications; initiate deployment of VIA Vans and Class 6/7 PHEV's; install cellular based data acquisition systems and set-up download servers to acquire in-use performance data; install Level 2 vehicle charging infrastructure; complete the deployment of VIA trucks, vans and Class 6/7 PHEV's; evaluate and analyze the vehicle operation in the field; conduct laboratory emissions and FE tests; and identify opportunities for cost reductions. The reviewer added that even though the company has shown a future plan, and based on the work that has been completed so far in three and-a-half years, it is going to be hard for the organization to complete the project.

Reviewer 4:
The reviewer commented that data acquisition will be limited to one year based on delays in the program. Future plans should be included in the re-scope, to ensure the best results of the project.

Reviewer 5:
The reviewer noted that since the project started in 2009 and that the first truck had not been delivered yet, that it was very important that the trucks start to be put into use later this year and that data start to be collected. The reviewer added that the analysis of data from vehicles in the field and laboratory emissions and FE tests would be excellent information to help promote the use of this technology in the future.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that work trucks were an ideal application for vehicular electrification and that this project certainly supported the DOE goals of petroleum displacement in all areas of transportation.

Reviewer 2:
This reviewer stated that this project supported the DOE goal of petroleum displacement through the use of hybrid technology, which will reduce greenhouse gas emissions, criteria pollutants and displace petroleum.

Reviewer 3:
The reviewer commented that deployment of medium-duty PHEVs will reduce petroleum consumption.

Reviewer 4:
This reviewer believes that PEVs will directly displace petroleum.

Reviewer 5:
This reviewer stated that the use of PHEVs reduces petroleum use if the users bother to charge them (sometimes a problem for commercial vehicles). The reviewer then added the displacement of petroleum in trucks often means a reduction in criteria pollutant emissions from the old diesels they replace.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

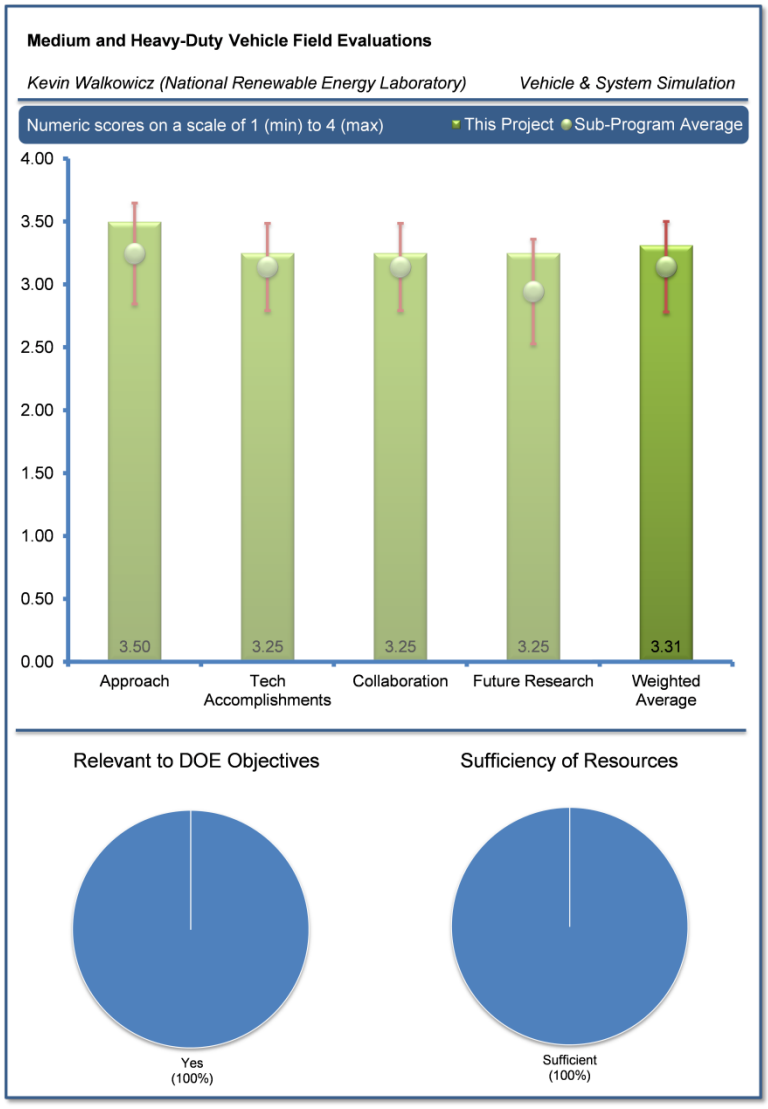
Reviewer 1:
The reviewer said that resources were sufficient.

Reviewer 2:
This reviewer could not gauge how many resources were working on the project based on the presentation and could not figure out whether the lack of progress was due to resources.

Reviewer 3:
This reviewer said that this was very hard to judge with no breakdown of costs provided.

Reviewer 4:
This reviewer said that with the VIA design already developed independently of this project, the project funds were likely excessive for the deployment of this vehicle, the development and deployment of the Odyne trucks, the deployment of the infrastructure and then the data collection and analysis.

Medium and Heavy-Duty Vehicle Field Evaluations: Kevin Walkowicz (National Renewable Energy Laboratory) - vss001



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer commented that the approach was on target and current with the new partnerships being evaluated yearly.

Reviewer 2:

The reviewer believes that it seems like a reasonable approach.

Reviewer 3:

This reviewer stated that the data collected provided great insight. Unfortunately, the insight was that electric trucks (e.g., Smith EVs) do not perform in practice anywhere close to what the manufacturers claim. While the slides do not reflect improved vehicle performance, the presenter noted that there had been positive movement toward the advertised vehicle specifications. As noted during the presentation, the NREL would soon conduct a deeper analysis of the data to determine what factors influenced vehicle performance. The reviewer added that without that type of analysis, it was impossible to know if this was strictly a bad news story or if there were actionable measures that could be taken to bring these trucks into the realm of financially (and operationally) viable products. The manufacturers' response to these concerns is to focus on more rigid route planning, but the reviewer hoped that NREL does not fall into this trap. The reviewer commented that ultimately, electric trucks need to perform like any other trucks if they are going to be broadly adopted. In the reviewer's opinion, NREL ought to be focusing its attention on improving the technology to reach comparable capabilities with internal combustion engine (ICE) vehicles rather than continuing to define parameters where the current underperforming technology could be good enough.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer said that the technical accomplishments in new analytical tools and methods were well-founded to address the diverse variable vehicle usages.

Reviewer 2:

The reviewer said that the goal seemed to be to collect data on a range of technologies which was being done. The analysis of the data was where the reviewer questioned if enough was being done. Since these were MD and HD trucks, the reviewer said that it would be

nice to see the major metrics be fuel consumption normalized by work, like the greenhouse gas (GHG) regulations use. The reviewer would have liked to see more analysis of the variability of the data. The reviewer wanted to know what really was driving the variability. If it was driver behavior, vehicle mass, ambient conditions, the reviewer asked if a metric could be created that included those items.

Reviewer 3:
The reviewer said that as noted previously, the work appeared incomplete without actionable items to improve the technology; but that the work to date had clearly defined the current status of the technology.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer said that it looked like there was good collaboration with the industry to collect the data.

Reviewer 2:
The reviewer commented that the project technology diversity and mix of vehicle applications evaluated demonstrated collaborative efforts across partnership OEMs. Data collection, reporting and database development activities also demonstrated effective collaborative and coordination efforts within NREL.

Reviewer 3:
This reviewer stated that there ought to be a partnership with the General Services Administration (GSA) to provide this performance data directly to government fleet managers interested in procuring EVs. Ideally, the data could be provided as part of AutoChoice (the system by which fleet managers procure vehicles from GSA).

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer said that looking for the new technologies seems like the right thing to do, but indicated that the project should keep an eye on even the standard technologies and use patterns that might be changing over time.

Reviewer 2:
The reviewer indicated that now with the FE or freight efficiency bar being raised at most every vehicle OEM to meet regulations, the baseline bar is also improving, but not necessarily with the adoption of revolutionary technology. The evolutionary technology needs to be assessed, such as advanced transmissions and improved brake thermal efficiency (BTE) powertrains by this project, which will be a more cost-effective market entry before the revolutionary technology is adopted. The reviewer stated that the approach was generally good but suggested improving the evaluation of baseline vehicle with a better understanding of underlying variables that affect differences found between dynamometer and in field testing. The industry needs better vehicle FE analytical prediction tools to displace costly field testing.

Reviewer 3:
The reviewer was looking forward to a deeper analysis of the EV performance data for lessons learned. As stated previously, the reviewer was primarily hoping for suggestions to improve the technology and secondarily was interested in operational best practices to improve the performance of the existing technology.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer said that there was no more comprehensive dataset for EV performance, so these data are absolutely essential to advancing the industry.

Reviewer 2:

This reviewer stated that having these data and making it available for analysis by all of those evaluating technologies and vehicle use habits is in line with the DOE objectives.

Reviewer 3:

The reviewer noted that the project provided a pertinent variety of competing technologies an unbiased comparison of FE attributes in actual real world drive cycles. However, with respect to overall petroleum displacement, the reviewer stated that a measurement of total fuel displaced for the vehicle class, and the impact that the specific vehicle technology would project when broader adoption occurred, needed further examination.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

This reviewer said that it seemed current funding levels were sufficient to support this work. At least, there was no indication from the presenter that additional resources would be necessary.

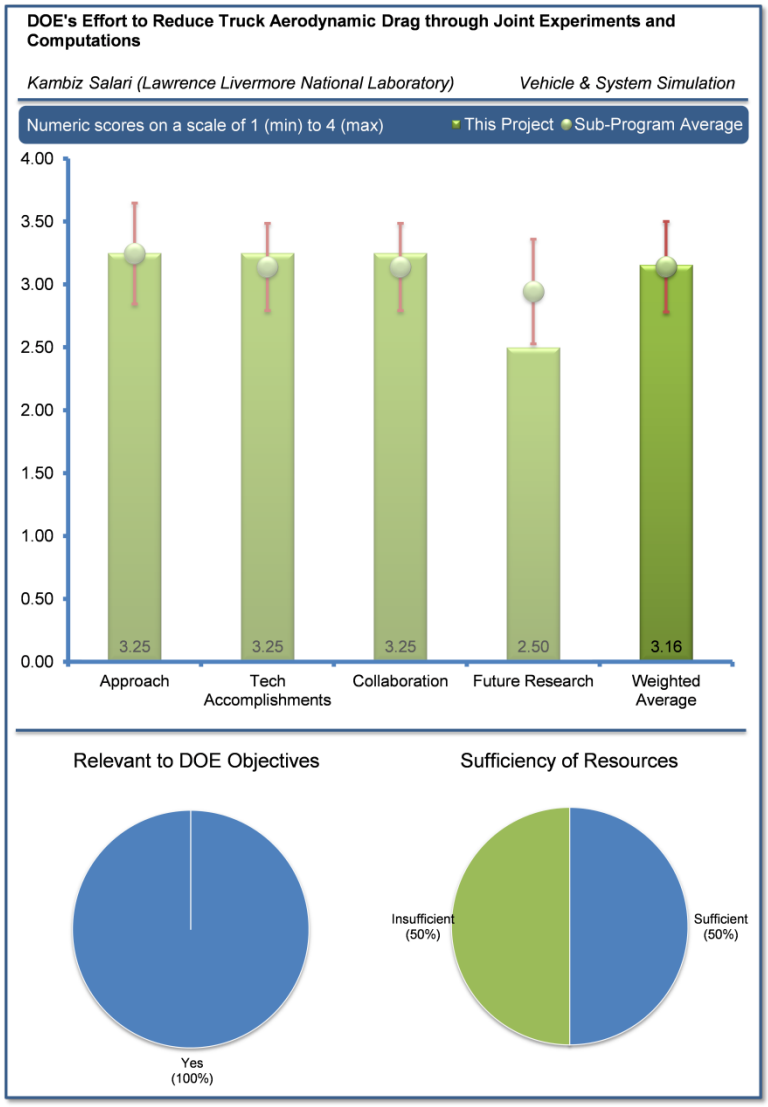
Reviewer 2:

This reviewer stated that sufficient resources were applied in meeting both overall and technical objectives. Although, NREL's adaptation of Fleet Analysis Tool (FAT) code to specific OEM data does push a portion of technical accomplishments out in time.

Reviewer 3:

This reviewer said that it was very hard to tell and asked if there was a goal for how much data to collect and how much money that would take.

DOE's Effort to Reduce Truck Aerodynamic Drag through Joint Experiments and Computations: Kambiz Salari (Lawrence Livermore National Laboratory) - vss006



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that there was an excellent PI, a well written research plan, and joint collaboration with the industry.

Reviewer 2:

The reviewer said that the program rightly used a mix of analytical and experimental work towards aerodynamics evaluation, which allows for correlating the results from two separate sources, namely computational fluid dynamics (CFD) with experimental measurements. This reviewer added that the presentation also mentioned that an integrated tractor/trailer approach was taken. However, the focus appeared to be heavily trailer focused, with limited tractor analysis (apart from tractor trailer gap seals).

Reviewer 3:

This reviewer said that the approach looked sound. The reviewer asked if there was opportunity for scale model testing in addition to all the full-size wind tunnel activity.

Reviewer 4:

The reviewer did not see a good overall plan for tankers and for evaluating data from the fleets. The reviewer was quite disappointed in the answer to why the fleet data did not match that in the wind tunnel. The reviewer expected an analysis of how different data collection methodologies and data match.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer commented that the project did a full scale wind tunnel testing and track testing, and was collecting on the road data. The reviewer concluded that the project improved the aerodynamics of the trailer.

Reviewer 2:

The reviewer indicated that the progress since 2012 seemed to be modest. There was some CFD work on tankers and some on corrugated trailers. The analysis work seemed pretty repetitive including the following: identifying some form of trailer equipment and running baseline CFD (dry van trailer, corrugated trailer, tanker); sealing the gap and adding skirts; and comparing the results.

The reviewer commented that aerodynamic development work was worthy of research funding due to its impact on fuel consumption, but that this area of research deserved more fresh thinking than this program provided. The reviewer continued that there are complex topics within experimental and computational aerodynamics that are not well understood, and should be addressed within this work, namely high turbulence areas. The reviewer added that high turbulence areas were characterized by high degrees of separation, which are caused by fast moving parts and are a significant contributor to drag. For example, airflow around and through the wheel well of the steer (front) tractor tire; spinning steer tires currently cause significant drag, but the industry has not found ways for reducing drag in this area. Secondly, air moving underneath the tractor and trailer with a moving road; here the boundary layer is significantly disrupted and air impinges on many parts under the chassis of the tractor and also under the trailer, despite the presence of trailer skirts.

Reviewer 3:

The reviewer stated that this was a little difficult to assess when accomplishments were logged. The milestones were not very specific as to what was expected when except a broad description of activities.

Reviewer 4:

This reviewer did not see much progress year over year. The reviewer was not sure if funding dropped off significantly, but the reviewer was expecting more technical progress to have been achieved.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

The reviewer said that the presenter had reported on collaborations with both manufacturers and fleets Spirit and Frito Lay and in the past, has collected data for vehicles operating in service. This reviewer further emphasized to keep up the effort.

Reviewer 2:

This reviewer said that the collaboration with the industry looked solid including on-road tests.

Reviewer 3:

This reviewer observed that the project was collaborating with the National Aeronautical and Space Administration (NASA) and industrial fleets.

Reviewer 4:

This reviewer observed that the project was winding down and not so much coordination was planned; but asserted that if collaboration was strong, that the reviewer would have expected to have seen more analysis on the fleet data. Also, the reviewer stated that the presenter's answer that fleets needed to take better data and deal with new trailer designs from an efficiency versus safety inspection perspective was not appropriate. Commercialization barriers for technology are expected at least at some level in these projects.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:

This reviewer stated that future research was important work and the project needed a return on investment.

Reviewer 2:

The reviewer strongly recommended to direct future aerodynamics work towards the study of high turbulence areas (wheel well of the tractor steer tire, under body of tractor and trailer). This reviewer also recommended ceasing research on tankers. It was mentioned that a national fleet of 200,000 tankers operate in the United States, which is a very small percentage when compared to dry van trailers, which is on the order of millions. Lastly, the reviewer recommended keeping focused on the trailer types that form the largest part of the national fleet.

Reviewer 3:
This reviewer opined that no real plan was suggested and contributed to why the reviewers maybe could not evaluate progress year over year.

Reviewer 4:
This reviewer did not see much of a roadmap beyond FY 2013 in any degree of specificity.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer commented that this work was highly relevant to DOE's objectives.

Reviewer 2:
This reviewer said that trailers were significant to fuel efficiency.

Reviewer 3:
This reviewer agreed that yes, tractor trailer aerodynamics developments play an important part towards displacing foreign oil. Further investments should continue, particularly if it is directed in the correct areas of focus.

Reviewer 4:
This reviewer stated that HD aerodynamics may be one of the highest points of leverage in reducing fuel consumption.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

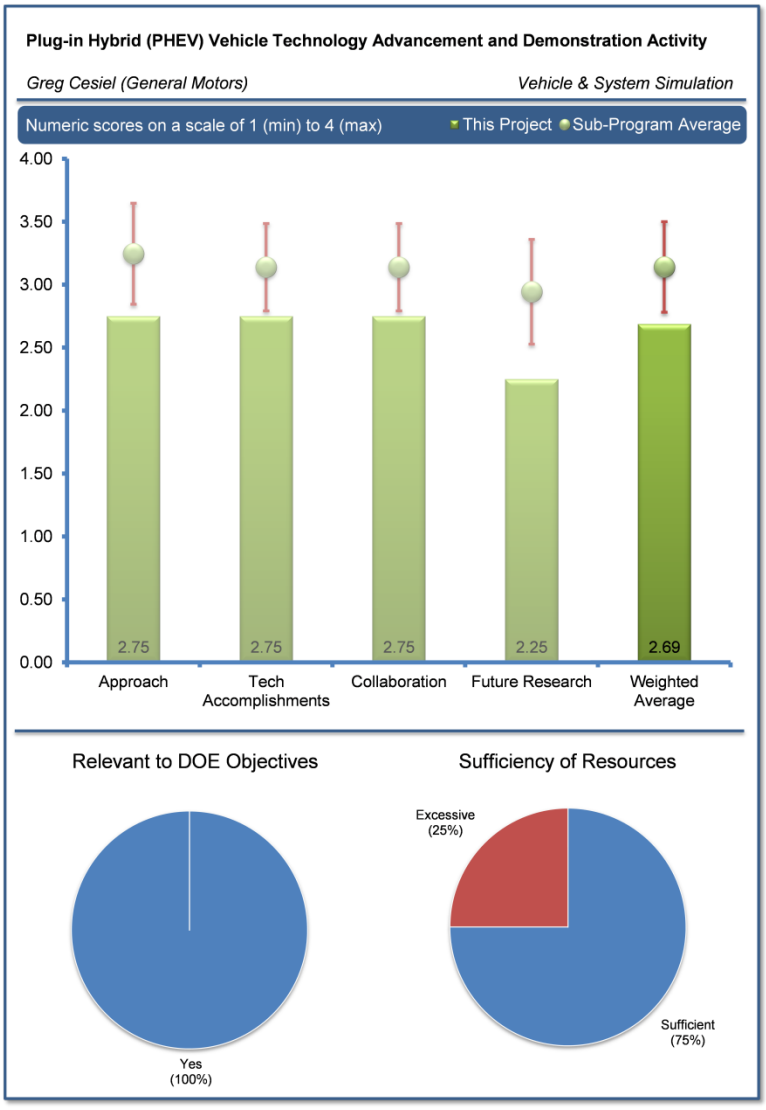
Reviewer 1:
This reviewer pointed out that this was low hanging fruit and commented that the project needed to speed up efforts. However, the reviewer said that this was excellent work. The reviewer observed that there was a top team working on this and said that there was an excellent PI.

Reviewer 2:
This reviewer stated that generally more research funding should be devoted to tractor/trailer aerodynamics in some form, given the large contribution of aerodynamic drag to losses. The reviewer would like to see a different focus from the planned working direction (i.e., shift away from tankers). Regarding the $600,000 resources allocated, which would be in excess of two man-years of engineering work, the reviewer frankly expected more outcome as well as a fresh approach to addressing the aerodynamic problem (i.e., tackling high turbulence areas). One idea suggested by this reviewer was to have manufacturers (tractor and/or trailer) play more of a leading role in aerodynamics research.

Reviewer 3:
This reviewer stated that it was difficult to judge given the broad statements of future activity (planned milestones were not too specific).

Reviewer 4:
This reviewer said that it seemed that this program should conclude or be funded with specific goals.

Plug-in Hybrid (PHEV) Vehicle Technology Advancement and Demonstration Activity: Greg Cesiel (General Motors) - vss018



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer said that a good rigorous testing strategy was defined for the battery development, including both laboratory and in-vehicle components. However, quantitative performance targets were not shown, and go/no-go decision points did not seem to have been established and followed to serve as gates for distribution of project funding (at least none of this was clear from the presentation).

Reviewer 2:

This reviewer commented that there was a very structured approach which addressed component and integration challenges. The reviewer added that the inclusion of E85-capable flex-fuel (FF) engine technology was very good. However, the reviewer said that it was difficult to evaluate the overall approach of an activity of this magnitude with a 20 minute presentation. With that said, the overall approach seemed right on target.

Reviewer 3:

The reviewer said that the project concept of developing components and sub-systems for integration into a production-intended vehicle was solid, and appeared to have been feasible. However, the choice of base vehicle for the PHEV design appeared to have been poor with Saturn no longer existing. Perhaps this could not have been foreseen in 2008, but suggested that the selection of a more established brand would have been advantageous.

Reviewer 4:

The reviewer said that conceptually the project appeared good, but asked if this was stand-alone or in conjunction with the Volt program. The reviewer added that it was unclear and this presentation lacked many technical details.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer stated that the milestones appeared to all be on schedule and/or completed on time. The project was 88% complete and appeared on track to overcoming technological barriers and integration challenges. The reviewer observed that more than 50 vehicles had been built and 180,000 miles driven and that the project included cold weather testing with conventional and E85 fuel.

Reviewer 2:
The reviewer observed that the presentation described qualitative progress on the battery development and indicated that 50 or more vehicles were built and driven over 180,000 miles at GM. However, due to the scant details included, the presentation demonstrated little or no progress toward the identified objectives/barriers.

Reviewer 3:
This reviewer observed that prototype vehicles were built and that the battery module design and testing appeared to be on schedule. However, the project objective was to develop a production-intended vehicle; yet the more than 50 vehicles built were for internal GM usage only, and no transfer to a vehicle intended for production appeared to be occurring. The development of the battery thermal management system (TMS) was a useful endeavor; however, it was relatively modest in light of the project objective, scope, and budget.

Reviewer 4:
The reviewer could not tell this based on the presentation and the presenter.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer observed that good collaboration was made and use of the diverse expertise. More information would have certainly been helpful for better understanding the nature of relationships and contributions. Also as the reviewer mentioned that it was hard for the presenter to really represent a project of this magnitude in 20 minutes.

Reviewer 2:
This reviewer stated that an OEM is often understandably reluctant to collaborate with partners on design and development. However, in this case, GM may have benefitted with more project partners. It was not made clear in the presentation what the role of the University of Michigan was in the project. The FEV, Inc. collaboration appeared to be useful and providing results.

Reviewer 3:
This reviewer observed that the collaboration included work with a supplier (FEV, Inc.) on development of the battery module TMS. A cooperative agreement between the University of Michigan and GM was also identified, but there was no specific University of Michigan coordination detailed with respect to this project.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the project was near completion and focused on finalization of successful project. The reviewer added that an extension seemed reasonable.

Reviewer 2:
This reviewer indicated that based on the presentation, nothing left them thinking of future research questions.

Reviewer 3:
This reviewer said that the slides only listed dates for reviews in the Future Work section. The reviewer observed that the oral comments indicated that the vehicle would not be going forward to production, but that the learning would be applied to other vehicle projects.

Reviewer 4:
The reviewer observed that the Future Work Slide contained nothing about the vehicle design resulting from this project being carried over to other programs. The battery module work appeared to be transferrable, and that was a positive outcome.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said most definitely. This project is addressing improvements in enabling this important technological path for potentially significant improvements in vehicle FE.

Reviewer 2:
The reviewer noted that the project, as designed, definitely helps reduce petroleum consumption. The reviewer added that even the modified project of only battery module development advances DOE objectives as long as the module design is used or at least informs other vehicle programs at GM.

Reviewer 3:
The reviewer said that PHEVs had significant fuel displacement potential relative to conventional vehicles.

Reviewer 4:
This reviewer stated that developing products was essential for technology integration.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

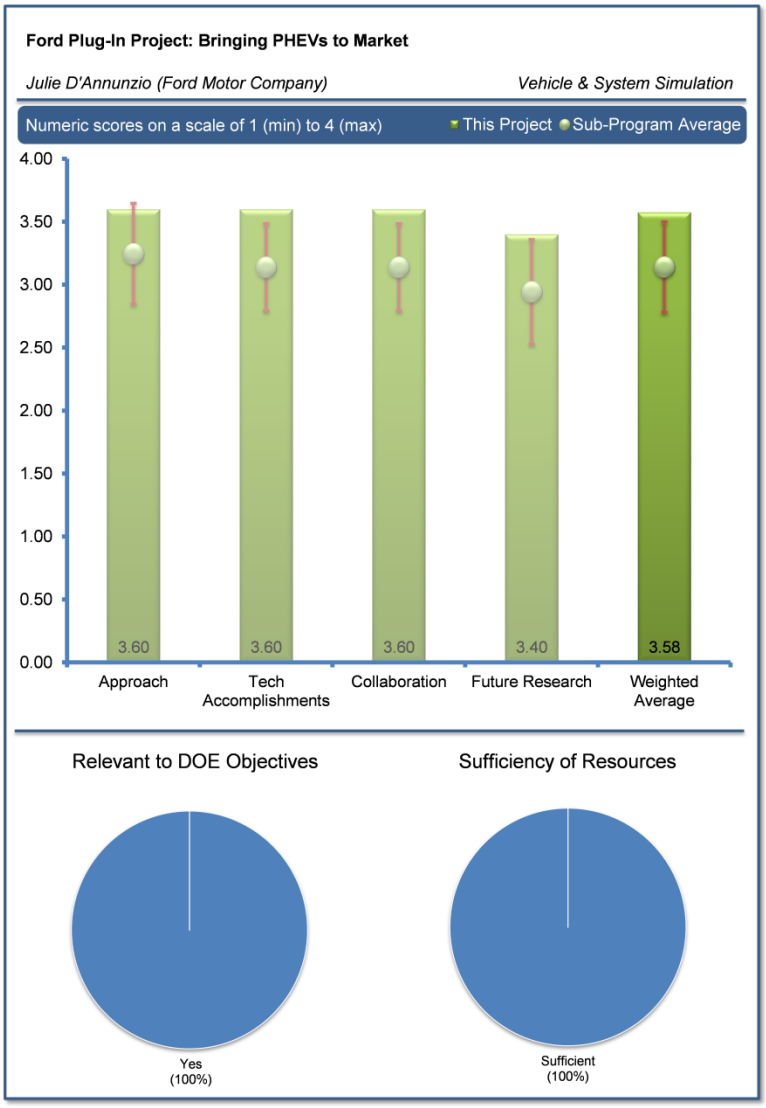
Reviewer 1:
The reviewer stated that the internal GM investment in the project has been considerable.

Reviewer 2:
Based on the presentation, the reviewer did not see the separation from a vehicle program at GM, which would have went on anyway.

Reviewer 3:
This reviewer said it was very hard to evaluate what was sufficient or insufficient from the information available.

Reviewer 4:
This reviewer explained that with the project outcome being only the battery module, the project resources appeared to be excessive. The vast majority of the funding came from GM, but the $9.5 million that came from DOE and Michigan Economic Development Corporation (MEDC) was probably not put to best use.

Ford Plug-In Project: Bringing PHEVs to Market: Julie D'Annunzio (Ford Motor Company) - vss019



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer commented that the project was well-explained and that there was a well-developed program, and a very good near-end summary.

Reviewer 2:

This reviewer observed a well-balanced and well-presented project. The reviewer noted a good balance between technical and programmatic objectives relating to increasing the application (sales) of the PHEV.

Reviewer 3:

The reviewer stated that the approach was very well-defined and focused successfully on completing the defined objectives of the work. The reviewer appreciated how well the author laid out the approach/status table and said it was very helpful.

Reviewer 4:

The reviewer said that the approach was well organized, and that the five phases presented a measured methodology for achieving the project objectives. As a reviewer from last year mentioned, the reviewer said that an increase in the diversity of vehicle users would improve the quality of the data. Specifically, the driving mode breakdown includes a higher percentage of charge sustaining (CS) driving than is seen in other data from personal vehicles, and thus the project data are slightly less valuable.

Reviewer 5:

This reviewer said that Slide 6 mentioned that the majority of the demonstration vehicles did not leverage electric air conditioning (A/C). It was not clear how the heating system worked from the slides. The FE versus the temperature graph on Slide 6 seemed to indicate that the use of the heating ventilating and air conditioning (HVAC) system resulted in a severe reduction in FE. This area may be an opportunity for improvement. The reviewer asked if the impact of HVAC strategies had been evaluated. The reviewer said that it was not clear how the Cloud Connectivity Architecture was related to the DOE objectives for this effort. The discussion indicated that the cloud computing was less expensive than adding the needed CPU power to the vehicle and the reviewer asked if this been substantiated. The reviewer also asked if customers were showing interest in the Location Based Energy Management feature, or if customers would use a manual charge depleting (CD)/CS switch (depletion/sustaining). The reviewer concluded that requiring the customer to input geo-fenced areas into his/her vehicle seemed overly complicated for the average consumer.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
The reviewer said that the technical accomplishments to date were impressive and well organized; a well-managed project.

Reviewer 2:
This reviewer stated that the project described technical accomplishments well; resulting in a Ford C-Max product.

Reviewer 3:
The reviewer observed a detailed and well-organized discussion of seven major accomplishments. The reviewer continued that there was a nice summary of results of different accomplishments and value to the program. The reviewer added a few comments: the results of demonstration fleet were very valuable for understanding/interpreting results. Information on how the vehicles were driven was expected to be useful for improved optimization of future systems; the Cloud connectivity progress was very impressive. Ford appears (within this reviewer's acknowledged range of knowledge) to be leading in this area, at least from a more open data perspective; Open XC is very exciting with an almost unlimited potential of third-party designers to develop optimization applications and ultimately better educate the customer on drive style opportunities to potentially achieve dramatic improvements in FE; path forecasting and trip profiling are potentially very powerful for improved FE and to perhaps help calm those with range anxiety; and that the Cell level modeling through the cloud was an interesting approach.

Reviewer 4:
This reviewer said that all milestones and reporting requirements appeared to have been met.

Reviewer 5:
This reviewer observed that 21 demonstration vehicles were fielded under this effort and that data were accumulated from 800,000 miles of usage. The Ford C-Max and Fusion PHEVs in production today leveraged technologies developed under this program. Summary reports from the demonstration have been made available to the public.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that there was good cross-functional collaboration in this project, and emphasized the nice work of Ford and DOE.

Reviewer 2:
The reviewer commented that there was nice outreach; and that partnering seemed okay. The reviewer wondered if there would be other opportunities for more collaboration and commented that the summary slide listed many partners but the collaboration slide only showed a few.

Reviewer 3:
The reviewer observed that the collaborations with EPRI and INL appeared to be well coordinated and the reports on the INL website provided useful insight into the project results.

Reviewer 4:
This reviewer said that numerous project partners have involvement in this project. Lawrence Technological University has a chassis dynamometer laboratory built to evaluate the Ford Escape Hybrid. The reviewer asked if Ford was also leveraging this laboratory.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer indicated that the planned work looked appropriate with the last element of migrating PHEV to production. The reviewer added that this was a pretty lofty goal but that it was good to see that in the DOE program objectives. Again, the reviewer emphasized that this was very good work.

Reviewer 2:
This reviewer stated that it was excellent that these technologies would translate from mule to production type technologies.

Reviewer 3:
This reviewer opined that there was a nice finalization with two product support Fusion and C-Max.

Reviewer 4:
This reviewer observed that further evaluation of two production C-MAX Energi PHEVs was underway by DOE. Results from this effort have been shared publically.

Reviewer 5:
This reviewer indicated that the future work plans were not very extensive and appeared to basically consist of continuing to collect data. The reviewer commented that the Future Work slide showed that the Escape PHEV development will inform the 2013 Fusion Energi and C-MAX Energi models for year-end 2013, but that these vehicles had already been introduced to the market, so it was unclear what was meant. It was also unclear where the two production C-MAX Energi PHEVs would be tested, and in what manner, by the DOE, and what INL would do with the resultant data.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that the PHEV vehicles developed under this effort have demonstrated significant reductions in fuel consumption when compared to their conventional counterparts. Ford has a successful fleet of hybrid electric offerings, and this program has helped further develop some of the key building blocks.

Reviewer 2:
This reviewer exclaimed absolutely, 100%.

Reviewer 3:
The reviewer stated that PHEV development definitely promoted the DOE goal of petroleum displacement.

Reviewer 4:
This reviewer said that yes, DOE funding has helped launch this work and will ultimately enable high-FE vehicles to the market.

Reviewer 5:
The reviewer said that products to support technology growth were needed.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer indicated that the funding for this project was relatively modest and that the successful outcomes meant that the amount of funding was appropriate and that Ford appeared to have used DOE funds wisely.

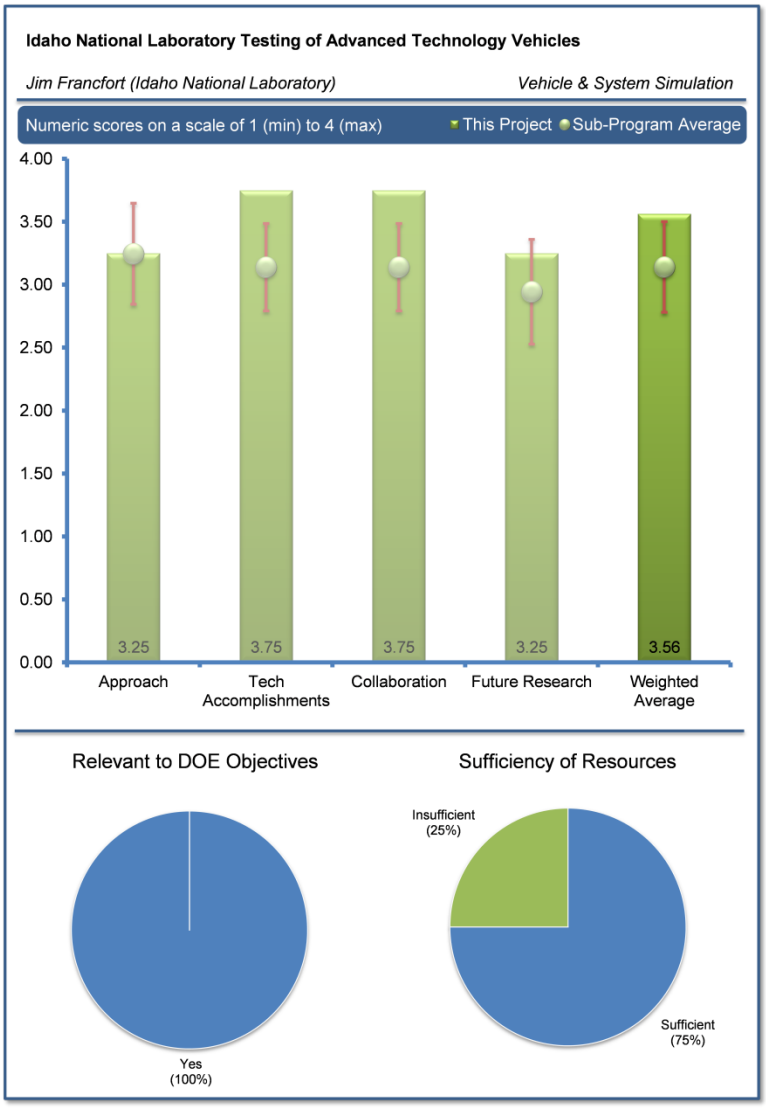
Reviewer 2:

The reviewer said that the project was on track. A lack of resources was not apparent from the presented material.

Reviewer 3:

This reviewer said that the project appeared to have the appropriate balance of resources from both the government and industry.

Idaho National Laboratory Testing of Advanced Technology Vehicles: Jim Francfort (Idaho National Laboratory) - vss021



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer indicated that this was a well-designed test. The reviewer explained that it was a difficult job to do and very important work that has to be done. The reviewer continued to say that high temperature work was important to understand. The reviewer observed a large number of participants in the test. The research plan was excellent and the reviewer noted a talented PI.

Reviewer 2:

This reviewer stated that this work appeared to be comprehensive and very useful. The primary additional information the reviewer was looking for were the lessons learned for how to improve vehicle performance and advance the technology. It seemed INL was heading in that direction but had not completed that work yet. Also, the reviewer observed that the presenter noted a lack of confidence in understanding the lifecycle performance of EV batteries under normal driving conditions. The reviewer suggested that if this was true, that the INL study ought to identify specific areas of concern and suggest specific pathways to resolve the concerns.

Reviewer 3:

This reviewer pointed out that there was good data collection activity. However, the reviewer noted that limited sample sizes could limit the strength of some conclusions.

Reviewer 4:

This reviewer noted that the project efforts to address cost barriers were not well delineated or assessed. However, the reviewer observed that the project appeared to be well-organized to gather the large amount of advanced technology vehicles available in the market.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer observed that the project was important work to understand. The reviewer added there were great partnerships in the research plan; over 11,000 vehicles and therefore, a large sample size. DOE needs to collect and evaluate the data so that impacts of

smart grid. The reviewer concluded this was very important data on charging times and can change people's behavior with regard to charging.

Reviewer 2:
The reviewer commented that the overall information was useful.

Reviewer 3:
This reviewer said that the technical accomplishments of gathering mileage and monthly status reporting was evident; however, it was not clear how these accomplishments related to the three barriers of cost, infrastructure and constant advances in technology. The reviewer stated that it seemed the sample size needed some rationalization.

Reviewer 4:
This reviewer pointed out that there was no more comprehensive dataset for this type of information.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer observed that the collaboration across DOE laboratories and partnership development was quite extensive and noteworthy.

Reviewer 2:
This reviewer commented that the project leveraged other labs and facilities very well.

Reviewer 3:
This reviewer observed that the project was collaborating with electrical utilities - 46 utilities and working with small businesses and car manufacturers.

Reviewer 4:
The reviewer indicated that there has been solid progress on collaborating with other federal agencies since the last AMR, which was appreciated. The reviewer suggested that the next step ought to be including relevant EV performance data in a useable format for GSA's AutoChoice system. AutoChoice is the Web tool that federal agencies use to purchase/lease vehicles from GSA. The reviewer commented that having data readily available on that system would be a great service for federal fleet managers to better align available EVs with their requirements.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that understanding federal fleets was important and well planned. The reviewer observed that the group used 50% cost sharing.

Reviewer 2:
This reviewer said that the presenter noted that part of the future work would be identifying lessons learned from the broad dataset. That information is essential for moving these technologies forward and accelerating adoption of these vehicles.

Reviewer 3:
This reviewer observed that there were no significant barriers to address.

Reviewer 4:
This reviewer indicated that a more targeted effort in bringing this voluminous data stream down to a digestible level across this vehicle class is warranted. The reviewer added that stating that continuation of objectives reinforces no change other than collecting more extensive data.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that electric vehicles were here to stay and added that more data was needed regarding wireless charging in the future. The reviewer observed that fire testing was excellent and noted that the group was thinking ahead. The reviewer cautioned that how to handle fires in batteries must be understood.

Reviewer 2:
This reviewer said that the data produced by this project were key for understanding EV performance in a variety of environments. Nobody else was collecting this broad a dataset – at least not for use by the public.

Reviewer 3:
This reviewer said that it appeared the project has relevance in providing specific electric drive vehicle performance and petroleum displacement. However, the reviewer suggested that the data should be summarized in a fashion to show how these classes of vehicles were meeting or not meeting expectations of DOE, OEMs and consumers.

Reviewer 4:
This reviewer said that yes the research was useful in looking at the useful life of technologies.

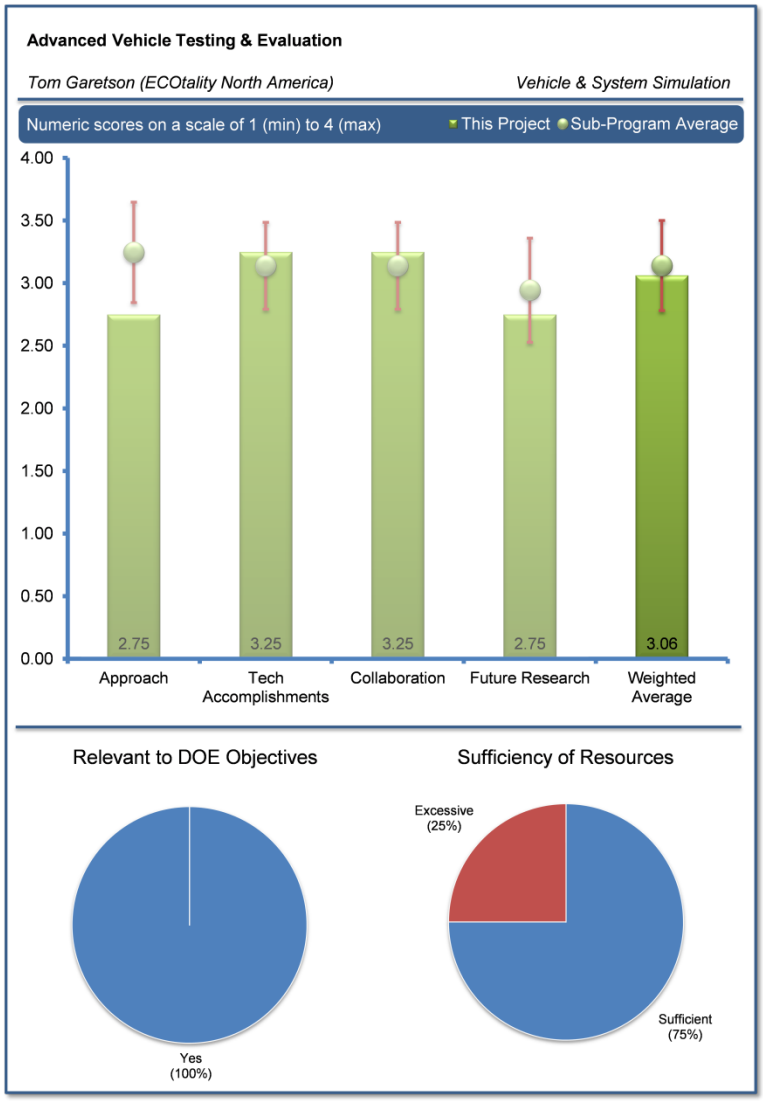
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer said that the project exceeded the milestones and noted an excellent presentation. This is important data if there is going to be a smart grid. The reviewer identified a need to better understand the batteries in cars and added that the EV market was getting larger and is here to stay. The reviewer concluded that impacts must be understood.

Reviewer 2:
This reviewer said that sufficient resources were applied in meeting stated objectives.

Reviewer 3:
The reviewer said that the presenter did not suggest any additional need for funds related to this project.

Advanced Vehicle Testing & Evaluation: Tom Garetson (ECOtality North America) - vss029



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer indicated that the reports being generated by this program [posted on the Advanced Vehicle Testing Activity (AVTA) website] were very informative and that the presentations were very factual. However, it was hard to discern what the real benefits of these advanced technology vehicles were. If the reviewer were a consumer looking to buy one such vehicle, the reviewer would have liked to know what the manufacturer claimed regarding the product, and what was actually being seen. Some of the Level 1 and Level 2 testing efforts at ANL could perhaps help address this issue. The reviewer continued to say that it was also quite possible that the various channels of (raw) data collected may be very useful to OEMs and other organizations. The reviewer could see that this would be a logistical nightmare and would require significant resources, but perhaps some thought should be given as to how more detailed data sets could be made available to the public in the future.

Reviewer 2:

The reviewer said that the discussion questions identified logical extensions and next steps involving developing degradation factors and being used to not just develop simulation inputs but rather compare simulation outputs to real world behavior. The reviewer added that incorporating these next steps would improve the usefulness of the data even further. Additionally, the reviewer suggested that the work needed to include benchmarking of conventional and used vehicles for comparison/analysis to current fleet parameters.

Reviewer 3:

This reviewer commented that very needed data from real world situations should be attained with some direct regard to more variable control that fleets could easily provide. The reviewer did not understand the big picture in terms of numbers and data points.

Reviewer 4:

This reviewer asserted that a fixed route and on-road should not be viewed as a substitution to lab comparisons.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer observed good progress and several reports. The reviewer directed the reader to please see other comments regarding other potential uses for the raw data that were collected from the fleets.

Reviewer 2:
The reviewer said that the information generated was useful. The reviewer could not find Road Load information in the fact sheets or online.

Reviewer 3:
This reviewer thought that perhaps this was limited due to the early stage of the program.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that the project was leveraging laboratories and other DOE partners well.

Reviewer 2:
This reviewer said there was good cooperation with both ANL and INL but suggested perhaps more cooperation with OEMs to understand better what else the vehicles should be tested for.

Reviewer 3:
This reviewer noted the collaboration and coordination between INL and ANL; recording and dynamometer.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer asked since the DOE goal was petroleum displacement, if there should be some focus on the highest volume vehicles that were sold in the United States that incorporated advanced technologies, but not necessarily hybrids or plug in hybrids. It would seem that verifying whether some of these technologies [such as adjustable grille shutters, active warm up, improvements to internal combustion (IC) engines, etc.] actually delivered the promised benefits would also help the DOE's stated goal, and also have the added benefit of providing the U.S. Environmental Protection Agency (EPA) input on their rulemaking.

Reviewer 2:
This reviewer could not understand the specific controls of the study with the 150 vehicles left to test along the way.

Reviewer 3:
This reviewer said that there were no barriers to overcome.

Reviewer 4:
The reviewer stated that the linkage between future work based on the results of existing project scope was not clear. Medium/ heavy duty vehicle data is sorely needed and should be increased as a priority. The reviewer added that current vehicle park data is needed as a point of reference for any analysis of this data to be very useful.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that most other DOE funded projects focused on specific drive cycles. This project involved real world driving, and could inform the average consumer, DOE and other government organizations, and OEMs, the real world benefits of these advanced technology vehicles.

Reviewer 2:
This reviewer stated that providing data into the public domain on advanced technologies was very supportive of DOE goals.

Reviewer 3:
This reviewer was optimistic that something was learned that the OEMs did not already know.

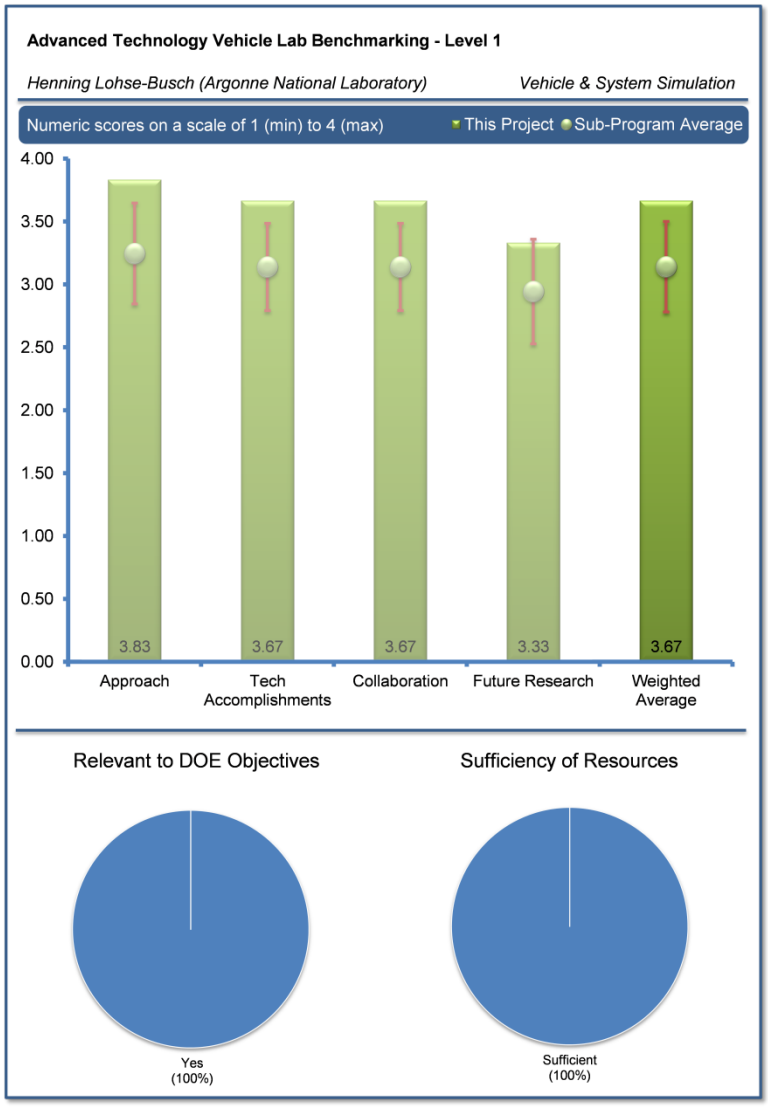
Reviewer 4:
This reviewer stated that this project generated understanding for life cycle effectiveness of some technologies.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer said that the vehicle throughput and quantity looked to be enough. The reviewer added that the project could cut to two vehicles from four per program on some, if the fleet needed to be more diverse.

Reviewer 2:
This reviewer said sorry that this was the only program the reviewer rated this way, but the reviewer did not see $26 million of work here. The reviewer indicated knowing that the DOE guys were very diligent with fund management, but the reviewer could not see this through the presentation.

Advanced Technology Vehicle Lab Benchmarking - Level 1: Henning Lohse-Busch (Argonne National Laboratory) - vss030



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer said that the task was sharply focused on benchmarking advanced technology vehicles of specific current interest due to unique technical characteristics. This benchmarking helps establish the state-of-the-art automotive technology baseline for powertrain systems and components from an unbiased, neutral perspective. The reviewer added that well-honed testing and evaluative procedures have been developed over the years. This is a well-defined, effective, and efficient task which has evolved into a very mature effort. Given this, it is not likely to require any revolutionary changes, but the project should continue to look for evolutionary improvements wherever possible in such areas as continued cost reduction for testing, and incremental advances/synergies in test procedure development and data dissemination.

Reviewer 2:

This reviewer believed that the move to baseline the conventional technology was good.

Reviewer 3:

This reviewer indicated that the quality of testing provided an industry benchmark.

Reviewer 4:

This reviewer stated that it was difficult to critique greater detail in this method. The reviewer viewed this as greatly sufficient, in depth and breadth of scope.

Reviewer 5:

This reviewer said that the previous year's comments appeared to have pointed out that more real world cycles should be included. A related comment that the reviewer made was regarding the use of certain extreme cycles. The reviewer said that OEMs use certain extreme cycles for sizing their heat exchangers and other components, and the size of these components have a significant impact on overall drivetrain efficiency. It would be worth investigating some of these extreme cycles to understand the rationale behind component sizing. It would also provide valuable information to buyers in deciding what are their trade-offs when they buy these advanced technology vehicles.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer stated that Level 1 testing, by its very nature, was somewhat limited in scope; the reviewer has had a chance to look at some of the data that is being generated, and believed that the Argonne team was doing an excellent job.

Reviewer 2:
This reviewer stated that the controller area network (CAN) measurements for Level 1 were excellent.

Reviewer 3:
This reviewer observed that FY 2013 saw a considerable bump up in funding to $1.3 million from $600,000 in FY 2012. Ten different test vehicles are being evaluated in FY 2013, as well as four additional studies on conventional vehicle efficiency, ambient temperature effects, vehicle mass, and battery resistance. Overall, the reviewer noted that a significant level of productivity had been achieved including completion of most of the studies. The results from the studies in FY 2013 so far did not show any really surprising results and appear to confirm what would largely be expected intuitively.

Reviewer 4:
This reviewer said that the test method development has kept base with technology advances. The reviewer added that support for standards development is critical to developing comprehensive standards.

Reviewer 5:
This reviewer stated that mass study is redundant to studies done by private entities and asked why this was redone.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated that this task was well coordinated both internally and externally. Data developed by the advanced technology vehicle lab benchmarking was well coordinated with internal ANL modeling efforts, the SAE codes and standards activities, on-road vehicle testing and evaluation activities with INL, advanced vehicle technology competitions, domestic automakers via U.S. Council for Automotive Research (USCAR), other National Laboratories and DOE. The reviewer observed that coordination also took place with a number of international organizations in Europe and the Far East. The downloadable dynamometer database (D3) serves as a good information dissemination mechanism for all interested parties including non-primary ones. If not already being done, the reviewer suggested that it may be good to poll some of the information users to see if D3 and other informal dissemination mechanisms are continuing to best meet their needs.

Reviewer 2:
This reviewer stated that vehicle partners had been able to provide Level 1 test vehicles in a timely manner. The reviewer added that the D3 was a great assist to the industry.

Reviewer 3:
The reviewer said that sharing of properties between the labs was the correct approach and good for collaboration.

Reviewer 4:
The reviewer stated that there appears to have been an increased effort to work with the domestic OEMs over the last year, and that this was indeed very welcome. Cooperation with the other National Laboratories also appeared to be very strong. The reviewer has had a chance to interact with more than one National Laboratory, and indicated that it does indeed appear that there was significant conversation going on between the various laboratories regarding these testing efforts.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that increasing focus on thermal testing is a positive, since it is a benefit that can be achieved even in vehicles with conventional powertrains, and potentially have a significant impact on corporate average fuel economy (CAFE).

Reviewer 2:
The reviewer opined that the proposed future work was logical given the especially negative impacts of climate control on full battery electric vehicles. Additionally, the capability of being able to handle fuel cell vehicles was a plus as well as benchmarking of natural gas vehicles, which were likely to see more attention given the current and projected cost advantages of natural gas. The reviewer added that it may be advantageous to give some thought to other potential future testing activities which may not have been considered before.

Reviewer 3:
This reviewer stated that testing of Advanced Vehicle Testing and Evaluation (AVTE) vehicles will provide a broad base of data across several vehicle technologies.

Reviewer 4:
This reviewer said to continue to review the new technologies.

Reviewer 5:
This reviewer stated that many issues associated with drive-ability and reliability of technologies are what slow the adoption of advanced technologies. The future scope of work should incorporate drive-ability and reliability assessments to go with the efficiency potential in real world usage.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that the project measures advances in FE and supports the standards for FE rating.

Reviewer 2:
The reviewer commented that this project directly supported DOE objectives of petroleum displacement through benchmarking of advanced technology vehicles, continual advancement of the baseline, and broad dissemination of information for maximum benefit. The overall effect is to help accelerate the progression of advanced petroleum and emission savings technologies into the nation's vehicular fleet.

Reviewer 3:
This reviewer said yes because the project focused on energy efficiency. The reviewer added that the project could be further improved by incorporating elements preventing technology adoption such as cost, reliability, and drive-ability.

Reviewer 4:
The reviewer said that the project provides extensive data to the consumers and other interested parties on a large range of advanced vehicles. The reviewer added that it verifies the claimed fuel consumption numbers by the manufacturers. The hope is that all of these (good) data will encourage more consumers to buy these advanced technology vehicles, and that it will encourage the various OEMs to continue to improve their lineup of advanced technology vehicles.

Reviewer 5:
The reviewer said that it was good to develop the understanding of fuel reduction technologies to learn to apply them appropriately, and to not double count technologies that address the same loss.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

This reviewer indicated that the Advanced Powertrain Research Facility is a key resource that appears to be fully adequate to provide industry benchmark data.

Reviewer 2:

This reviewer stated that since this was Level 1 testing, and it does not involve the purchase of the vehicles and extensive intrusive instrumentation, that the funding appeared to be adequate for the number of vehicles being tested.

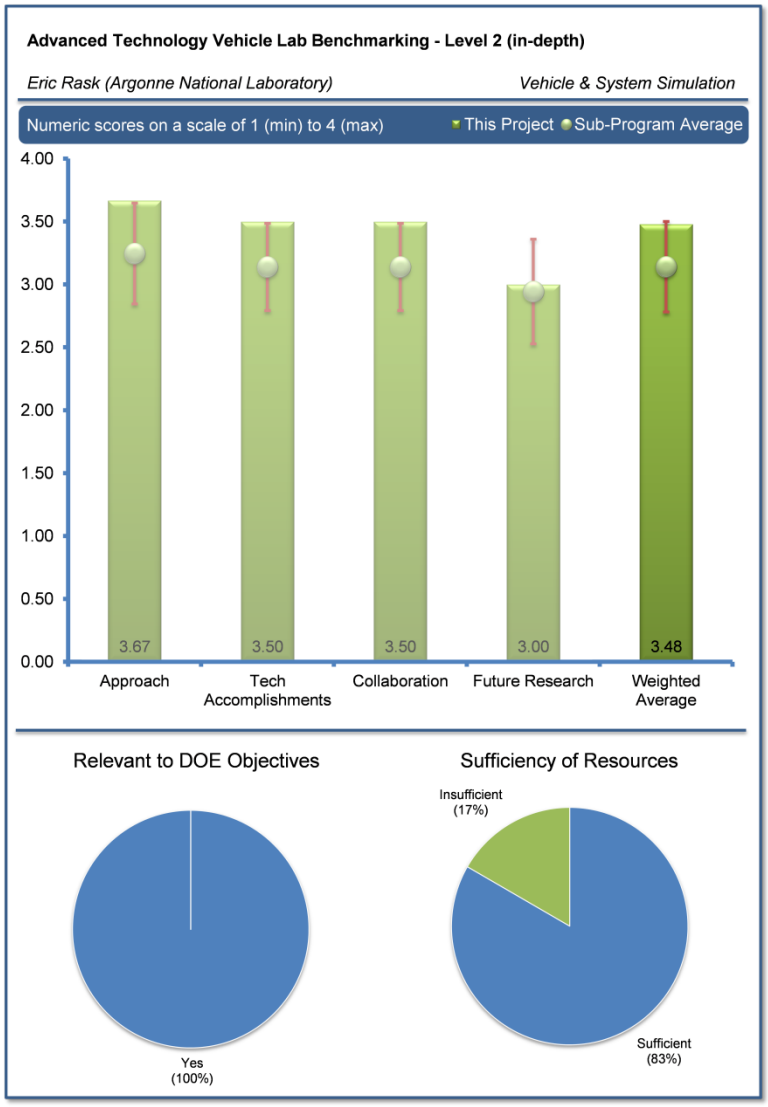
Reviewer 3:

This reviewer stated that the resources for this task were adequate. Specific activities for Level 1 testing and special studies have been costed out over the years. Nonetheless, as previously mentioned, it is important to continually emphasize incremental improvements in project technical and cost efficiencies.

Reviewer 4:

The reviewer commented that the throughput seemed sufficient for the type of information provided by the activity.

Advanced Technology Vehicle Lab Benchmarking - Level 2 (in-depth): Eric Rask (Argonne National Laboratory) - vss031



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that there was excellent dataset generation. As the number of vehicles that can be exhaustively tested is limited by time and resources, a more rigorous (collaborative and documented) approach to vehicle selection could make results useful to a wider audience.

Reviewer 2:

This reviewer commented that this appeared to be a thorough evaluation process that would be able to generate high quality comparable data.

Reviewer 3:

This reviewer said that the task was sharply focused on deep dive benchmarking of advanced technology vehicles of specific current interest due to unique technical characteristics. This benchmarking helped establish the state-of-the-art automotive technology baseline for powertrain systems and components from an unbiased, neutral perspective. The reviewer stated that well-honed testing and evaluative procedures have been developed over the years. This is a well-defined task which has evolved over the years into a mature effort. Given this, it is not likely to require any revolutionary changes, but should continue to look for evolutionary improvements wherever possible in such areas as continued cost reduction of testing (be it through streamlined testing processes or labor cost reductions), and incremental advances/synergies in test procedure development and data dissemination. The reviewer added that the Peugeot 3008 Hybrid4 was a good choice as a result of its unique diesel-hybrid configuration, four different user operating modes, and emphasis upon content reduction and associated cost savings. Diesel hybrid configurations have not been well studied nor understood to this point. The reviewer did have a question of interest though, and asked why the provided road loads and ANL estimated rolling and aerodynamic loss calculations were used as opposed to actual results from cost down testing through field testing with INL.

Reviewer 4:

This reviewer said it looked like the team had done great work in learning how to collect the signals needed to Level 2 benchmarking. The reviewer added that obtaining the correct signals accurately seemed to be the main barrier for this activity.

Reviewer 5:

This reviewer believed that overall, the Level 2 benchmarking generated very useful data for both modeling (Autonomie) and as inputs to other DOE funded projects in other National Laboratories. However, the reviewer said that since the primary purpose of these projects was petroleum displacement, and a significant number of vehicles that are sold in the domestic market are SUVs and

trucks, the reviewer wondered whether some of these should undergo Level 2 testing as well. Granted that they do not offer many of the advanced technology features that passenger cars are equipped with, but many of the newer trucks and SUVs do have advanced engines, transmissions, and other fuel saving features such as adjustable grille shutters, active warm-up and so on. The OEMs get credit for incorporating these features in the vehicles, and one would think that is it well worth funding projects where ANL looks at these vehicles and evaluates the true benefits of some of these features. Besides providing valuable input to EPA, it would also allow the consumer to evaluate these different technologies, and their true benefit. In the longer term, to truly achieve petroleum displacement, these technologies have to offer the consumer tangible benefits (significantly) in excess of the premium that would have to be paid for these features.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer stated that excellent progress had been made, from the standpoint of available resources (manpower and testing facilities).

Reviewer 2:
This reviewer said that there was an excellent level of information.

Reviewer 3:
The reviewer indicated that benchmarking to date was a significant resource.

Reviewer 4:
The reviewer stated that the task this year has demonstrated several technical accomplishments including normal mode versus U.S. cycle testing, understanding of basic vehicle operation, and evaluation of user selectable modes. It was ascertained that despite the vehicle's unique configuration, its operation was pretty typical. Of particular interest was the study of regenerative braking across several vehicles, which was not well-studied or understood. Additionally, it was also noted that emissions could be a significant barrier (especially in stop/start conditions) for diesel- hybrid vehicles. The reviewer commented that the presentation did not provide an indication of the overall spending to this point nor project completion to date for the year. The reviewer had a question of interest and said that it was understood that the vehicle had four operating modes, but asked if it was necessary to test the vehicle over so many drive cycles and if so why. The reviewer continued to ask if an assessment or approach of some kind had ever been considered to determine statistically really how many (and what type) of drive cycles were needed to adequately characterize a vehicle.

Reviewer 5:
The reviewer reiterated that this appeared to be a thorough evaluation process that would be able to generate high quality comparable data.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated that there appeared to be very good cooperation between the various National Laboratories. More recently, the reviewer believed that there had been a stronger effort to involve all the domestic OEMs, and that was definitely a welcome step. The reviewer wondered if there was any scope for increasing this cooperation even further, for instance by sharing some of the components with some of the USCAR benchmarking teams after the Level 2 testing has been completed. The USCAR benchmarking teams may be interested in evaluating the component efficiencies of some of these components, and may perhaps be willing to share some of the information in return.

Reviewer 2:
The reviewer observed that the interactions and sharing of information within the ANL's sub teams was good, as well as leveraging INL and ORNL for other data collection.

Reviewer 3:
The reviewer said that this task appeared fairly well coordinated both internally and externally. Deep dive data developed by the advanced technology vehicle lab benchmarking Level 2 testing appeared to be coordinated with internal ANL modeling efforts, SAE's codes and standards activities, on-road vehicle testing and evaluation activities with INL, domestic automakers via USCAR, other National Laboratories, and DOE. The reviewer added that if it was not already being done, that it may be good to periodically poll the information end-users to see if the data provided and dissemination mechanisms were continuing to best meet their needs.

Reviewer 4:
This reviewer stated that the support for other ANL activities appeared excellent. However, the reviewer said that the use of data by OEMs was not apparent from the presentation.

Reviewer 5:
The reviewer said that the project had engaged many if not all the major collaborators.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer observed that in FY 2014, the thrust of Level 2 benchmarking was the Ford Focus battery electric vehicle (BEV). The reviewer added that it seemed like a good selection although not much was provided supporting this choice and what exactly was to be looked for. It would be beneficial to provide more supporting information.

Reviewer 2:
This reviewer stated that it was hard to determine, as analysis of data was not included in the report. The reviewer added that future work should certainly include analysis of implications.

Reviewer 3:
This reviewer said that the proposed future research included Level 2 testing of the Peugeot 3008 Hybrid. While this had several of the characteristics that ANL looked for in a potential candidate for Level 2 testing, the reviewer feared that this configuration was overkill. There is a premium for diesel, and a premium for the hybrid, and this may limit its real potential for petroleum displacement. The reviewer noted that purely from an advanced technology point of view, perhaps it was acceptable. The reviewer said that a comment similar to the one made for Level 1 testing applied as well. The focus of the testing (specifically the drive cycles), appears to be geared towards FE. However, more severe drive cycles that are used to size components (heat exchangers, viscosity of axle lubricant, and etc.) have an indirect impact on the fuel consumption by influencing the overall propulsion efficiency. Including some of these cycles in the testing repertoire may be very beneficial in understanding the trade-offs that different OEMs have to go through.

Reviewer 4:
The reviewer stated that testing of a BEV next probably would not generate significant new data on drive train interactions.

Reviewer 5:
This reviewer commented that benchmarking an electric vehicle for the next year seemed like a step back from the more elaborate powertrains that had been Level 2 benchmarked in the past.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that this project directly supported DOE objectives of petroleum displacement through benchmarking of advanced technology vehicles, continual advancement of the baseline, and broad dissemination of information for maximum benefit. The overall effect is to help accelerate the progression of advanced petroleum and emission savings technologies into the nation's vehicular fleet.

Reviewer 2:
The reviewer stated that the study of the Peugeot hybrid was very important.

Reviewer 3:
This reviewer said that the project provided data for product maturity.

Reviewer 4:
This reviewer said that understanding the technology's capability to be applied elsewhere was useful to understanding petroleum displacement.

Reviewer 5:
This reviewer said yes.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

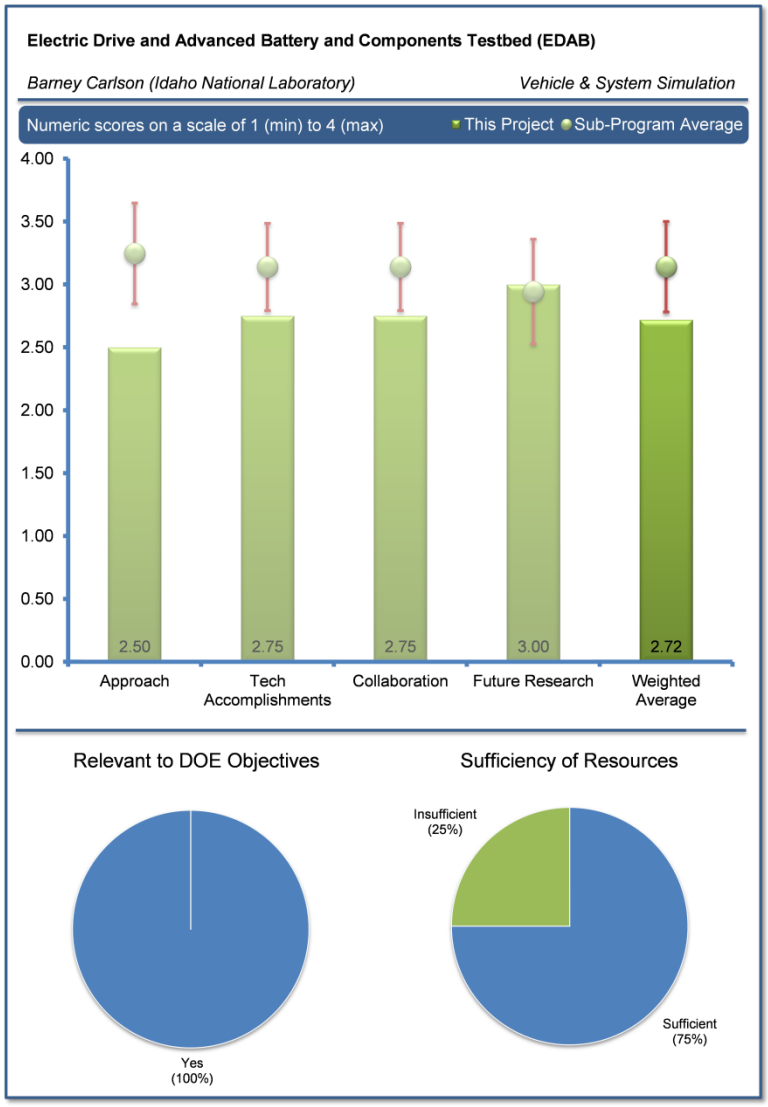
Reviewer 1:
The reviewer stated that this project team should be given a larger share of the AVTE vehicle testing budget, and seriously thinks a greater database would be had.

Reviewer 2:
This reviewer believed for the most part, that the resources are sufficient. The OEMs would always like to see results from these tests sooner rather than later, but whether achieving it is worth a significant increase in resources is debatable.

Reviewer 3:
This reviewer commented that good throughput for the resources allowed.

Reviewer 4:
The resources for this task are adequate. As mentioned above though, it is important to continually emphasize incremental improvements in project technical and cost efficiencies.

Electric Drive and Advanced Battery and Components Testbed (EDAB): Barney Carlson (Idaho National Laboratory) - vss033



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer commented that it appeared that there was a sound protocol for evaluating the battery used in the testbed system from the presentation. However, the unusually rapid degradation of the battery called for laboratory testing of the battery. The reviewer suggested that if the manufacturer will not provide useful data, this group ought to conduct pertinent tests independently. This was especially important, because this was the first battery to be evaluated in the testbed system. The reviewer was concerned that if there was not complete confidence for this first effort that conclusions from future testing would be suspect.

Reviewer 2:

The reviewer commented that there was a very good implementation of the system to match a target vehicle (the Nissan LEAF). The reviewer added that the strategy of evaluation with optimized controls seemed sound. However, the reviewer was just worried that this approach would not give good technology comparisons due to the variability of use in a field setting. The reviewer stated that this was okay as a reference point for where battery technology might be in some absolute sense under the variable field conditions, but pointed out that when more than one technology starts running, people will want to compare the results and it seemed like that would be hard. For example, the project might need to repeat a given technology evaluation at a different time of year.

Reviewer 3:

This reviewer stated that this project had made fantastic strides to get this project functioning the way that it did. The barrier to get the vehicle to drive must have been difficult to overcome. However, the reviewer was just not convinced that the barriers needed to be overcome and that a similar level of information could be achieved on the bench.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer said that the system is in place and working, and that the development progress seemed good.

Reviewer 2:
The reviewer indicated that this was interesting work. Since the Electric Energy Storage Tech team appeared to endorse this work to help prove out the DOE battery technology projects then these were good technical accomplishments. The reviewer added that progress was excellent in that a lot of data on the battery had been collected.

Reviewer 3:
The reviewer observed that from last year to this year, there had been substantive progress. The reviewer's primary concern was with the validation of results.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer noted that it seemed like good coordination with the listed partners like ORNL and AVL North America to get the system going. There is a note in the collaboration section that results would be provided to others for modeling and energy storage system (ESS) development, but the reviewer did not see any of those partners listed. The reviewer asked if there was a clear path to delivery and if there were specific recipients for modeling especially.

Reviewer 2:
The reviewer said that having the Electric Energy Storage Tech Team select the battery and vehicle type for this activity was the correct approach.

Reviewer 3:
This reviewer said that there did not appear to be any particularly strong effort for collaboration, but that this study did not necessarily require such effort at this point.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the PHEV selection for the next battery to be reviewed seemed to be the correct choice.

Reviewer 2:
The reviewer stated that the future battery testing would be helpful, but noted that again it would be very useful to have a validation of the initial results through some form of laboratory evaluation.

Reviewer 3:
This reviewer said that the project was in the testing phase now so the future research was just about selecting next pack to test. The reviewer did not get a feel for the process used to select the next pack to test.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that this was a very worthwhile effort to conduct field evaluations of new battery technologies.

Reviewer 2:
This reviewer said that the effort contributed to the evaluation of battery projects that were also funded by DOE.

Reviewer 3:
The reviewer stated that it would be a small piece of a large puzzle in how new technology battery packs perform in the real world, but again the reviewer worried how comparative single tests with real world variability would be.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

The reviewer thought that while the presenter did specifically note areas where additional funds would be necessary, that the project could use some additional funding to support validation of the initial testing results.

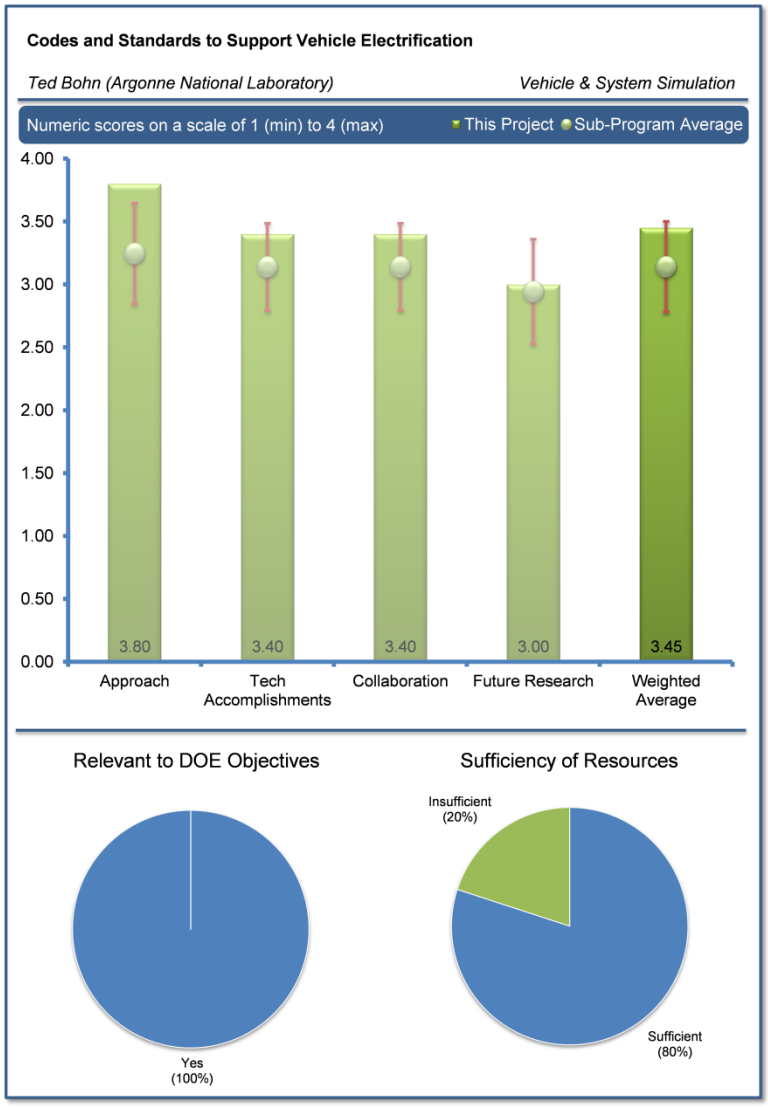
Reviewer 2:

This reviewer said that there was excellent data throughput for the resources allowed.

Reviewer 3:

The reviewer saw resources dropping from FY 2012 to FY 2013, which seemed reasonable with the change from system development to just testing packs.

Codes and Standards to Support Vehicle Electrification: Ted Bohn (Argonne National Laboratory) - vss053



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer said that the approach for standards development was pretty much cut and dried through the SAE and International Organization for Standardization (ISO) type processes. The approach of chairing some of the committees, using direct participation and bench testing to understand the technical problems was outstanding. This approach helped validate some of the situations and gave DOE a firsthand perspective in some of the problems versus taking an ivory tower type approach. Also looking at certain technologies (sub metering and vehicle de-powering) to fill in some of the gaps showed leadership and moves the industry forward.

Reviewer 2:

This reviewer said that considering the timeframe, the approach was adequate and very well executed.

Reviewer 3:

The reviewer stated that the project demonstrated a clear understanding of how this approach (i.e., committee leadership) best met objective for developing standards.

Reviewer 4:

This reviewer said that the standards were critical for wide-scale adoption. The reviewer added that it was a cost-effective use of research dollars. The reviewer concluded that proof of concepts for feeding and validation.

Reviewer 5:

The reviewer said that the approach of developing standards based on what was possible may divert industry efforts into areas that were not relevant to vehicle and infrastructure deployment. The reviewer added that some consideration of what was needed should be included.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer stated that the variety of areas covered was very impressive.

Reviewer 2:
This reviewer said that getting the direct current (DC) combo connector standard adopted and having hardware starting to head toward industry was good. However, as has been well known, having a U.S. standard in this area prior to 2010 could have saved the industry significant issues. It should be recognized that no single organization has total control over this issue. The reviewer added that queuing up the interoperability standards as the next priority is also good.

Reviewer 3:
The reviewer stated that it was good to see the Gantt chart since it implied a managed project.

Reviewer 4:
This reviewer stated that progress was generally slow with standard definition and development, and that those engaged were no exception.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer noted that an excellent industry team was developed to support the wide-ranging technical wok underway.

Reviewer 2:
This reviewer stated that there was clear coordination with all parties. The nature of this activity is to collaborate, and although the PI clearly has an in-depth knowledge of the subject, he demonstrated through the presentation the involvement of others in defining the standards.

Reviewer 3:
The reviewer commented by the nature of the work.

Reviewer 4:
This reviewer said that the overall collaboration on the organization supporting the SAE committees and supporting research was good. If a wider range of utilities could be brought into the picture it would improve the overall effort. The reviewer added that trying to reach consensus across the wide range of competing business interest is difficult and was noted as a barrier in the 2012 presentation. The next major barrier in this area will probably revolve around the National Institute of Standards and Technology (NIST) sub-metering area. It was implied in the oral presentation that DOE was supporting the NIST standards development. The reviewer suggested that an additional chart on that effort would have been beneficial if DOE was supporting that standard development. If not, DOE should consider supporting that effort. NIST did not show up on the collaboration list. If DOE feels that it has enabling technology in this area, it should be working with NIST for adoption of that technology. This was not discussed similar to other standards development that was SAE based.

Reviewer 5:
This reviewer said that more international collaboration was required (the reviewer assumed this was restricted by travel limitations).

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer observed that all of this work is focused on the future standards, and this was clearly shown in the presentation which included standards that would follow the existing work (e.g., 2953 for DC charging)

Reviewer 2:
This reviewer said that the focus on wireless charging is not supported by the current market. The sub-metering focus was well placed for grid integration, but is as much a regulatory issue as it is a technical one. The reviewer pointed out that some regulatory interface may be necessary to guide standards development.

Reviewer 3:
The reviewer opined that the plans to prioritize interoperability type standards and support of NIST sub-metering should be given priority over other elements that were identified such as V2G or wireless power transfer (WPT). The reviewer explained that the standards around the interoperability and sub-metering would be necessary for all concepts going forward and surety in these areas would help support the nascent business models that will be necessary to support industry after EVSE deployment grants are slowly phased out.

Reviewer 4:
This reviewer indicated that dynamic wireless charging needed to be addressed. This requires collaboration with Institute of Electrical and Electronics Engineers (IEEE) Standards Association (SA) electric vehicle wireless power transfer (EVWPT) activities.

Reviewer 5:
This reviewer stated that ongoing work was needed during market and technology growth.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer said that standards development was the backbone to achieving deployment at scale for PEVs with associated EVSE and surety to the consumers that they can access charging. The codes and standards are vital in supporting the overall market deployment of these vehicles which will result in petroleum displacement.

Reviewer 2:
This reviewer reasoned that because the technology being deployed that is subject to the standards being developed were clearly relevant to DOE petroleum reduction objectives, the project itself was relevant.

Reviewer 3:
This reviewer stated that standards were critical for wide-scale adoption.

Reviewer 4:
This reviewer indicated that the interoperability and grid interaction issues were significant to successful vehicle deployment. Combining hardware and software presentations next year would be more effective in conveying relevance.

Reviewer 5:
The reviewer said that the suggested standards contributed to developing an EV infrastructure that provides to the consumer and alternative to gasoline powered vehicles.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer said that it appeared that the resources were approximately at one full time equivalent employee. This appeared adequate to cover the SAE committee activities, but as previously noted, it did not show much evidence of supporting the NIST standards on sub-metering. Given that caveat, if the current funding level is also covering NIST then the resources would have been considered sufficient. If the NIST activity is not being covered then additional resources would be needed to cover that important area, especially if DOE is developing enabling technology in that area.

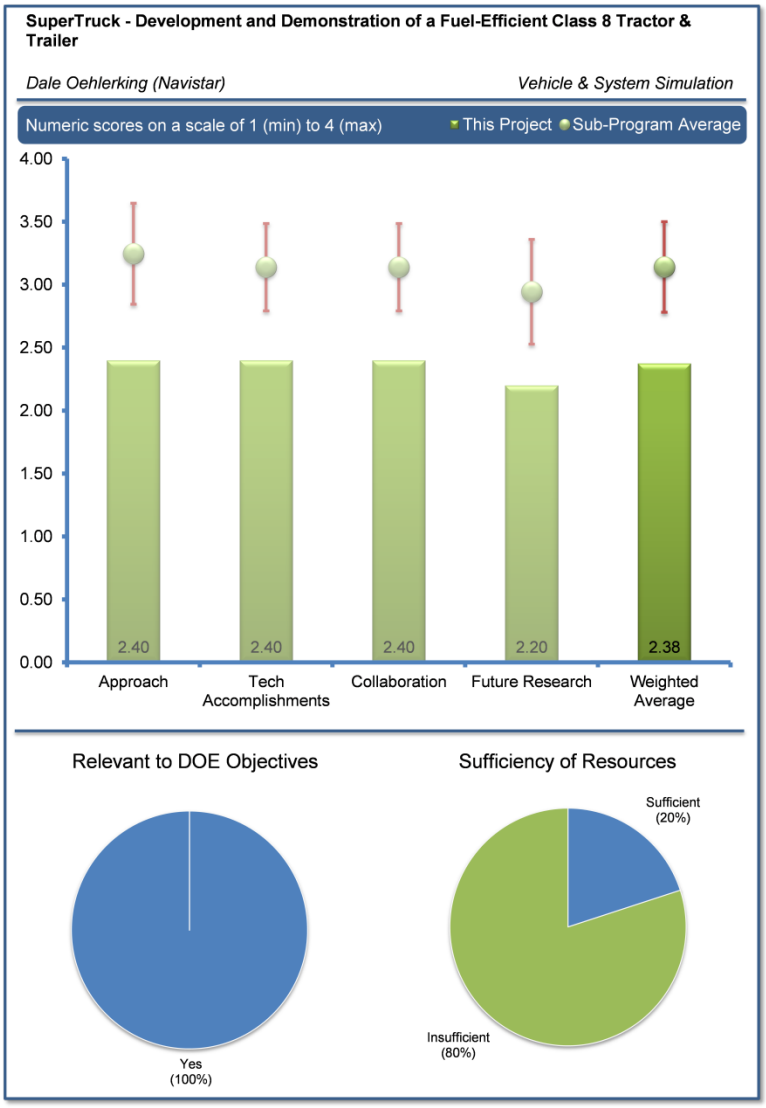
Reviewer 2:

This reviewer commented that the PI and his colleagues at ANL were clearly a sufficient resource for this project.

Reviewer 3:

This reviewer assumed that the resources were primarily driven by salaries and travel.

SuperTruck - Development and Demonstration of a Fuel-Efficient Class 8 Tractor & Trailer: Dale Oehlerking (Navistar) - vss064



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the approach was a good straightforward analytical engineering approach but that there appeared to have been little progress beyond the analytical phase.

Reviewer 2:

This reviewer said that due to issues associated with Navistar dealing with their production engine exhaust gas recirculation EGR system (transferring to urea SCR), the project has been put on hold for one year. The approach and potential are very good; however, the business environment has complicated completion of the project.

Reviewer 3:

Overall, the reviewer commented that the approach was good. The aerodynamic improvement approach looked innovative. However, the reviewer was not sure how much help could be obtained from hybrid system for a highway operation. The reviewer observed that no waste heat recovery, such as Rankine cycle, would make the program hard to meet the program goal.

Reviewer 4:

The reviewer said that given that the project was put on hold nearly a year ago, and that good progress was made up to that point. The reviewer was disappointed that the presenter had only been involved with the project a short time and had limited visibility into the technical details and needed assistance from colleagues to answer questions.

Reviewer 5:

This reviewer said that unfortunately this project has been put on hold resulting in a delay of over a year, which might cause some of the work to lag behind or overlap with other SuperTruck projects. The reviewer then recommended that efforts be made to look at results of other SuperTruck projects before proceeding.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer said that given the work stoppage, the progress was good and commented that the Hybrid and Aero work were well executed. The reviewer added that the smart cruise control should be validated in real world conditions (or modeled accordingly) to quantify actual improvements.

Reviewer 2:
This reviewer indicated that the project was on a one-year hiatus due to the business environment and lack of resources within Navistar for completion. The reviewer added that the approach seemed sound, but that progress was limited due to internal resource.

Reviewer 3:
This reviewer was impressed with the forward windshield/driver and rear engine analysis and said that this was provocative. The reviewer was disappointed in the hold on the project, but appreciated that Navistar was very honest in their reasons.

Reviewer 4:
This reviewer observed there was not so much progress since the last annual report due to the program on hold.

Reviewer 5:
This reviewer noted that the rate of progress has been slow and that little actual hardware seemed to have been built and tested.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated there were good collaborations with Meritor and Lawrence Livermore National Laboratory (LLNL).

Reviewer 2:
This reviewer stated that the collaboration could be good if work was permitted to proceed; but until or unless that occurs, there was little real collaboration.

Reviewer 3:
This reviewer stated that the appropriate collaborators were on board, however, that the progress following the hiatus would better to determine proper collaboration.

Reviewer 4:
This reviewer commented that it would be helpful if the contractor could be more specific about how the partners helped the program. Perhaps, an acknowledgement with partner logo for those slides would be helpful.

Reviewer 5:
This reviewer stated that the turmoil at Navistar had likely affected their relationships with partners. This will probably have an effect on this project, now and when the team restarts next year.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that although the project was on hold, that the project proposal appeared sound. The reviewer added that completion was an issue until the Navistar business environment improves.

Reviewer 2:
This reviewer thought that Navistar had good ideas to move forward with later on and certainly hoped that project finish its total scope.

Reviewer 3:
This reviewer stated that the future plan was good, but identified that the entire program was on hold, which would make the program progress way behind their competitors.

Reviewer 4:
This reviewer said that unless work resumed, there was no future for this project.

Reviewer 5:
This reviewer observed no future research proposed due to the work stoppage.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that the improvement of freight efficiency supported the overall DOE objectives of petroleum displacement.

Reviewer 2:
The reviewer stated that the goals were in line with petroleum displacement.

Reviewer 3:
This reviewer said that this project could indeed support the overall DOE objective of petroleum displacement if it were allowed to proceed.

Reviewer 4:
The reviewer commented that if successful, the project could result in a commercial product that improves freight efficiency.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer commented that currently, Navistar has to re-allocate its resources to production projects. Once this environment improves, resources can be re-applied to project.

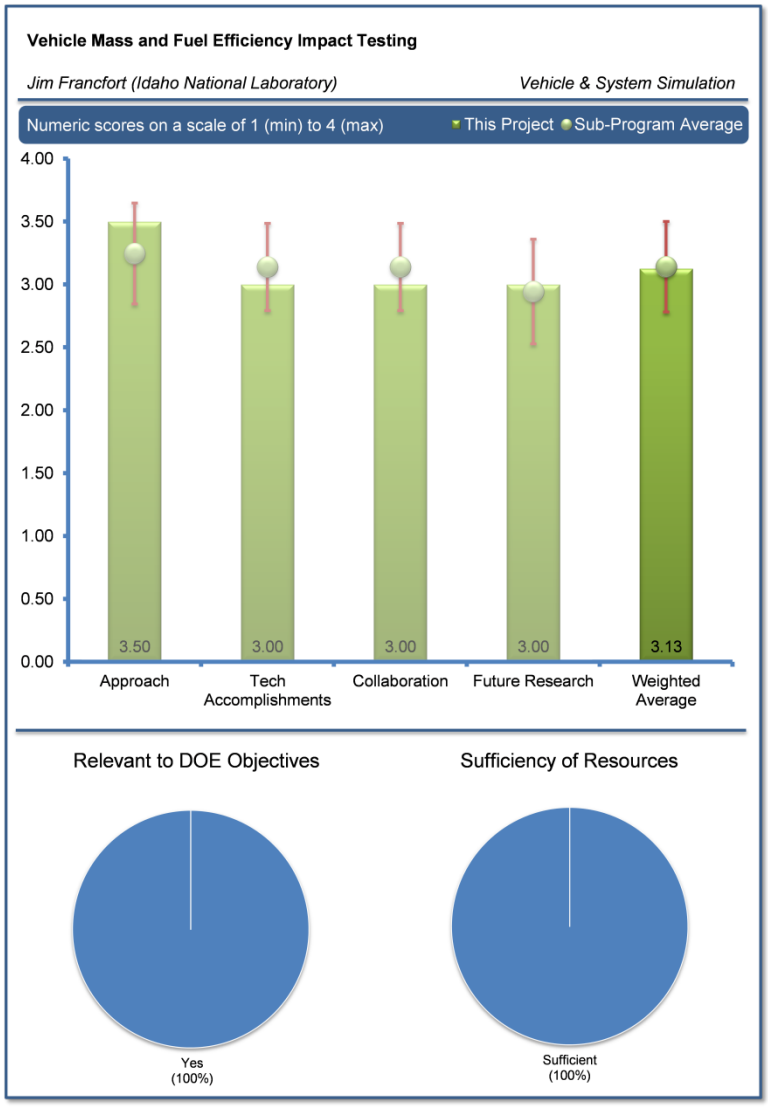
Reviewer 2:
This reviewer said that since the work has stopped, it was obvious that resource availability was the issue.

Reviewer 3:
The reviewer said the project was on hold due to resource issues.

Reviewer 4:
The reviewer was not sure how Navistar was able to support this program with their 58% cost-sharing due to their current financial situation. However, this was not caused by DOE. Rather, this was due to Navistar management.

Reviewer 5:
The reviewer observed sufficient resources given the agreement to put the project on hold.

Vehicle Mass and Fuel Efficiency Impact Testing: Jim Francfort (Idaho National Laboratory) - vss074



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer said that the research plan was well thought-out. Good research methods were used in collecting data.

Reviewer 2:

The reviewer commented that this appears to have been a reasonably well-constructed study, and that future efforts appeared to be relatively minor tweaks to the initial effort.

Reviewer 3:

This reviewer said that the technical approach was sound. Adjusting for ride height was good attention to detail but this was not really new stuff with a lot of new barriers. The biggest barrier is the variability of coast down testing. Vehicle coast down testing can have high variability, so many tests are needed. It sounds like there was adequate attention to detail to obtain good repeatable results. Fourteen were done but the reviewer would have liked to see the statistical significance of that number of tests. The reviewer thought that including error bars on Slide 10 showed the variability. Within those error bars it was hard to say that the weight changes had a different impact in the LEAF and Fusion Hybrid. The reviewer added that an omission is any analysis or modeling to suggest what the answer should be based on knowledge of the vehicles. It seems like there should have been a better connection to use this data for model validation and improvement and also to use modeling to get expected results.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer said yes, that the data gave some surprising results. This data will help validate DOE models. Therefore, future data collection may not be needed. This will reduce cost. The reviewer added that this was important work.

Reviewer 2:

This reviewer observed that the study accomplished what it set out to do, but the reviewer was not sure that the results were particularly meaningful. In fact, the data suggested this study was more relevant for internal combustion vehicles than EVs. In the future, it would be helpful for INL to more clearly articulate how the data produced by this study could be used to advance EV technologies.

Reviewer 3:
This reviewer thought the why could have been shown better. The reviewer asked if it made sense that the vehicle mass had less impact on highway driving. The reviewer continued by asking what the analysis of the breakdown of loads, like aero versus rolling resistance and weight related was.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer observed significant work from all partners.

Reviewer 2:
This reviewer commented that there were good collaborators.

Reviewer 3:
This reviewer indicated that this study did not necessarily require strong collaborations, but that it might be useful to coordinate activities with other entities or projects to better relate the results to future actionable activities.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer commented that there has always been a tradeoff between safety and weight. This work will help designers and other researchers make better choices. Other reviewers were concerned about tire pressure remaining the same. The reviewer indicated that looking at low friction tires for future work would be helpful.

Reviewer 2:
The reviewer stated that this work was complete. The reviewer just thought this kind of work should be done with a goal in mind of looking a little deeper than just reporting results, so more modeling should be involved.

Reviewer 3:
This reviewer stated that the proposed future research appeared to be relatively minor tweaks to the existing effort, but that it was unclear that those tweaks would cause any significant changes to the underlying trends of the original data. The reviewer was not sure about supporting funding for the future work without a much clearer description of how any of the results could be used to further advance EV technologies.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer said that weight and FE were important for DOE. This work validates DOE simulation models.

Reviewer 2:
This reviewer said that the project showed how lighter-weight vehicles could get better fuel consumption.

Reviewer 3:
The reviewer stated that at a minimum, the study could serve as validation for the current design of EVs.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer said that resources appeared to be adequate.

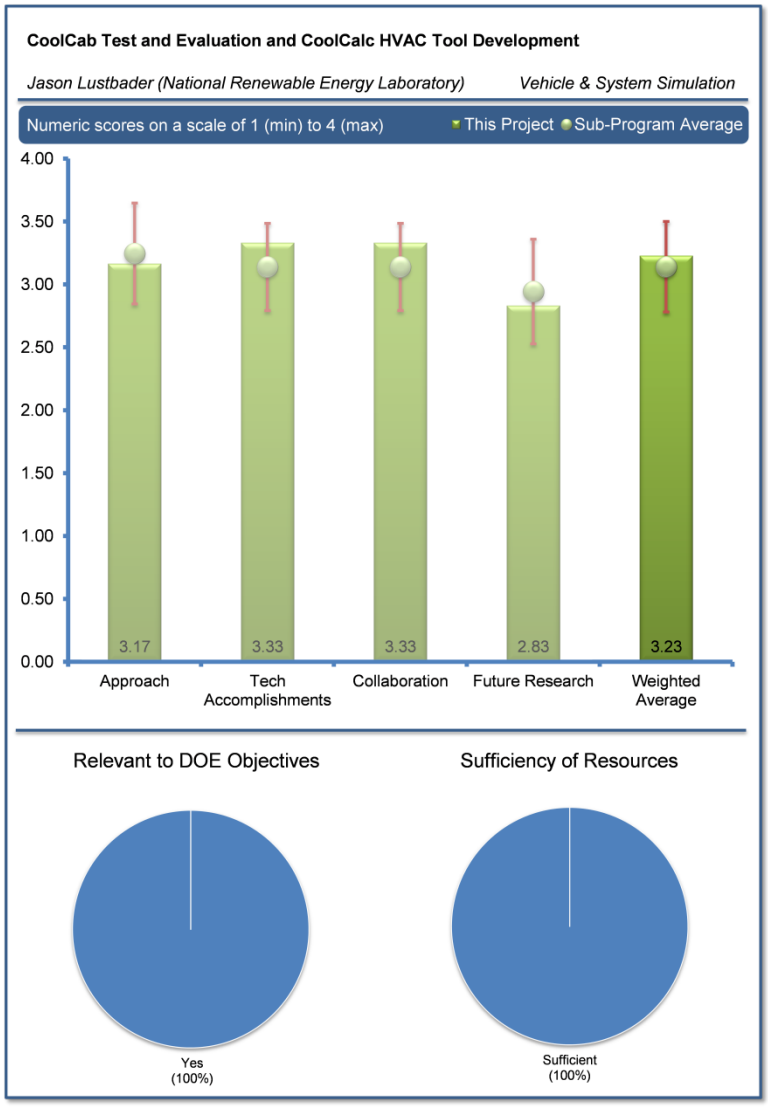
Reviewer 2:

The reviewer observed that the study was funded sufficiently to produce verifiable data, but that the presenters did not suggest any additional funds were essential to further advance this study.

Reviewer 3:

This reviewer stated that resources seemed reasonable.

CoolCab Test and Evaluation and CoolCalc HVAC Tool Development: Jason Lustbader (National Renewable Energy Laboratory) - vss075



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that heating energy requirements were not addressed. The data reported for cooling situations was good, but this may not translate to the heating side. For example, a white paint job is good for cooling, but not for heating. This aspect really needed to be addressed to make sure that the results/conclusions were valid whether the vehicle is operated in a hot or cold zone. The reviewer added that the testing processes/setup seemed to be adequate for the scope of research. The reviewer said that it was important to try and relate design changes to the cost of the change, and FE benefit. Adoption of new technologies by the industry will be driven primarily by cost.

Reviewer 2:

The reviewer commented that the overall approach was good; however, the reviewer would have preferred to have seen the technologies picked after the benchmark data produced an energy audit that identified the largest opportunities. The reviewer added that it was possible that prior work provided insight into the technologies; however, these insights were not identified in the presentation.

Reviewer 3:

The reviewer commented that there was a lot of material in the slides related to the effort to develop and deploy the CoolCalc tool. The approach to the overarching goal, however, may be a bit lost in this detail. If the goal were simply to develop the analytical tool, it would be a different matter. The reviewer added that it was not clear how the project would first split the dictionary to determine if the majority of opportunity for 30% reduction was on the heating or the cooling side. If it was an 80% heating issue and 80% effort (for example only) was focused on cooling efficiencies, then this would be a very ineffective approach. A couple years into the effort it seemed there would have been some insights into this fundamental question. The reviewer also questioned surveys as a research tool in this case and are admittedly uncertain, especially segmenting down to specific relevance to thermal loads. A shift to some data loggers would be advisable.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
The reviewer observed good progress with accomplishments. The simulation was almost complete, and it seemed that lots of technical insight would be gained from it. Some very valuable data had been generated/presented regarding cooling loads. The reviewer continued to say that a good grasp of actual idle times was critical to the accuracy of simulation results. The reviewer suspected that most fleets have this information, and would be much more willing to share than OEMs. Lastly, the reviewer concluded that the experiments seem really well controlled, and data appears to be valid.

Reviewer 2:
This reviewer thought that the technical accomplishments were many and commended the PI for that. The reviewer had questioned the approach to the stated goal but this was not to detract from the substantial effort and results even if not efficiently targeted to the stated objective.

Reviewer 3:
This reviewer stated that the technical progress and progress toward goals appeared consistent with the plan; however, the reviewer's only concern was not being sure that the project helped if the systems were already adopted. The reviewer was under the impression that systems were already fielded to address anti-idling laws, and commented that the presentation did not lay out the current market landscape cleanly. It was not clear to this reviewer if the technologies under consideration were not yet adopted widely and if this was an enabler to support more beneficial technologies.

Reviewer 4:
The reviewer indicated that the progress is to plan.

The reviewer added that more disclosure on the effects of other variables would be helpful as those become available.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer acknowledged that there were many involved parties, especially from the industry, which showed excellent collaboration.

Reviewer 2:
This reviewer commented that the collaboration was very good, almost outstanding. It was not clear exactly how much the partners were really involved, other than with the hardware supply. The reviewer suggested that the project try to demonstrate how the data might be used in the design processes. It may be good to report on their feedback on the project.

Reviewer 3:
The reviewer observed that the project had good working relationships with several OEMs. The reviewer added knowing that the project planned to bring fleets in and suggested that sooner rather than later would be helpful to get fleet viewpoints, even before the tools and techniques are completely polished.

Reviewer 4:
The reviewer indicated that the collaborators had skin in the game, thus there was a reasonable path to market should the technology be viable.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer said that the results of other proposed insulations and cab materials will provide good design guidance to the OEMs. The reviewer added that very specific payback information on proposed solutions will help guide fleets to purchase these solutions.

Reviewer 2:
The reviewer indicated that the planned work appeared to be good, but that the lack of focus on cold work, where heating was needed, was a major drawback.

Reviewer 3:
The reviewer said that the proposed future research seemed reasonable, but it did not appear to leverage other transportation segments that could benefit from lower HVAC cabin loads [light-duty (LD) BEV/PHEV markets]. With SC03 testing with A/C on, the reviewer believed others were interested in lower HVAC cabin loads. The reviewer noted that one of the technologies that was not considered (or mentioned) is the control of the fresh air/blend door to reduce thermal loading.

Reviewer 4:
This reviewer stated that there was not enough plan specifics here for a multi-year, multi-phase project. The reviewer reported that FY 2014 boiled down to the following: bring together knowledge...; and improve capabilities.... The reviewer opined that these were very broad and insufficient to effectively achieve the objective without more specifics. The reviewer noted that perhaps these existed but just did not come through well in the presentation.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that the project was absolutely relevant and that much fuel is used for idling.

Reviewer 2:
This reviewer said that idle fuel consumption reduction was a major issue that consumed massive amounts of fuel. Additionally, there were economic drivers for fleets to adopt the lessons learned from this project, so it was likely to have a benefit on fuel consumption.

Reviewer 3:
This reviewer observed that this project targeted the reduction of fuel consumption during idling periods of trucks. The findings are also relevant for electrified trucks and will help to reduce the required amount of energy for heating and cooling.

Reviewer 4:
The reviewer indicated that the topic was relevant though it could be questioned if the subject matter should not be simply left to competitive OEM development. It was not clear to the reviewer that the tool was worth the investment in its impact to the real product development efforts at the OEMs.

Reviewer 5:
This reviewer stated that the core technology under consideration appeared consistent with petroleum displacement, but that the path to adoption was simplified into the following: if the three-year pay back is met, of course everyone would adopt the technology. In the past, anti-idling discussions were about meeting anti-idling laws, but anti-idling laws were not really mentioned as a driver. The reviewer's concern was that a three-year pay back may not be enough to drive the technology, thus leading to reduced petroleum displacement.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

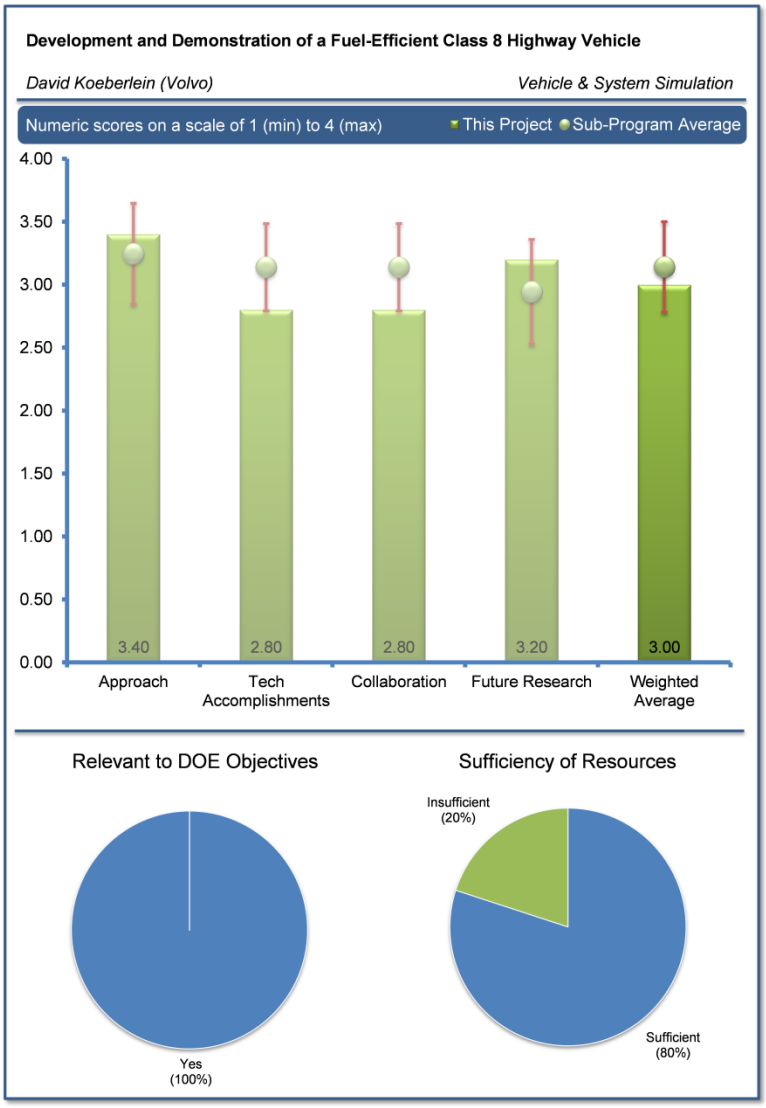
Reviewer 1:

This reviewer said that resources were adequate. The data that the project was able to generate now seemed to be sufficient to draw the conclusions required at the end of the project.

Reviewer 2:

This reviewer thought that the resources were sufficient. Per other comments in the approach, etc. it could be argued that the resources could be allocated in a different way and perhaps lead to greater returns toward the objective.

Development and Demonstration of a Fuel-Efficient Class 8 Highway Vehicle: David Koeberlein (Volvo) - vss081



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the work had technically sound systems approach to goals. The reviewer added that the project used sufficient tools to achieve the task, and was confident to hit target.

Reviewer 2:

This reviewer very much appreciated Volvo's approach on this project. The reviewer commented that it was methodical, technical, good use of resources, etc. The project is taking the opportunity to integrate into a complete system. Volvo very much understands that this is a completely new tractor trailer and old school analysis/thinking no longer applies (e.g., how engines work with significantly better aero).

Reviewer 3:

This reviewer commented that this was a well-constructed project plan and a good approach to identify and evaluate the most promising technologies which could achieve the goal.

Reviewer 4:

The reviewer observed that the approach was a straightforward engineering approach whereby candidate technologies were evaluated for possible use to overcome barriers to achieving the project objectives. System simulation studies were done for both the baseline truck followed by the improved truck with various technologies included.

Reviewer 5:

This reviewer observed that the work included all necessary means to achieve the program goals. The reviewer was not sure why a pick-up truck on Slide 5 was used, which was not appropriate because this was a heavy duty truck program.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer observed that the progress toward overcoming fuel efficiency barriers in the engine powertrain via right-sizing the engine appeared to be good.

Reviewer 2:
This reviewer observed that the brake thermal improvements were ahead of schedule, showing a 48% brake thermal efficiency. Vehicle aero improvements had been implemented on trailer. The design to reduce the weight on cab system was complete (concept complete, 7,800 lbs. reduction in modeling completed).

Reviewer 3:
This reviewer indicated that this was a bit difficult because the project started so much later, but given that the project was starting to build their test mule, it seemed great progress was being achieved.

Reviewer 4:
The reviewer indicated that the progress was impressive considering that the program started late, but most of the slides were still about the road maps; not too much to be quantified.

Reviewer 5:
The reviewer said that right sizing the engine could result in a very specific design and it was unclear if this engine could perform as well in a different application or if all the changes were not implemented in the truck design. Comments on hybrid commercial feasibility were well throughout.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated that there were sufficient partners when compared to other projects.

Reviewer 2:
The reviewer stated there was a good balance of collaborators with institutes, testing, manufacturers, and etc.

Reviewer 3:
The reviewer observed that collaboration seemed solid with the suppliers.

Reviewer 4:
This reviewer said that the project should have a fleet/customer involved more.

Reviewer 5:
This reviewer stated that aerodynamic improvements would require a great deal of collaboration between the prime contractor and the trailer manufacturers. This collaboration appeared to need some additional work to enable the system - tractor and trailer to meet the performance objectives.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the project was outlined and in progress, and that appropriate tools and analysis were guiding the decisions (with a focus towards production).

Reviewer 2:
This reviewer stated that the project demonstrated a well thought-out plan for the next few years.

Reviewer 3:
This reviewer said that on-road testing and validation of final demonstrator should show good results.

Reviewer 4:
The reviewer stated that the plans for future work should lead to improvements but did need better focus on overcoming barriers.

Reviewer 5:
This reviewer commented that the future research needed to be more specific on the technologies.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer opined that this work, if successful, would support the overall DOE objective of reducing petroleum.

Reviewer 2:
This reviewer commented that results, in production, could greatly impact consumption for freight transportation.

Reviewer 3:
This reviewer said that if successful, this project could result in a commercial product that improves freight efficiency.

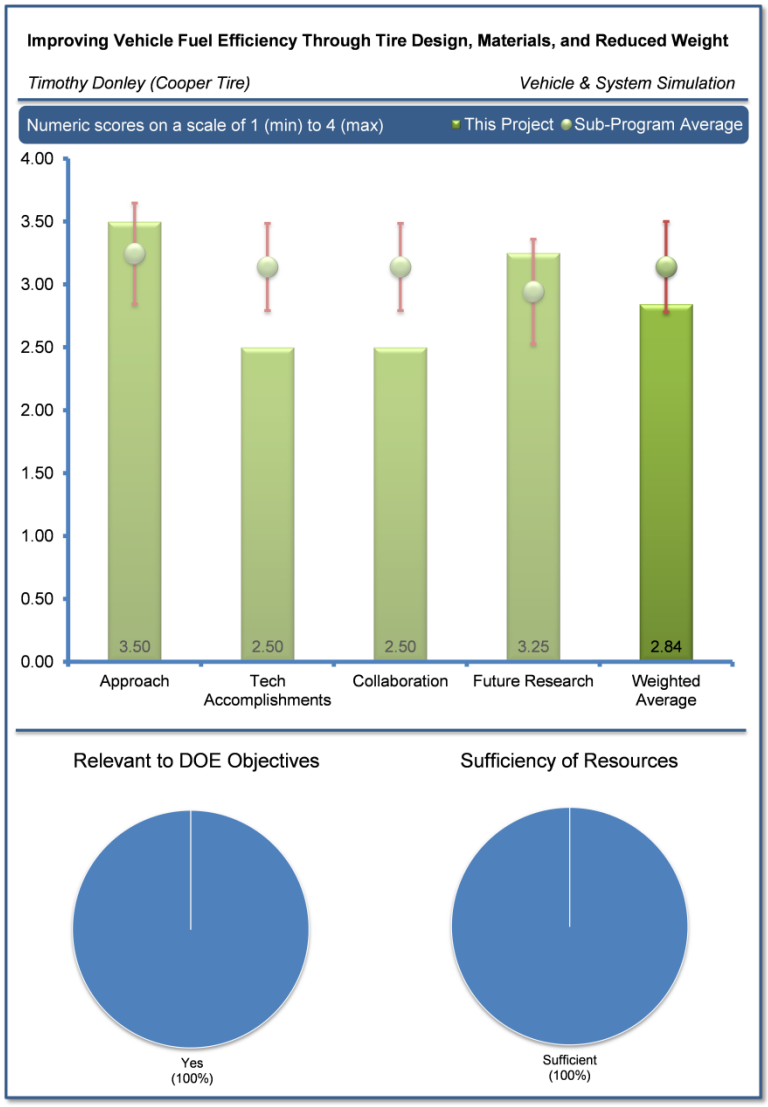
Reviewer 4:
The reviewer indicated that improvement of the freight efficiency was always in the line of DOE objectives of petroleum displacement.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer stated that resources for the project were quite substantial and appeared to be sufficient to meet the stated milestones, but perhaps not in such a timely manner.

Reviewer 2:
This reviewer indicated that at the present, most of the presentation slides were only on road maps, and was not so sure how the contractor could achieve the goal with much less funding compared to their competitors.

Improving Vehicle Fuel Efficiency Through Tire Design, Materials, and Reduced Weight: Timothy Donley (Cooper Tire) - vss083



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer commented there was an excellent approach and excellent use of go/no go steps. The reviewer liked the number of tests performed already.

Reviewer 2:

This reviewer observed that the project identified six novel technologies that could favorably impact fuel efficiency through weight and/or rolling resistance savings, rather than focusing on just one. The reviewer also observed separate milestones and go/no-go gates for each of the six technology approaches. The reviewer commented that the fuel savings and weight reduction goals were more aggressive than some other projects in the DOE portfolio.

Reviewer 3:

This reviewer commented that exploring several technologies in one project was an ambitious approach, which could benefit the project outcome. However, it seemed that the project approach was working in the sense of 50/50 chance on the development of the six technologies. So a decision needs to be made on whether or not to drop the non-working technologies at this time.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer noted that the project had performed a number of tests already and had made excellent progress.

Reviewer 2:

This reviewer stated that there was good progress on all six technical approaches. The reviewer added that testing to date suggested Cooper was on track to meet goals of 20% weight reduction and 3% fuel savings.

Reviewer 3:

The reviewer commented that the project was achieving progress with the working technologies and could achieve the required goal of the DOE's objective, in spite of no positive results for some technologies.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated there was good progress with the collaboration with NREL.

Reviewer 2:
This reviewer observed that there was a dynamic adjustment based on actual needs. NREL was developing a lightweight tire model, but Cooper has its own modeling capability now and will explore whether it is possible to transition the NREL contract to focus on testing fuel efficiency. The reviewer added that wear testing was done externally; and that all other testing is currently being done within Cooper.

Reviewer 3:
The reviewer observed that the collaboration with the only partner, NREL, ended, and that there was no further indication that more collaboration would happen in the current or future work. However, the project could benefit from collaboration in the area of material development, consumer feedback, and other areas.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer observed excellent go/no go decision points coming up. The reviewer added that there was good use of decision making for cost feasibility.

Reviewer 2:
This reviewer commented that the proposed future research is generally very good. In one of the technical approaches (i.e., Approach 5), Cooper plans to try making tires with shallower treads but with better rubber compounding to result in the same tire life. The reviewer asked why not have a very long-life tire with (near-) standard tread depth instead. That approach would likely be safer in water/snow, and there would be fewer tires to make/transport/landfill/recycle overall.

Reviewer 3:
This reviewer said that the project had clear decision points for each technology. However, it seemed that the decision points were not followed in the development of some of these technologies and planning for future work.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer indicated that rolling resistance reduction and weight savings in tires could modestly reduce fuel consumption on a per-vehicle basis, but this can be multiplied across the entire vehicle fleet for a significant overall benefit.

Reviewer 2:
This reviewer commented that this project was well designed for cost savings by reducing gas mileage.

Reviewer 3:
The reviewer indicated that the project seemed on track for achieving the DOE objectives of petroleum displacement with the technologies that were showing positive results.

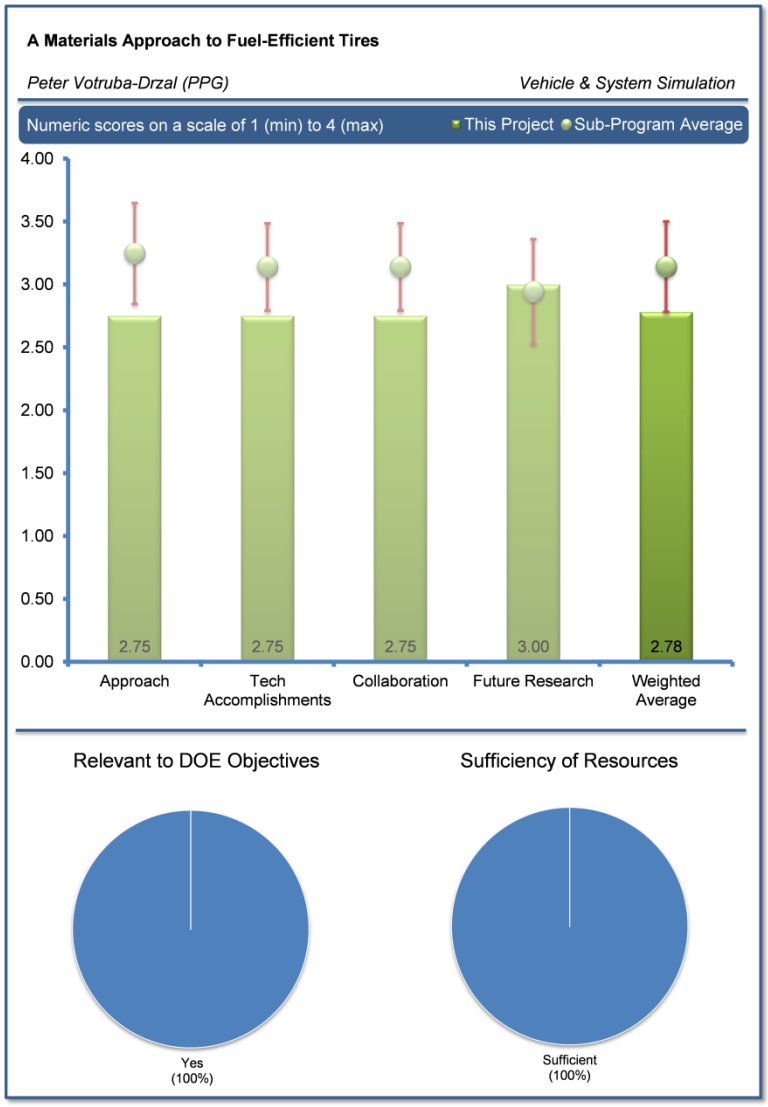
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer observed good progress and no indication of resource constraints.

Reviewer 2:

This reviewer said that it seemed there were sufficient resources to achieve the goal of the project.

A Materials Approach to Fuel-Efficient Tires: Peter Votruba-Drzal (PPG) - vss084



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer liked that the project had a go/no go milestone coming up. It will be an important step.

Reviewer 2:

This reviewer commented that the approach of developing tire materials to improve its fuel efficiency by using innovative fillers and barrier coating technologies was the most feasible method for achieving good results while maintaining other tire performance parameters. However, the approach needed to elaborate more on how the project would address the manufacturability issues especially with the inner liner coating material. In addition, there was no discussion on the cost of these technologies, especially filler materials, and how it would be solved.

Reviewer 3:

This reviewer observed the refinements of traditional technologies. The reviewer noted that the milestones looked reasonable. The reviewer added that the Programmatic Approach slide was not helpful.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer said that the project achieved its milestones, had excellent milestones set, and had achieved their goals to this point. The reviewer added that the project was doing a good job on focusing on keeping costs reasonable for consumers.

Reviewer 2:

The reviewer said that filler material work showed progress on developing compounds that have improved properties for meeting the rolling resistance performance requirements; however, the cost will be the main factor for commercialization of these materials. Also, the coating material has showed good results in terms of barrier performance however, manufacturing issues will be the key factor for any good outcome of the project.

Reviewer 3:

This reviewer identified that the project was about 5% behind on barrier work, but that corrective action was underway. The reviewer observed that the project had prototyped and tested numerous materials. The reviewer added that the progress appeared substantial; as

of March 15, there were 115 functionalization experiments, 181 rubber compounds mixed, 1,755 tests on rubber compounds, and 8 pilot-plants scaled-up. Lastly, the reviewer commented that it appeared that the current barrier coating was not stable at vulcanization temperature.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer observed that the collaboration with Goodyear continued and that the project apparently added collaboration with North Dakota State University Center for nanoscale science and engineering in 2013.

Reviewer 2:
This reviewer stated that there was good collaboration with Goodyear and that it was an important one to achieve goals.

Reviewer 3:
The reviewer said that the collaboration with a major tire manufacturer and a research institute were well coordinated.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer indicated that the project had a clear future plan, especially the milestone for building a tire using the down selected filler materials, and also for mentioning maintaining alignment with tire manufacturers for coating material, which can resolve manufacturability issues.

Reviewer 2:
This reviewer could have benefitted from more detail in the presentation but indicated that what was reported looked reasonable.

Reviewer 3:
The reviewer noted important steps were coming in the future. This reviewer added the presentation could have detailed the go/no go step better.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that the change in silica would allow for better gas savings.

Reviewer 2:
This reviewer stated that the project supported DOE's objectives.

Reviewer 3:
This reviewer commented that reducing tire rolling resistance would save a modest amount of energy per vehicle, but could be rapidly deployed across the entire new and legacy vehicle fleet. Those legacy vehicles that are driven the most (consuming the most fuel) will be able to access this fuel-saving technology soonest.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer said that the project has sufficient resources.

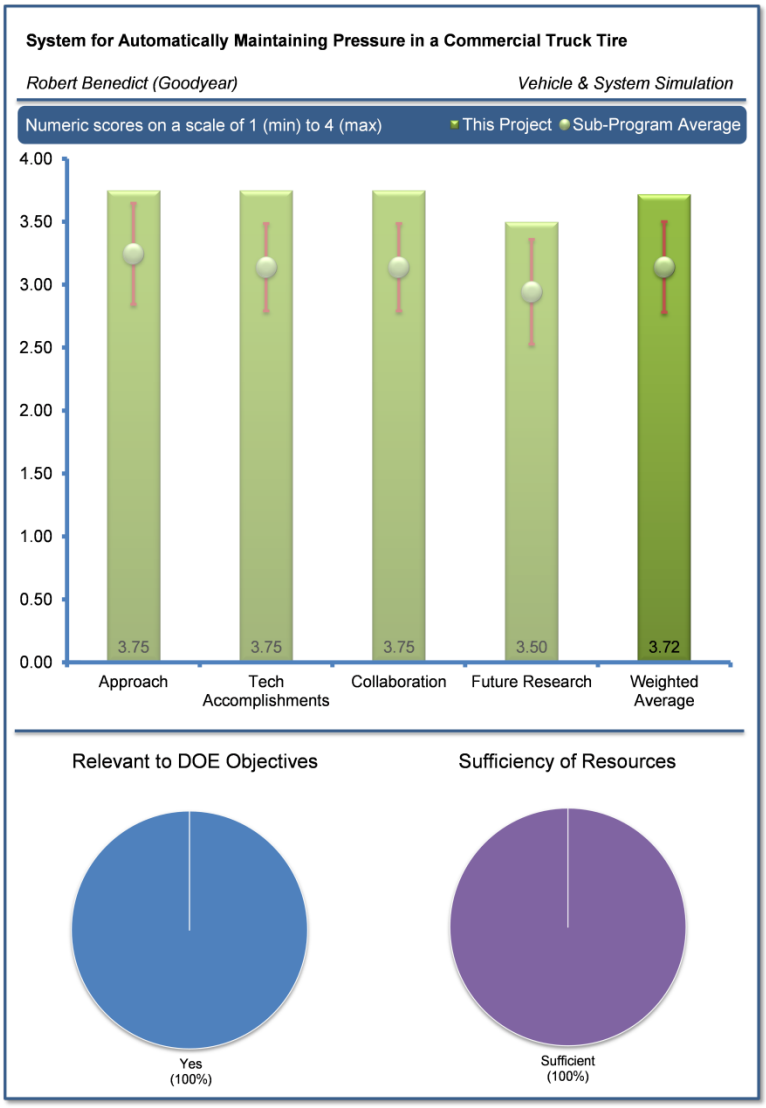
Reviewer 2:

This reviewer stated that the resources appeared to be appropriate. The project is mostly on-track (a minor delay, with a corrective plan in place) and PPG has not indicated a need for additional resources.

Reviewer 3:

The reviewer observed good partners and coordination.

System for Automatically Maintaining Pressure in a Commercial Truck Tire: Robert Benedict (Goodyear) - vss085



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer commented that the approach had clear steps and milestones. It also covered several aspects of project concerns, for example, not altering the tire significantly, maintain current manufacturing process, and addressing retreading issues.

Reviewer 2:

The reviewer liked that the project has surveyed to see interest in buying these tires.

Reviewer 3:

This reviewer stated that the peristaltic pump molds into the tire sidewall near the bead. The regulator in the tire opens to allow air to enter the pump tube when the tire pressure is under the set value. All system components are built into the tire; this compatible with existing standard fleet wheels and tire-pressure monitoring system (TPMS). The system lasts the life of the tire, including retreading. The reviewer concluded that the project would test in diverse vehicle fleets.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer noted excellent progress. Much of the 2013 presentation was completely different from the 2012 presentation. The reviewer observed that there were molded prototypes anticipated in summer 2013. Target specifications have been met to date.

Reviewer 2:

This reviewer liked that the project considered the cost implications and that the project was trying to accomplish the objectives in a cost-effective manner for consumers.

Reviewer 3:

The reviewer observed that the project had overcome some barriers with possible successful approaches, for example, designing redundant check valves to prevent leaks, and replaceable filters. However, the reviewer opined that more emphasis on tire durability and reliability is needed, as well cost.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that there were good indicators of collaboration with components manufacturers, fabrication facilities, and consultants.

Reviewer 2:
This reviewer observed that the project was collaborating with fleets, vendors, and suppliers. The reviewer commented that roles were appropriate and defined. The reviewer noted vendor/supplier contracts were completed with Sam Landers (former Goodyear R&D fellow), AMB (tire production fixtures), Logan (tire production fixtures), and Eaton (air management components).

Reviewer 3:
The reviewer said that the project team knew what it was good at and knew where help was needed. The reviewer noted a good collaboration with Eaton.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer noted that there was well-defined, appropriate, and apparently complete plans for tire prototyping, performance and durability testing, fleet trials, and design refinement.

Reviewer 2:
The reviewer indicated that the project had excellent and realistic milestones set. The timelines were reasonable to achieve objectives.

Reviewer 3:
The reviewer observed that the future plan had accounted for design refinement, evaluation of prototype tire performance, and the durability of the tire. However, further planning for mitigating durability issues may improve the chance of having a working final product. In addition, the project could have a future plan to evaluate the effect of this device on the TPMS or similar technologies.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer indicated that while Goodyear was (appropriately) starting with HD truck tires, this technology was ultimately applicable to every on-road vehicle. The per-vehicle FE savings would be modest; however, the benefits could be realized by every vehicle; new and legacy after a short phase-in (and the vehicles that drive the most would be ready for new tires the soonest).

Reviewer 2:
The reviewer stated that the project would support DOE objectives by automatically maintaining proper tire inflation pressure and reducing fuel consumption of under inflated tires.

Reviewer 3:
The reviewer said that yes the project allowed for savings in fuel by changing tires.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer did not think that the project has the resources to accomplish the objectives.

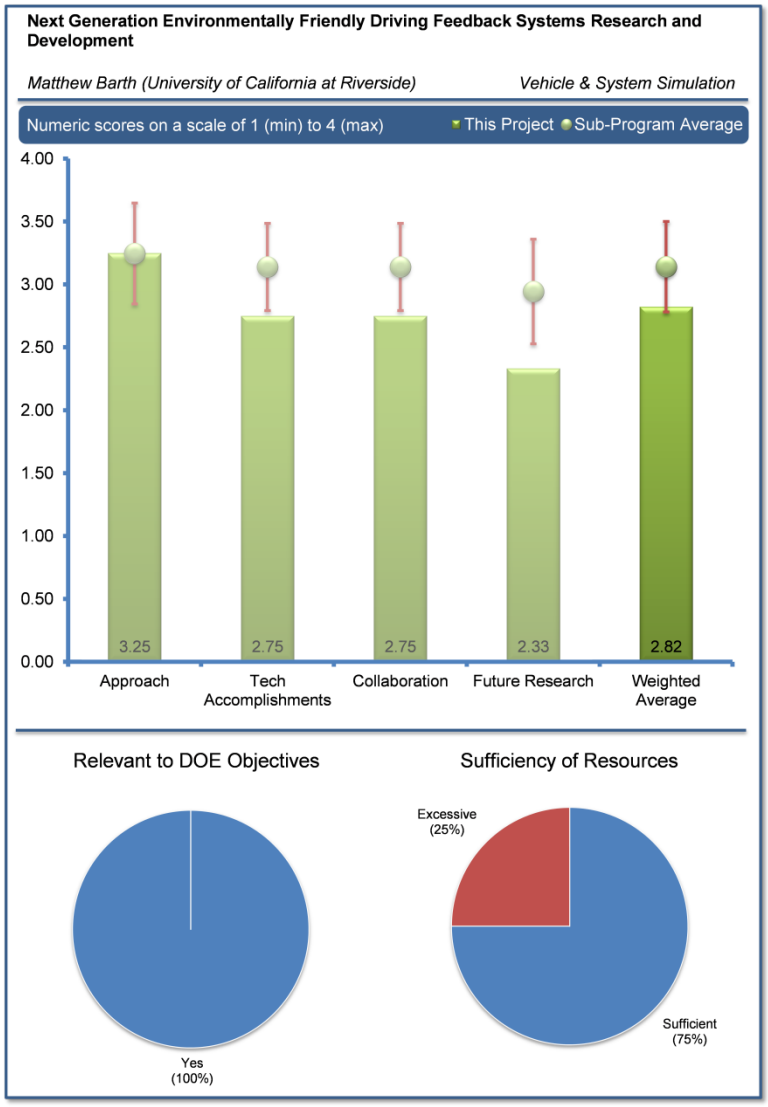
Reviewer 2:

The reviewer commented that resources appeared to be adequate. The reviewer added that Goodyear has made excellent progress, and offers no indications that resources are insufficient. Goodyear is approximately halfway through the three-year project. The reviewer noted funding as $1.5 million DOE, $2.57 million match.

Reviewer 3:

This reviewer stated that the project had sufficient funding

Next Generation Environmentally Friendly Driving Feedback Systems Research and Development: Matthew Barth (University of California at Riverside) - vss086



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer said that the project team approach appeared consistent with the original proposal.

Reviewer 2:

This reviewer said that the multi-pronged approach addressed many opportunities for reducing fuel consumption. The project is well designed and feasible, but it was not clear how closely it is integrated with any other projects. The phased approach to the project is logical.

Reviewer 3:

This reviewer said that it was not clear until later that this project applied only to light-duty vehicles. It was confusing because the inclusion of Riverside Transit Agency implied the inclusion of Class 8 heavy-duty vehicles operating on fixed routes. The reviewer commented that the approach needs a lot of work for both consumer drivers and fleet drivers. It was not clear to the reviewer how many consumer drivers would be involved, how they would be selected, and what controls would be established. While controls could be established for fleet drivers because the drivers operate from and return on a daily basis to a centralized base, there were several deficiencies. Most important, it was also unclear to the reviewer if individual drivers in a fleet were being tracked. Without tracking individual drivers, there could be no accountability and no incentivization. The incentive for the consumer drivers is clear – reducing fuel consumption saves money. However, as far as the fleet driver is concerned, the driver has no incentive to improve FE because the driver is not paying for the cost of fuel. The presenter did not discuss any incentives for the fleet driver to improve FE. The reviewer asked what happened when the fleet driver was not being observed by the project investigators. The reviewer continued to say that for incentivization to take place for fleet drivers, there has to be supervisor intervention. The supervisor needs to monitor periodically (e.g., weekly) fuel consumption for each individual fleet driver and provide rewards for improvement as well as discipline for lack of improvement.

Other observations were provided by the reviewer as follows:

The reviewer suggested setting the commercial fleet average fuel consumption reduction goal at 5-10%, citing a 2010 National Academy of Sciences report that states that improvements with driver can result in as much as 17% fuel savings.

The reviewer also noted the need to calibrate fuel consumption measurements and referenced a West Virginia University study that indicates on-board diagnostics (i.e., J1939) fuel consumption measurements can be off by 10%. The reviewer questioned the 2% improvement shown by the project when the inaccuracy is 10%. Thus, 2% improvement is in the noise level.

The reviewer recommended including go/no-go decision points between phases so that if the appropriate progress is not made, the successive phase is not engaged until the preceding phase is satisfactorily accomplished.

The reviewer suggested taking advantage of the recommended practices and displays made by the U.S. DOT Intelligent Transportation Systems Joint Program Office (ITS JPO) on Human Machine Interfaces that apply to drivers. The reviewer stated that the ITS JPO has been working on prioritizing the types of warning, alerts, and displays of information to the driver so that the driver is neither overwhelmed nor confused and makes the appropriate decision to act safely.

The reviewer stated that the project did not seem to control variables such as miles driven, route, duty cycle, terrain, routing, climate, traffic conditions, and weight of load carried, and noted that the last variable has a tremendous effect on fuel consumption (because the National Academy of Sciences has recommended a measure of FE based on weight-specific or weight-normalized fuel consumption per mile). Unlike passenger cars, FE of light-duty vans can vary with load carried. As such, the reviewer recommended that the project show that either the weight of the load does not matter or that the vehicle load is weighed.

According to the reviewer, there did not appear to be measures in place to prevent distracted driving. A smartphone was used for the driver to receive information, but no safety countermeasure feature was in place to prevent the driver from texting or otherwise using the smartphone to dial or transmit.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
The reviewer commented that there was a long list of technical accomplishments so far and said great work.

Reviewer 2:
This reviewer said that the presenter seemed to have a very good understanding of the project and the work remaining. Accomplishments and progress appeared consistent with the original schedule. The project appeared to be on track for completion. Proper consideration of safety issues appeared to be important to the project team.

Reviewer 3:
This reviewer said that the results were shown for only two drivers, which should have been stated up front and not withheld until the question was asked about sample size. The reviewer added that unless there was a good, sound technical approach, technical accomplishments can be meaningless.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that there was a good explanation of collaborative roles.

Reviewer 2:
This reviewer stated that the project lacked collaboration with experts on fuel consumption measurement, statisticians (who address design experiments, determine sample sizes of statistical significance, and conduct retrospective cohort analysis and power analysis), human factors experts (who specialize in driver display information and driver-car interactions), fleet operations managers (who review driving performance on a periodic basis and provide driver intervention when necessary), and actual fleet drivers (who can provide insight and feedback on acceptance of new technologies and incentivization strategies. The reviewer stated that there was too much focus on data collection and not enough focus on establishing the accuracy and appropriateness of the data.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer indicated that the explanation of future plans was adequate but that it was not clear if any alternative development pathways were considered for research project.

Reviewer 2:
This reviewer stated that the project sorely needed to have developed a good, solid research plan, and then have had that research plan rigorously peer reviewed before having proceeded.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that the purpose of this study was to reduce petroleum fuel consumption.

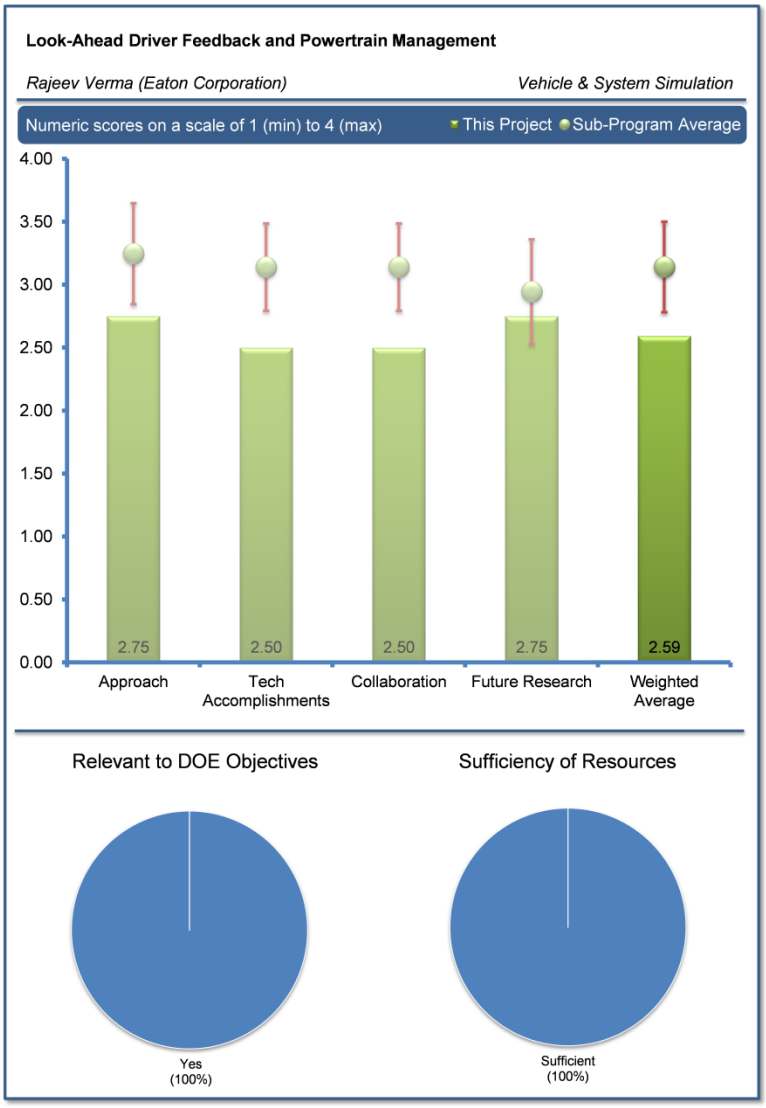
Reviewer 2:
The reviewer said that the high cost of paratransit service combined with legal mandates to provide it make this project relevant to reducing the public cost of human services transportation. The reviewer added that the team appeared to be doing a good job of it, and seemed sincere about the project's potential to make a difference. As with its sister project at Eaton, with increasing amount of research into driverless vehicles, the reviewer questioned the long-term potential for continuing research into driver assistance strategies for saving fuel. However, the reviewer thought that in the interim it would still continue to be an important issue for public and private fleet managers concerned with fuel costs. The reviewer thought that the modest level of research is appropriate.

Reviewer 3:
This reviewer commented that a National Academy of Sciences report issued in 2010 showed that the driver could contribute as much as 17% savings in FE through proper training and certification although strategies such as driver feedback was not considered. If driver feedback were considered, the savings would be even higher.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer said that it was not clear why this project should be 30% more costly than the project that was covered in the immediately preceding presentation. The reviewer added that without a cost breakdown, it was difficult to say.

Look-Ahead Driver Feedback and Powertrain Management: Rajeev Verma (Eaton Corporation) - vss087



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the work approach appeared consistent with the original proposal.

Reviewer 2:

The reviewer said that the project developed a combination of advisory feedback to drivers and powertrain control to minimize fuel usage. It was not clear from the presentation how these two strategies would interact. The technical approach to the project is sound. Human-to-machine Interface (HMI) testing in a simulator followed by testing systems in real trucks is a strength of this project.

Reviewer 3:

The reviewer provided several comments on the project's approach to performing the work. The reviewer suggested setting the commercial fleet average fuel consumption reduction goal at 5-10%, citing a 2010 National Academy of Sciences report that states that improvements with driver can result in as much as 17% fuel savings.

The reviewer also noted the need to calibrate fuel consumption measurement and referenced a West Virginia University study that indicates on-board diagnostics (i.e., J1939) fuel consumption measurements can be off by 10%. The reviewer asked how the project could show an improvement of 2% when the inaccuracy was 10%. The reviewer asserted that it is in the noise level.

The reviewer recommended including go/no-go decision points between phases so that if the appropriate progress is not made, the successive phase is not engaged until the preceding phase is satisfactorily accomplished.

The reviewer suggested taking advantage of the recommended practices and displays made by the DOT ITS JPO on Human Machine Interfaces. The ITS JPO has been working on prioritizing the types of warning, alerts, and displays of information to the driver so that the driver is neither overwhelmed nor confused and makes the appropriate decision to act safely.

The reviewer recommended establishing a baseline with a control group to make a valid comparison of before-and-after results, rather than using the 600,000 miles of naturalistic driving data for comparison.

The reviewer stated that the project did not seem to control variables, such as route, duty cycle, terrain, routing, climate, traffic conditions, weight of freight carried, and type of driver, and noted that the last two variables have a tremendous effect on fuel

consumption (the National Academy of Sciences had recommended a measure of FE based on weight-specific or weight normalized fuel consumption per mile). Unlike passenger cars, FE of trucks varies vastly with load carried. The reviewer added that FE of trucks also varies vastly depending on whether the tractor is a day cab or sleeper cab. Day cabs make a lot of pick-up and deliveries while sleeper cabs make a lot of long-haul, overnight trips. The FE of sleeper cabs is vastly different from that of day cabs.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer said that the project seemed to be on track with the schedule and key milestones accomplished.

Reviewer 2:
This reviewer observed that progress appeared consistent with the original schedule. The project team appeared focused and on track for completion.

Reviewer 3:
The reviewer stated that without a good, valid, and rigorous technical approach, the technical accomplishments can be meaningless.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer said that there appeared to be excellent collaboration between partners with work shared between organizations.

Reviewer 2:
This reviewer observed that there was no collaboration with the experts who measured/calibrated fuel consumption, statisticians who design experiments (such as the set-up of retrospective cohorts, control of variables, power analysis, sample sizes for statistical significance), fleet managers who supervise trucking operations, and human factors engineers/psychologists (experienced in human machine interface). The investigators did not familiarize themselves with the 2010 National Academy of Sciences study or use anybody with expertise related to that study. The reviewer commented that the investigators also did not engage or propose to engage with actual truck drivers to establish/determine acceptability of any of the proposed displays and interventions with their driving behavior and control of the truck.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer commented that the project management seemed good. Plans for future work were logical and seemed do-able.

Reviewer 2:
The reviewer said that the project needed to have developed a good, solid research plan, and then have that research plan rigorously peer reviewed before having proceeded. Also, V2V was not relevant at this point; it should be omitted for the time being. The inclusion of radar such as for lane departure warning or forward collision warning systems is definitely out of scope. Radar sensors are already studied under the Integrated Vehicle-Based Safety Systems study paid for by the DOT ITS JPO and integration of safety systems with systems to provide FE feedback to the driver should be considered a separate project for the future with separate funding. The reviewer stated that there is already too much work in the FE area alone to accomplish here without trying to integrate collision avoidance at the same time and confusing the issues.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

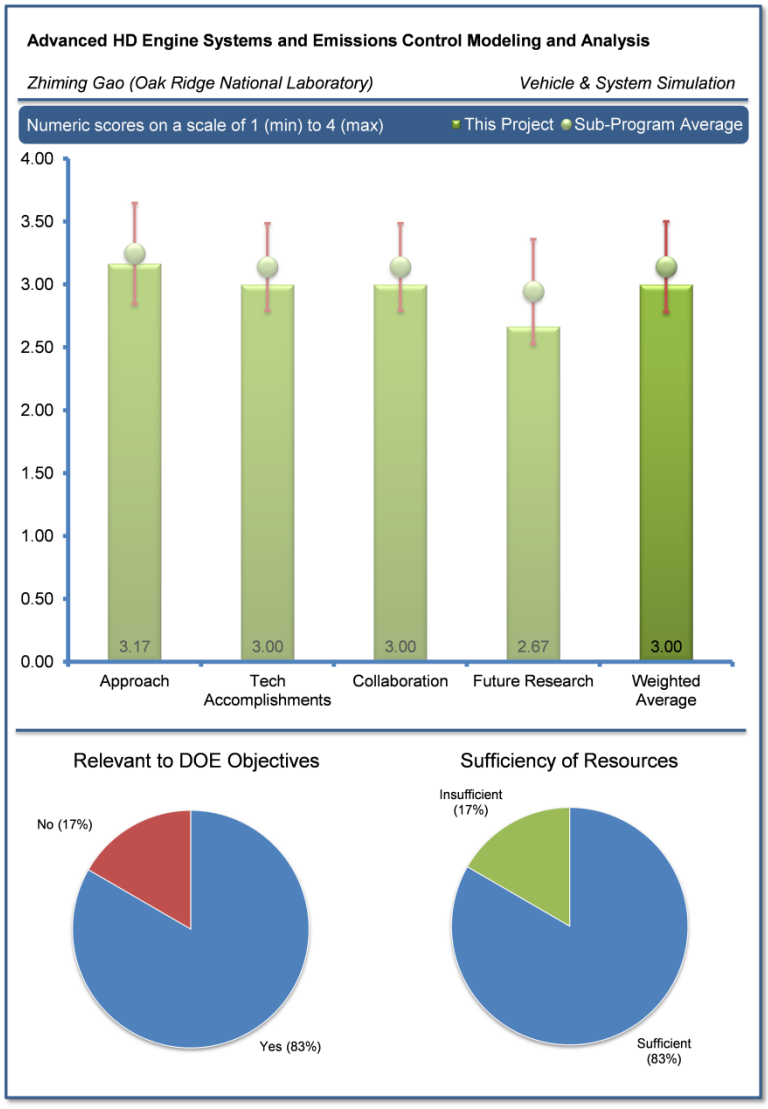
Reviewer 1:
The reviewer observed that the stated goal of the system in development was to reduce fleet fuel consumption by at least 2%.

Reviewer 2:
The reviewer questioned the long-term potential for continuing research into driver assistance strategies for saving fuel with the increasing amount of research into driverless vehicles. However, the reviewer thought that in the interim it would still continue to be an important issue for fleet managers concerned with fuel costs. The reviewer thought that the modest level of research was appropriate.

Reviewer 3:
This reviewer referenced that a National Academy of Sciences report issued in 2010 showed that the driver can contribute as much as 17% savings in FE through proper training and certification although strategies such as driver feedback were not considered. If driver feedback were considered, the savings would be even higher.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?
No comments were received in response to this question.

Advanced HD Engine Systems and Emissions Control Modeling and Analysis: Zhiming Gao (Oak Ridge National Laboratory) - vss089



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer commented that the approach integrating a HD engine powertrain system and emission after treatment control modeling together was very noteworthy and needed to optimize freight efficiency of the entire vehicle. Currently, individual component optimization modeling has been accomplished by individual component suppliers but an integrated vehicle based model has not been taken on in the past. Lastly, the reviewer commented that using and expanding integrated Autonomie models would benefit the industry to understand system level interactions and dependencies.

Reviewer 2:

The reviewer said that as an ongoing project to advance the knowledge base of MD/HD hybridization, the approach was appropriate and was building the foundation for future work with the linking of component models. The reviewer suggested that perhaps a description of how the sequence of modeling elements would be chosen would be helpful. The reviewer asked if to date this may have been driven by elements involved in the Cooperative Research and Development Agreement (CRADA).

Reviewer 3:

The reviewer indicated that the approach appeared sound, but that the project was working with old (2010) engine calibrations. It was not clear if industry-significant results would come from this project. The process that the project team was developing to analyze this problem was very good though. It may be up to an OEM in the future to use the process to gain useful technical insight. The reviewer added that it was not clear how realistic of an engine control strategy that the project was using. If the project was only using steady-state maps to make FE predictions, then the project team may be missing many real economy and emissions impacts of transient conditions. FE benefit should be weighed against emissions reduction potential. If emissions could be reduced, then maybe further FE gains could be made by re-calibration of the engine. This is not addressed in the current work, but probably needed significant OEM involvement to achieve.

Reviewer 4:

It was not clear to the reviewer that the overall model including hybrid powertrain and emissions system was correlated with physical data for more than the example case study shown on Slide 10. The reviewer said that if that was the only example then more work should be done with other routes. The engine maps looked to take much time and effort. The reviewer asked if Southwest Research

Institute (SWRI) checked to see if this information already existed for the engines. The reviewer continued to ask if it was checked and did not exist, if other engines could have been used. The reviewer commented that SWRI was not inexpensive, but is probably less costly than doing the map.

Reviewer 5:

This reviewer stated that it was not clear if the models were public domain or internal project use only. If the models are public domain, then the ability to use with software other than Autonomie is of interest. If the models are internal project use only due to confidential partner information, then the real value of the project is the insight the model produces, but that was not a part of the project focus. Normally when a tool is developed, it starts from the need (i.e., need something to help do X) and the tool requirements are established such that the end goal is met. The project did not really focus on the end goal, rather than just developed some tools. As a result, the tool that is developed may not provide the required functionality. The reviewer added that the opportunity to link FE and emissions in a single optimization effort was very powerful, and if the tool does not help link these for the broader community, then it is leaving something on the table. The reviewer said that the PI's mindset was his task to develop a tool, and not to explore some interesting space using a tool, which is leaving something on the table.

Reviewer 6:

The reviewer said that considering the shift towards natural gas powered HD trucks, the question was whether compressed natural gas/ liquefied natural gas (CNG/LNG)-hybrids needed to be considered for future power train configurations.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer stated that the progress seemed very good. The overall accomplishments may strongly depend on details of the control strategy and drive-ability issues. However, the reviewer commented that the model the project is building is a very useful tool.

Reviewer 2:

The reviewer commented that there were significant results of model construction and simulations with observations.

Reviewer 3:

The reviewer commented that the technical accomplishments and progress seemed reasonable relative to the project plan and project goals.

Reviewer 4:

This reviewer said that the maps were generated and at least one example case study was done.

Reviewer 5:

The reviewer commented that Autonomie modeling development and modeling calibration seemed to have taken longer than expected. Further simulation work scheduled for FY 2013 seemed further drawn out. Most fuel consumption simulation observations (Accomplishment 3) published across the chosen five different drive cycles were not news. The reviewer remarked that the value of this integrated model was better shown in Accomplishment 4, where the tailpipe emissions were predicted. Yet the alternative hybrid drivetrains, waste heat recovery and control strategy variations were even further out in the 2014 timeframe when those answers were needed earlier to support other freight efficiency system projects such as SuperTruck.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer commented that the collaboration and coordination involving Meritor's CRADA, Cross-Cut Lean Exhaust Emissions Reduction Simulations (CLEERS) and a multitude of ORNL-related activities was a fine example for other projects to follow. The reviewer added that some explanation of how this is accomplished would be a benefit.

Reviewer 2:
The reviewer commented that the collaboration appeared appropriate for the activity. The reviewer thought that the summary addressed previous reviewer concerns of the collaborations not being sufficiently highlighted (or in question). The reviewer typically wonders why EPA was either not involved or not explicitly listed as a collaborator in these types of projects.

Reviewer 3:
This reviewer asked why SWRI was not involved for the engine maps. The reviewer commented that Arvin was a good partner when their work was moving forward, but that the models should be used for more than one vehicle even if Arvin continued to be part of the project.

Reviewer 4:
This reviewer commented that it would greatly improve the project to have collaborations with the engine controls and calibration groups of an OEM. It would help add realism to the results. There is plenty of sound technical expertise on the modeling side, but some practical issues should be addressed with OEM insight.

Reviewer 5:
The reviewer noticed that the item that was missing in the collaboration list is OEM adopters of the tool. It appeared that the adopters were other DOE and ORNL researchers, but influencing the OEMs in how they operate is the key to promoting change. Plus, the development of the tool needs end-user feedback to insure the tool meets needs. The reviewer commented that this project was technically very interesting and could have significant impact, but it appeared to be a technology push rather than a market pull, and market pull is so key for adoption of the tool into best practice.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer said that this work could be very valuable for decreasing emissions test costs of hybrid systems - maybe even being used in lieu of the test for a relatively small amount of vehicles sold for some hybrid systems. The reviewer asked if there was a possibility of using it for that. The emission system development and test costs are part of the barrier to introducing new hybrids systems commercially.

Reviewer 2:
The reviewer thought that the proposed future research was good, but suggested that the influence of drive cycle/driver behavior should be considered in the final results.

Reviewer 3:
The reviewer said that the proposed future research was down the right path but that the timeline was not.

Reviewer 4:
This reviewer had not seen a mention regarding MD (versus HD) in the future work, even though MD was listed as in scope with the objectives of the project.

Reviewer 5:
The reviewer referenced a previous comment that natural gas powered engines needed to be considered in the future. Due to performance issues, hybridization might have to be considered. The reviewer added that CNG/LNG hybrids should be considered in future research.

Reviewer 6:
The reviewer said that the proposed future work appeared to be focused on other architectures, rather than getting insights into the public domain using the tool. The reviewer would much rather have had one solid data point (i.e., one architecture) rather than a blur

on seven different architectures. The reviewer would have preferred to open the eyes of the world on one architecture (parallel, the most common) and validate the approach of optimizing with emissions considerations as a good idea before the tool is developed to include more less-common architectures.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that the project was very relevant to support industry decisions on what technologies needed to support the greenhouse gas regulations other than the greenhouse gas emissions model (GEM model) currently offered.

Reviewer 2:
The reviewer stated that the project was highly relevant to DOE objectives to advance state-of-the-art in system simulation for efficiency gains and emission reductions.

Reviewer 3:
The reviewer stated that there was a strong trade-off between FE and regulated emissions. A better understanding of this area is greatly needed, especially on the system level (which this project addresses).

Reviewer 4:
The reviewer said that this project could decrease the cost of emissions systems development and test for hybrid vehicles.

Reviewer 5:
The reviewer said that a substantial fuel efficiency improvement is addressed via hybrids powertrains. The question is of course how quickly this market will develop for HD vehicles.

Reviewer 6:
The reviewer said that this was a tough question because the tool helps brings emissions over drive cycles into the simulation world to the same level as current FE. Currently, emissions standards are over a standard drive cycle with a variety of pass-fail criteria. If the emissions pass/fail criteria were to change, then the tool could be very useful to evaluate FE and emissions together. As it is currently, they are separate.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

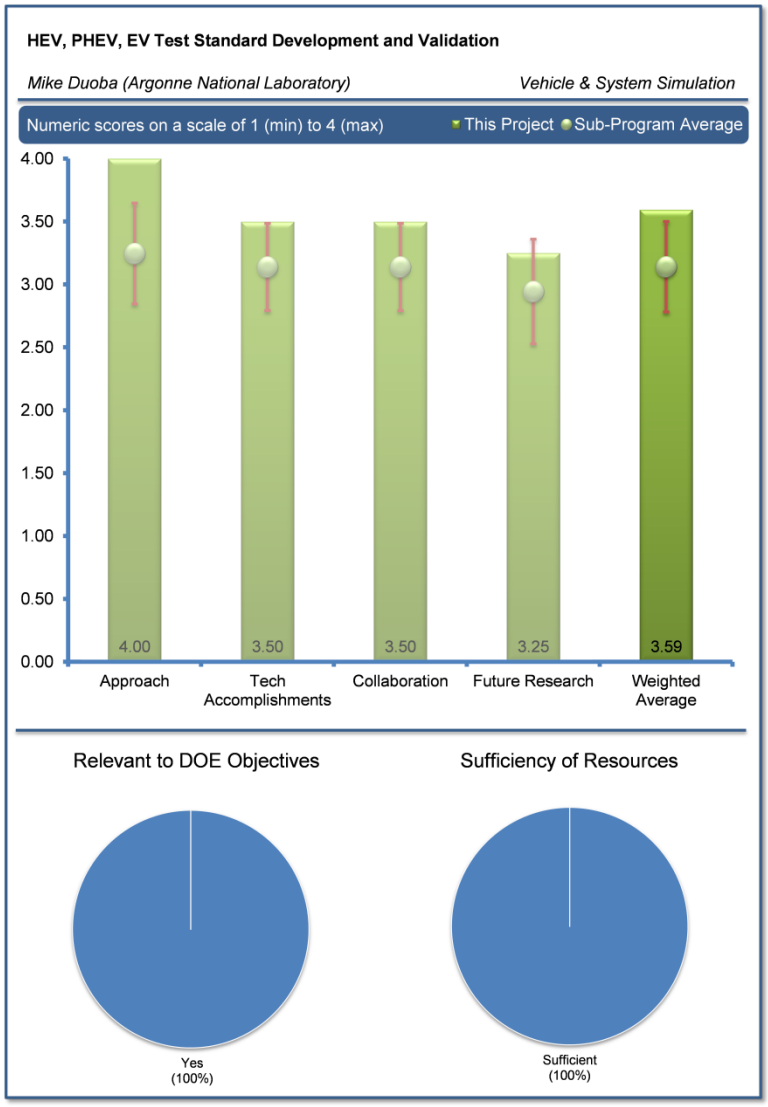
Reviewer 1:
The reviewer said that it appeared more resources were needed to improve timeline.

Reviewer 2:
The reviewer stated that more funding might allow more hybrid systems to be modeled and correlated with real world cycle data.

Reviewer 3:
The reviewer indicated the resources were sufficient. There was plenty of computing power available.

Reviewer 4:
The reviewer indicated that there were sufficient resources for an ongoing activity, and appeared to be part of a baseline budget.

HEV, PHEV, EV Test Standard Development and Validation: Mike Duoba (Argonne National Laboratory) - vss094



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that there was an outstanding approach even if SAE standards development was pretty cut and dried. Somewhere up front in the oral presentation there was a general statement made about the benefits to industry of standards. The reviewer thought that this would be even more important to overstate. In these types of technologies, nothing is comparably real until it is in a specification or tested to a standard. The reviewer would like to commend ANL for chairing some of these development committees. The reviewer acknowledged that it takes a lot of time and dedication and patience in leading these groups and getting to a standard. That was why the reviewer gave it an outstanding rating.

Reviewer 2:

The reviewer indicated that there was a high return on a $150,000 investment. The reviewer added that the SAE / ISO committee leadership/membership provided data to the efforts.

Reviewer 3:

The reviewer stated that the leadership on standard development and testing to support standards clearly addressed the industry needs in this area.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer said that it appeared that all the hard work that started a while ago was starting to pay off, with a lot of the important standards coming online in 2012. The reviewer continued that there were lots of good accomplishment charts showing the test results provided by the new standards development. It is always good to see some data after spending a lot of time reaching a standard. Further charts also showed some of the variables and differences that could occur given the different test conditions. This showed a depth of understanding what the issues are. There was a comment in the oral presentation that real world driving was much more complex than coming up with a simple single number for vehicle energy comparison. The reviewer liked Chart 10, which showed the comparative aspects of the PHEV/extended range electric vehicle (EREV) making it to the market.

Reviewer 2:
The reviewer observed two SAE standards updated and/or developed that addressed vehicle technological developments in recent years. The reviewer added that work on the newest vehicles and evaluating their applicability to existing standards also demonstrated technical progress.

Reviewer 3:
This reviewer noted that J1634 was balloted, that there was field validation of J1634 and J1711 with revisions, and that the approach and contribution depended on the market and technology standard.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer said that it appeared that all the right players were involved, although the EPA was not listed as a collaborator.

Reviewer 2:
The reviewer indicated that the industry collaboration was clear and a necessary part of standards evaluation and development, and were identified as such in the presentation.

Reviewer 3:
The reviewer commented that collaboration and coordination with other institutions were by nature of the activity, domestic and international.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer liked the plans for the next standard on power trains. The reviewer recognized the variability of the specmanship and claims. There is potentially a safety aspect for consideration in this standard development and that would be available vehicle acceleration when a PHEV has a fully depleted battery. Having adequate acceleration capability is an important safety criteria that not all PHEV designs (especially by non-OEM's) take into consideration. To provide a vision of this issue, the reviewer suggested thinking about merging onto the freeway and having a Class 8 truck barreling down the slow lane at you and considering whether one would have enough acceleration capability under all battery state of charge (SOC) conditions to make it or if one would have to swerve out of the way. The reviewer asked if this could be worked into the standard such as listing the available PHEV horsepower at minimal SOC.

Reviewer 2:
The reviewer commented that there was a clear vision on future evaluation, refinement and analysis of existing standards discussed. New standards were also identified and presented as future work.

Reviewer 3:
The reviewer stated that the project was continuing to improve information to customers and the public.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that standards development to help create the PEV industry was certainly needed to accelerate the market and give consumers confidence in buying these vehicles. The reviewer noted that that would lead to petroleum displacement.

Reviewer 2:
This reviewer commented that standards were critical to treat automakers in a balanced way and to provide good information to the public.

Reviewer 3:
This reviewer stated that FE measurement was a clear part of the standards work in this project. Better standards for performance testing helps to measure progress and success in meeting petroleum displacement objectives.

Reviewer 4:
This reviewer stated that developing test standards for EV and PHEV contributed to determining the correct energy consumption calculation and measurement.

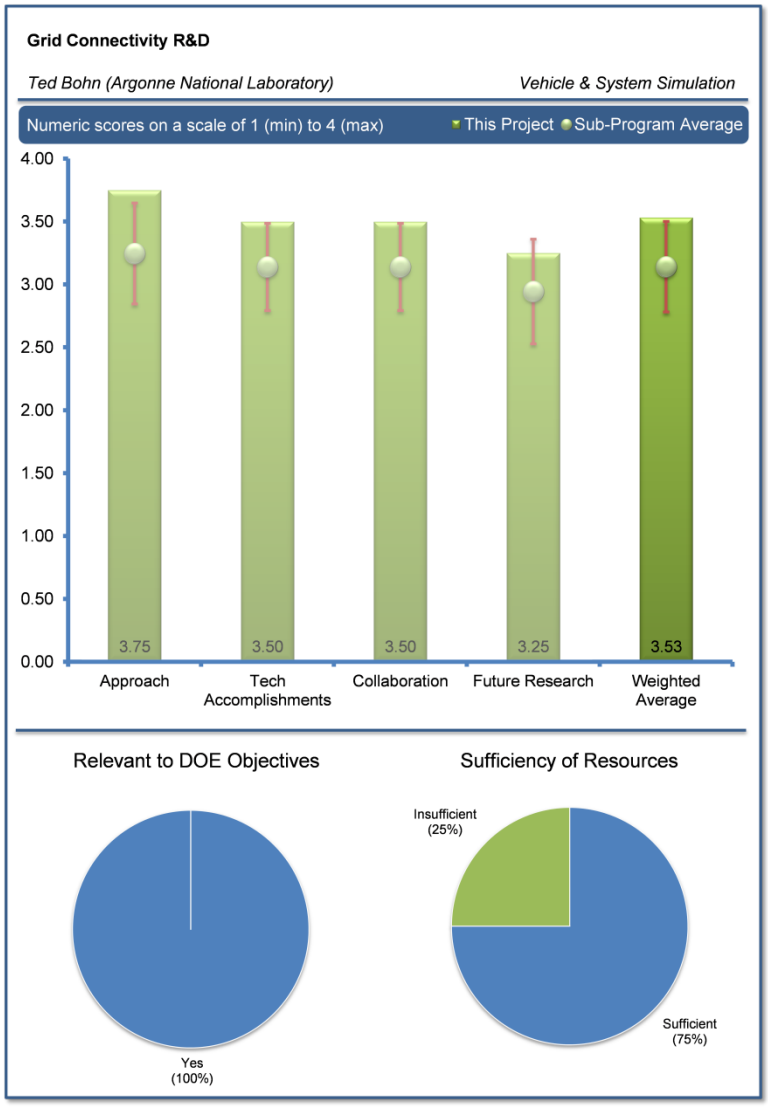
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
Given the number of standards reaching the industry in the last few years, it appears that this has sufficient resources.

Reviewer 2:
This reviewer said that ANL clearly identified having sufficient resources to complete this project and its ongoing nature.

Reviewer 3:
This reviewer stated that there was a high return on the investment.

Grid Connectivity R&D: Ted Bohn (Argonne National Laboratory) - vss095



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer observed that the leadership and participation in interoperability and new technology evaluation and demonstrations clearly supported the project's stated objective to support transitional and transformational technologies associated with grid connected vehicle charging.

Reviewer 2:

The reviewer said that this was a messy technology segment. The reviewer commented that the technology and potential markets are developing and changing at a fast pace. A lot of stakeholders are trying to shape the market and there is a lot of diversity. Given that the approach is that the DOE is trying to stay out of the business fray, and more or less providing common technology solutions that would benefit all parties in key areas, is a good approach. This will be especially important in the sub-metering on a chip project because the electricity meter is essentially the cash register for electricity and all the stakeholders will be angling to take control of that technology. The reviewer remarked that also given all the permutations of vehicles, EVSE, communication nuances, basic functionality, control strategies, and communication pathways, this will be an ongoing growing area, that probably could use some more funding to dive into more of these issues as they begin to appear. According to the reviewer, this was probably the difference between good and outstanding. If more resources were available for testing a lot more of the hardware and communication software permutations and finding more agnostic technical solutions, that would move this toward outstanding.

Reviewer 3:

The reviewer said that hardware development for electrification and grid interaction provides data for standards making, proof of concepts, and disseminates information. The reviewer stated that a barrier was the interoperability of EV to grid. The reviewer commented to find and fill technology gaps. Lastly, the reviewer stated it was very important to provide data to the providers and the consumers.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer observed that the project identified technical accomplishments that clearly supported understanding for the traditional and transformational technologies.

Reviewer 2:

This reviewer stated that there was good progress, given that so much was changing in this area and that keeping up with all the changes was difficult. Getting hardware and testing protocols is important. The reviewer thought that the recent release of Smart Energy Profile (SEP) 2.0 would help in this matter. To some degree the reviewer thinks that the delay in SEP 2.0 getting to the market, created a technology vacuum that all the other networks and controls schemes took advantage of. Once again, concentrating on agnostic technology, universal communication standards and not propriety solutions will be important. Once more standards exist, making progress will help organize activity and support progress. Regarding milestones, and smart grid related charging, in the oral presentation there was mention that subscription services are starting to appear like a likely business model. The reviewer thinks it might be too early to presuppose this. There is somewhat of a backlash from PEV drivers about having to belong to each individual subscription service to get coverage and some folks are suggesting a simple credit card reader for a default payment system is necessary, to get around subscription services. This could simplify and change the market place to some different technical solutions. The reviewer liked the accomplishments and technical depth that was provided on wireless charging in the oral presentation. Often, the technology vendors have little knowledge of these bigger picture issues that were discussed, such as EMF/EMI compatibility with vehicle back up sensors, medical equipment and other ancillary technologies. A lot of work and testing in this area will be required.

Reviewer 3:

The reviewer stated that it was difficult to judge whether the standards development was in time to help the market.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

The reviewer observed that collaborations were listed, but not as clearly identified in the work, but certainly existed with charging standards organizations, product suppliers and internally with team approach to proof of concept work.

Reviewer 2:

The reviewer suggested getting more utility involvement in this space. The reviewer asked if the project has tried engaging EPRI. The reviewer pointed out that EPRI was listed on one chart and have also been working with the OEM's for years. Utilities are a diverse bunch (over 3,000 in the United States) and getting input from just a handful can be limiting. The reviewer commented that EPRI tries to strike the best balance of getting as much of the utility world on one page. The reviewer was a little cautious on putting a lot of emphasis on the California Public Utilities Commission (CPUC) sub-metering protocols. There was not much thought given to the consumer protection aspects of metering when the project team made a decision to go in that direction. The reviewer believes that the project may have to revisit some of that in the future or it will be overtaking by the ongoing NIST effort.

Reviewer 3:

The reviewer commented that the collaboration and coordination with other institutions was by the nature of the work.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:

This reviewer said that all work in this project was looking to future needs and standards. The reviewer added that the work is clearly path-dependent and is the nature of research.

Reviewer 2:

This reviewer stated that there was a wide landscape for this area going forward. The reviewer liked the general direction everything was headed but said that a lot more testing will be necessary and it will probably take a lot more funding. The reviewer commented on environmental testing. The reviewer said that a lot of the DC fast charging hardware is only UL listed to work in ambient environments up to 104°F. The reviewer said that that was not going to cut it for a wide market deployment. So things like additional environment testing of hardware will be needed and likewise for wireless charging. The reviewer asked what the reliability of that

equipment was going to be after repeated cycles at temperatures as high as 160°F, just above the pavement. The reviewer also asked what the EMF signature under different thermal conditions would be.

The reviewer stated that the $100 sub-meter chip was a great goal from a utility value chain, but believed that a lot of the EVSE folks want stuff in the $10 range. The reviewer commented that just like having an agnostic metering chip under development, the reviewer thinks that an agnostic communication board-insert slot could also be of value to the industry. The reviewer thought that was discussed last year. Just like the EVSE companies have worked on proprietary communication protocols, so have the AMI systems companies. It is problematic for the industry. The reviewer said that hopefully SEP 2.0 will help.

As previously discussed, the reviewer thought that incorporating SEP 2.0 will be an important step going forward and testing some of the aspects of that improved communication protocol.

The reviewer commented on Slide 11 regarding Demand Response (DR) Test Cases. The reviewer suggested considering a test case where the project ratchets the DR level from 100% Level 2 down to a simple Level 1. The reviewer believes the only other test cases were either to 0 or 50%. The reviewer added that the charging level has a greater grid impact than the time of day, and charging at Level 1 is probably 80% as good as optimized smart charging based on some ongoing utility analyses.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that the technologies involved with this project supported the DOE's objectives for petroleum displacement, and so this project does also.

Reviewer 2:
The reviewer said that a lot of these technologies were enabling in making PEV charging ubiquitous, easy and reliable. This would further help to accelerate the PEV market to support petroleum displacement.

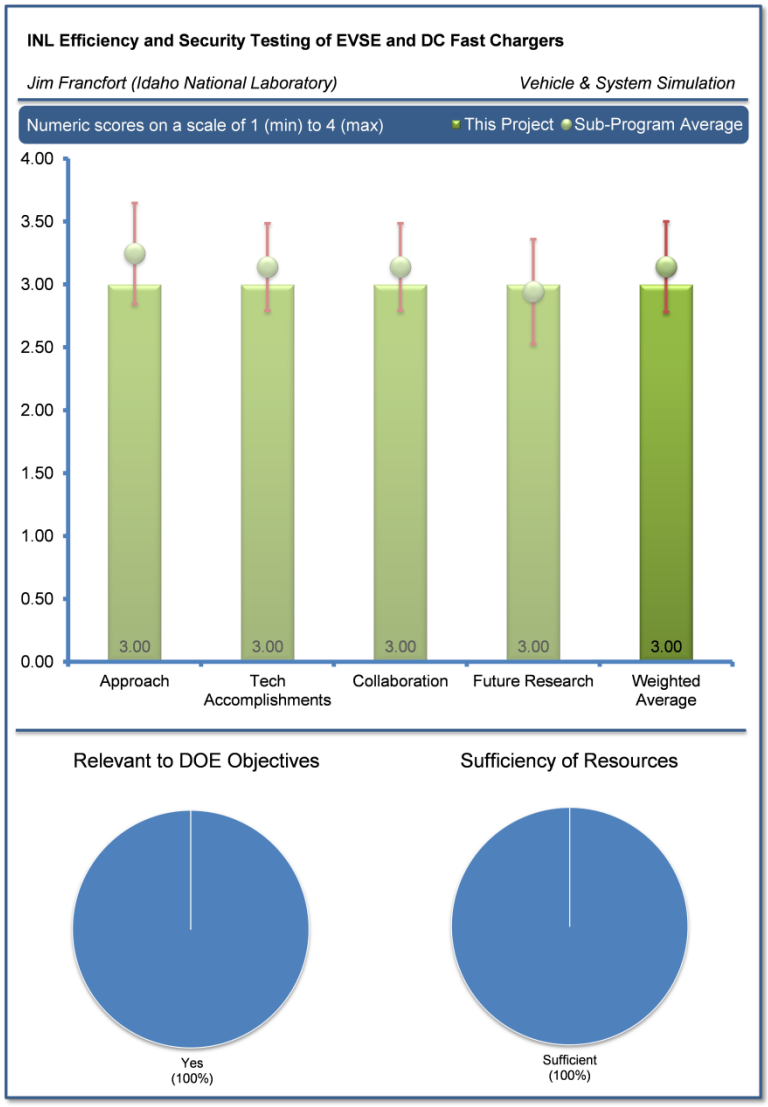
Reviewer 3:
This reviewer commented that future research was critical for mass adoption.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer commented that there was no indication that the ANL team was not able to support industry needs in these areas.

Reviewer 2:
This reviewer said that it appeared that the funding in this area had been all over the map. Upwards of $950,000 back in 2010, then down to $300,000 in 2012, now back up to $650,000 in 2013. The reviewer thinks having some more consistent funding would be beneficial. The reviewer also thinks that more activity would benefit the industry; the reviewer liked the approach of being independent and agnostic. Since the PEV market is growing and the technology is changing, additional resources would be good.

INL Efficiency and Security Testing of EVSE and DC Fast Chargers: Jim Francfort (Idaho National Laboratory) - vss096



Reviewer Sample Size

A total of two reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer recounted data collection for DC fast charging and wireless - battery impact, system efficiency, and cyber security.

Reviewer 2:

This reviewer observed that there was a variety of projects identified in this presentation. The reviewer added that the approach was to provide testing and qualification of existing systems and confirm compliance with requirements.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer said that much of the accomplishments for these projects would take place in the future, so technical accomplishments were not as relevant yet. The reviewer added that test set-ups and procedures were identified and read of upcoming evaluations.

Reviewer 2:

This reviewer stated it was difficult to judge progress against planned deliverables.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer stated that the project clearly demonstrated collaboration in all areas including agreements and broad participation for needed partners.

Reviewer 2:

The reviewer said that collaboration and coordination with other institutions was unclear from the presentation. The reviewer recounted the discussion that OEMs were asking for interoperation between EVs and charging systems (EVSE).

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:

This reviewer said that future work was identified for most of the projects as time dependent on others for the evaluations. INL appeared to be ready for evaluations and not the cause for any delays.

Reviewer 2:

The reviewer stated that the proposed future research was difficult to judge from the presentation.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:

This reviewer commented that the technologies being evaluated were clearly in support of petroleum displacement. Benchmarking and compliance evaluations clearly supported this objective.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

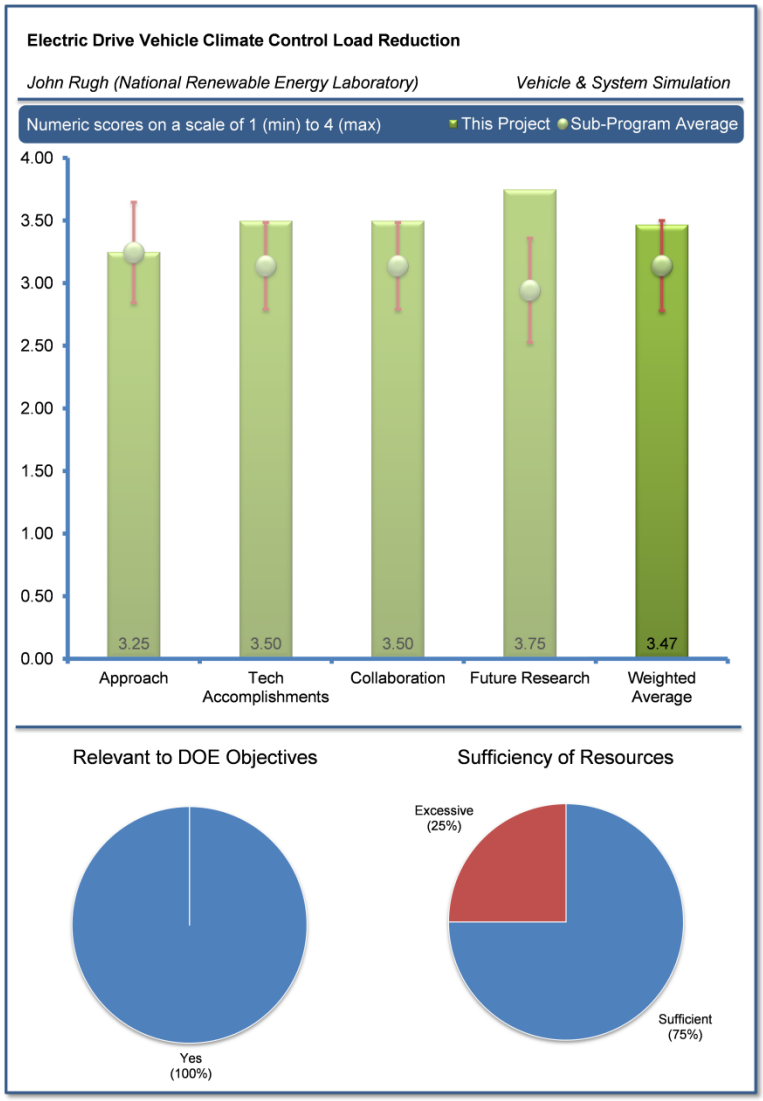
Reviewer 1:

This reviewer said that the project was clearly utilizing resources wisely to meet milestones and objectives where INL has influence. No milestone requirements appeared to be missed due to the INL resources applied.

Reviewer 2:

The reviewer commented that there were unspecified efforts to reduce testing (possibly capital) costs.

Electric Drive Vehicle Climate Control Load Reduction: John Rugh (National Renewable Energy Laboratory) - vss097



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer said that barriers were properly identified and that the approach was appropriate.

Reviewer 2:

The reviewer stated that there was a good combination of simulation and testing to develop understanding for HVAC energy.

Reviewer 3:

This reviewer would have liked to see defog (dehumidification) and defrost (removal of ice) included in this study, as both consume energy, especially with defrost. The total glass area (minimal defined viewing area) needs to be kept clear of ice and this is an energy challenge especially with EVs and PHEVs.

Reviewer 4:

The reviewer commented that the baseline needs to be better characterized, especially for extreme environments such as Phoenix, Arizona or Fairbanks, Alaska.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer stated that the project appeared well executed and is following the defined plan.

Reviewer 2:

The reviewer commented that the project is early on and that the goals and control factors to measure for fuel consumption reduction are good.

Reviewer 3:

This reviewer commented that the use of good simulation models represented a solid step forward. The proper use of these data, however, would be a real challenge.

Reviewer 4:
The reviewer commented that the work done to date was excellent, but $1.7 million seemed to be a lot of money for what has been accomplished so far. The reviewer added that the project has not even completed the baseline testing.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer noted an impressive list of partners who were providing important inputs, plus that were leveraging existing DOE research.

Reviewer 2:
This reviewer commented that there was a good use of industry partners, including both suppliers and OEMs.

Reviewer 3:
The reviewer commented that it was good that the supply base to the components used to insulate or diffuse energy were involved.

Reviewer 4:
This reviewer indicated that collaboration with an OEM vehicle manufacturer (Ford) was absolutely necessary for real world results.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer said that the plan was excellent and addressed the primary issues.

Reviewer 2:
The reviewer stated that the proposed future work clearly builds upon past progress and the use of models represents a solid engineering approach.

Reviewer 3:
This reviewer stated that logical next steps were well-defined.

Reviewer 4:
The reviewer commented that the mission of increasing electric range while operating the HVAC by 10% appears that it will be understood with the proposed activities.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer stated that any capability to further electrify the fleet of vehicles strongly supports the DOE objective of petroleum displacement.

Reviewer 2:
The reviewer asserted that this project does support the DOE objectives.

Reviewer 3:
The reviewer said that it will support DOE objectives where petroleum is used to generate electricity.

Reviewer 4:

The reviewer noted that climate control was a significant barrier to adoption of EVs. In addition, the reviewer stated that improvements identified by this program may also help reduce climate control fuel consumption and GHG emissions in conventional vehicles.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

The reviewer stated that resources appeared adequate to achieve the stated milestones on a reasonable time schedule.

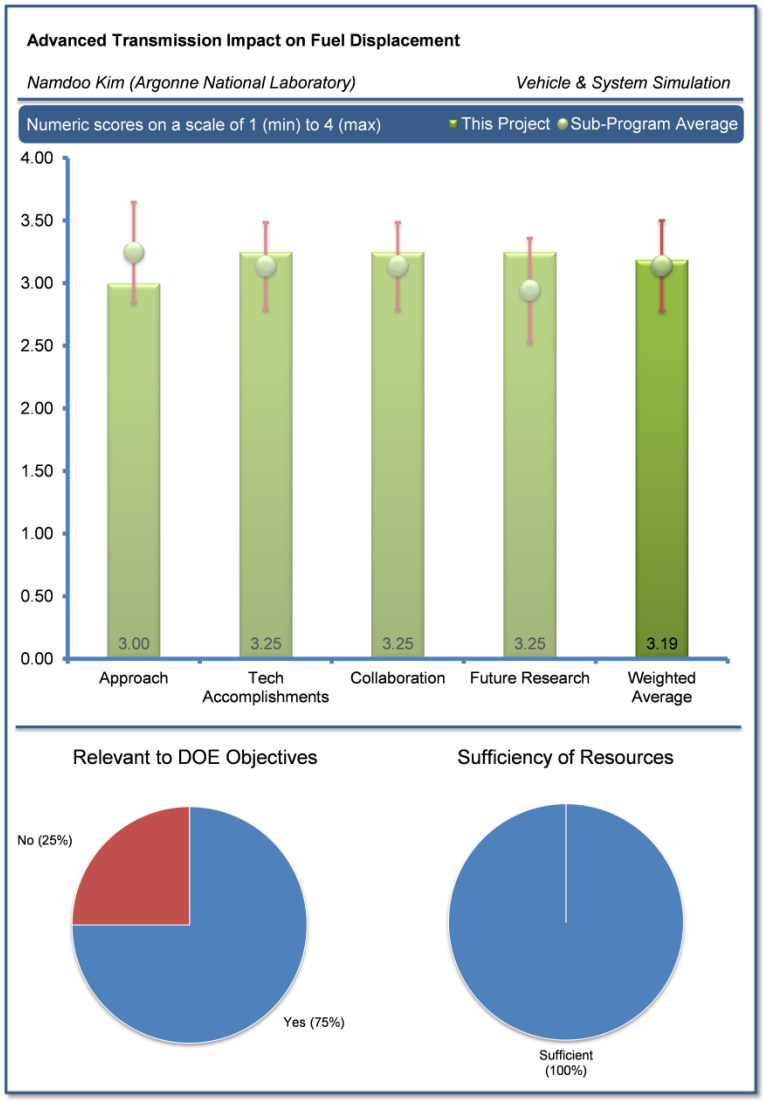
Reviewer 2:

The reviewer commented that the resources appeared sufficient.

Reviewer 3:

The reviewer commented that the amounts spent to date ($1.7 million) appeared to be far too much for the relatively limited results seen so far.

Advanced Transmission Impact on Fuel Displacement: Namdoo Kim (Argonne National Laboratory) - vss098



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer said that the approach, in the absence of data from OEM vehicle manufacturers, was excellent. It may be a bit more difficult to validate the model outputs without active collaborative input from these OEMs.

Reviewer 2:

The reviewer observed that the approach seemed appropriate. This project appeared to be merely an update to Autonomie to keep it relevant and on track with current technology trends.

Reviewer 3:

Use of the Advanced Powertrain Research Facility (APRF) for data collection to build the plant models is the correct choice.

Reviewer 4:

The reviewer commented that there was a wide range of baseline vehicles, although the data gathered was minimal. The reviewer said that the project was inferring many of the parameters analytically. The reviewer suggested that it may have helped improve modeling if more detailed data had been gathered (although this would have required a larger budget). The reviewer noted a wide range of test cycles. The reviewer added there was good integration with Autonomie. Lastly, the reviewer said it was not entirely clear how shifting points would be optimized for future transmissions, especially for hybrids with electric motors.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer commented that the progress toward overcoming the barrier of lack of OEM transmission performance (gears) was admirable and will help establish credibility of the DOE vehicle R&D activities, especially that of hybrid technologies.

Reviewer 2:

The reviewer commented that the project was progressing well. The reviewer added that lots of testing was completed and procedures developed to assess shift points.

Reviewer 3:
The reviewer observed that the accomplishments are as per the plan and appear to be of high quality.

Reviewer 4:
The reviewer said that keeping DOE's fuel consumption evaluation tools up to date was a necessity.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
The reviewer stated that the collaboration was appropriate for the project (not a lot of coordination is required).

Reviewer 2:
The reviewer observed that the collaboration and coordination with the OEMs in these kinds of activities were particularly difficult as transmission design was one of the most proprietary areas of vehicle manufacturer's technologies.

Reviewer 3:
The reviewer said that it was unclear how much collaboration was actually occurring on this program. While there was obvious collaboration within ANL, the extent of OEM manufacturer or Tier 1 supplier involvement is not spelled out in the presentation material.

Reviewer 4:
The reviewer asked the team to continue to try to work directly with OEM's when possible.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer affirmed that all technologies proposed to be updated in the model were appropriate to research.

Reviewer 2:
The reviewer said that this was a relatively small, sharply focused program.

Reviewer 3:
The reviewer stated that the proposed future research was clearly based upon past progress to overcome the barrier of proprietary knowledge base of the OEM vehicle manufacturers.

Reviewer 4:
The reviewer observed that the proposed future work included validation of various transmission technologies and that extending the coverage into medium- and heavy-duty would be a significant step forward.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer stated that transmissions are very important to future conventional vehicle efficiency. This is especially important for integrating transmissions with hybrid systems.

Reviewer 2:
The reviewer stated that the improvement model allowed better accuracy to displacement projections.

Reviewer 3:
The reviewer commented that without these kinds of models (Autonomie), DOE would have no means of evaluating the benefits of the research. It is often stated (by certain critics) that DOE's R&D has not produced any benefits. These models as well as more in depth analysis (retrospectives) demonstrate the benefits (cost/benefit analyses) of the VTO research.

Reviewer 4:
The reviewer was unclear why DOE was funding the development of Autonomie.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

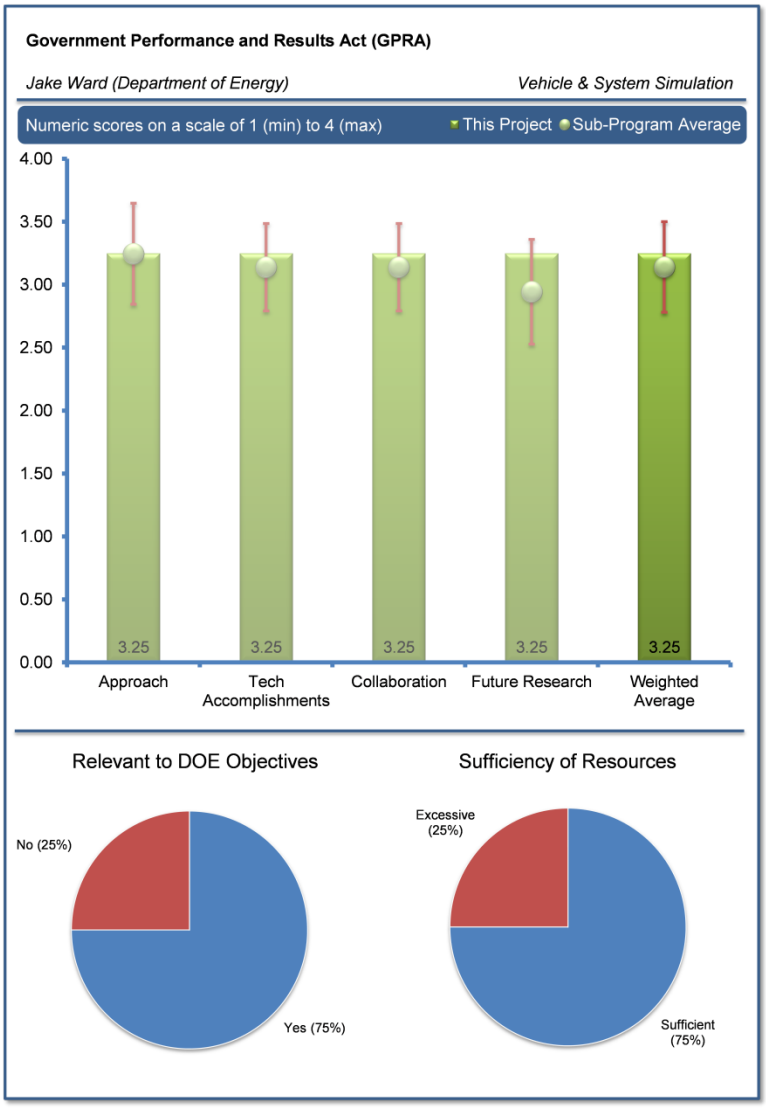
Reviewer 1:
The reviewer stated there was not a lot of money for a very important upgrade.

Reviewer 2:
The reviewer said that this was a good single year project with a start and end date, good purpose, and good to see reach a conclusion. The reviewer added that follow-up on the medium and heavy-duty seemed like a good use of the resource continuing on from here.

Reviewer 3:
The reviewer said that the resources for this effort were sufficient for the project to achieve the stated milestones in a timely fashion.

Reviewer 4:
The reviewer indicated that resources seemed sufficient.

Government Performance and Results Act (GPRA): Jake Ward (DOE) - vss099



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that there was a good approach with clear objectives, and exclaimed that success needed to be measured somehow.

Reviewer 2:

The reviewer commented that the approach was very good. The reviewer said that assessing how VTO's projects accelerate technology introduction, compared to what would have occurred without VTO, was extremely subjective. The approach taken handles these subjective factors as well as possible.

Reviewer 3:

The reviewer said that it was understood that the Government Performance and Results Act (GPRA) analyses was required but that there must be a means to simplify the presentation of the impacts of the VTO R&D. The reviewer asked if there was a way to extract some of the benefits of technologies from the GPRA analysis and present them separately from all of the other technologies.

Reviewer 4:

The reviewer commented that the question this is trying to answer was difficult to answer with a high degree of fidelity. The reviewer noted that the appropriate DOE partners are pulled for data, so continue to increase the accuracy and fidelity as best as is possible.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer noted that the projections of technologies, market, and fuel out to 2050 would have a high percentage chance for being inaccurate, but that as a review of the DOE project portfolio, this appeared to be a good effort.

Reviewer 2:

The reviewer exclaimed that the project does what it states it will do.

Reviewer 3:

The reviewer said that since the GPRA analysis was required by law, progress toward that objective was essentially a given.

Reviewer 4:

The reviewer questioned the validity of the market penetration data presented. The reviewer stated that the vehicle modeling and simulation part of the work was very useful and important, but estimating the market penetration with and without VTO's programs was not possible. Forecasting technology penetration in general is extremely difficult and assessing differences in penetration is often subjective.

The example presented on Slide 7 illustrates the problem. DOE estimates that light-duty vehicle (LDV) efficiency would be about 50 mpg in 2050 without VTO and about 85 with VTO. However, 85 mpg in 2050 could also be achieved simply by continuing to increase CAFE standards, even if VTO did nothing. Another example is fuel cell penetration, which will be largely determined by building hydrogen infrastructure just ahead of vehicle sales. The reviewer pointed out that work to improve the vehicle will have relatively little impact on fuel cell penetration (it might on fuel cell cost). The reviewer acknowledged that managers want to see these numbers to help support program activity, but that does not change the fact that there was no real way to know how the programs will affect future market penetration.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

The reviewer commented that there was a good use of Autonomie, good leveraging of other DOE departments, and good pull of data from many sources to create estimates.

Reviewer 2:

The reviewer stated that this was entirely a coordination project. The reviewer stated that it does not advance any technology on its own.

Reviewer 3:

The reviewer stated that the data was used by a large number of activities in many partnerships/initiatives.

Reviewer 4:

The reviewer commented that GPRA is essentially an internal DOE required activity, so the collaboration outside of DOE really would not make sense. However, the reviewer commented that including in the GPRA process a linkage to more in-depth retrospective analyses would make the GPRA results seem more real to outside stakeholders (e.g., Congress).

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:

The reviewer said that the proposal was to make the tool better, which is the appropriate mission of future research for this project.

Reviewer 2:

The reviewer commented to continue the GPRA with the caveat discussed previously.

Reviewer 3:

The reviewer suggested that future research needs to continue as outlined.

Reviewer 4:

The reviewer stated that the proper steps were being taken to use the analyses. The reviewer stated it is just GIGO.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer noted that the whole purpose of the DOE GPRA for VTO R&D was to reduce petroleum consumption.

Reviewer 2:
The reviewer asked how else the success of VTO could be measured.

Reviewer 3:
The reviewer said that the results were almost entirely subjective and had little value; especially if DOE wants to use the results to help plan their future projects.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

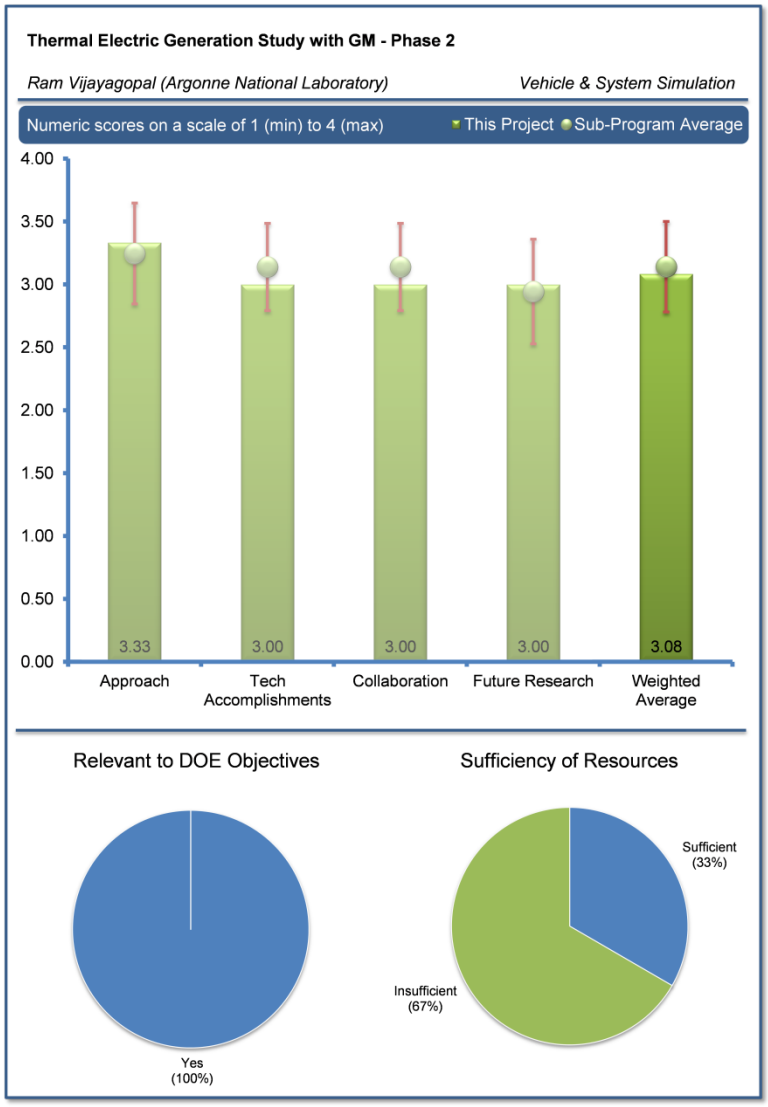
Reviewer 1:
The reviewer stated that resources appeared sufficient.

Reviewer 2:
The reviewer said that this seemed like the appropriate level of funding compared to the entire DOE project list for this type of activity.

Reviewer 3:
The reviewer commented that the resources for GPRA appeared adequate but should be increased by about 15% to accommodate retrospective analysis to capture the benefits of DOE VTO R&D for specific technologies.

Reviewer 4:
The reviewer noted that the value of this work was greater to DOE internally rather than externally.

Thermal Electric Generation Study with GM - Phase 2: Ram Vijayagopal (Argonne National Laboratory) - vss100



Reviewer Sample Size

A total of three reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that this was a very challenging topic and one that would in time yield very good results.

Reviewer 2:

The reviewer said that the thermoelectric generation (TEG) evaluation sounded excellent, but it was still not clear to if the model was properly translating TEG output to the overall efficiency of the vehicle.

Reviewer 3:

The reviewer stated that the approach contributed to overcoming some barriers but that it was unclear what these barriers were.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer stated that material science was where most of the breakthroughs were going to happen in this arena.

Reviewer 2:

The reviewer reiterated again, that the TEG evaluation looked to be excellent, but that it was not clear about calculation of fuel savings.

Reviewer 3:

The reviewer said that the rate of progress has been slow and it was not even clear why this project was necessary.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

The reviewer noted that this was a small project that does not require much coordination. The reviewer added that obtaining TEG modeling data from GM was key to the whole program.

Reviewer 2:
This reviewer would like to see more collaboration, especially with the OEMs.

Reviewer 3:
The reviewer observed that collaboration was said to be with GM, yet the hand of GM did not seem much in evidence.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer noted that future plans focused on better assessing ways to recover energy from TEGs, which was properly focused.

Reviewer 2:
The reviewer stated that this technology must be pushed forward.

Reviewer 3:
The reviewer indicated that the proposed future research needed better focus to overcome barriers, whatever they might be.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer stated that this was very relevant and asked why waste all that energy as heat.

Reviewer 2:
The reviewer commented that energy recovery was a potentially large improvement to hybrid efficiency and deserved more work.

Reviewer 3:
The reviewer said that if this project contributed to the use of thermoelectric devices to improve vehicle FE, then this project would support the overall DOE objective to displace petroleum.

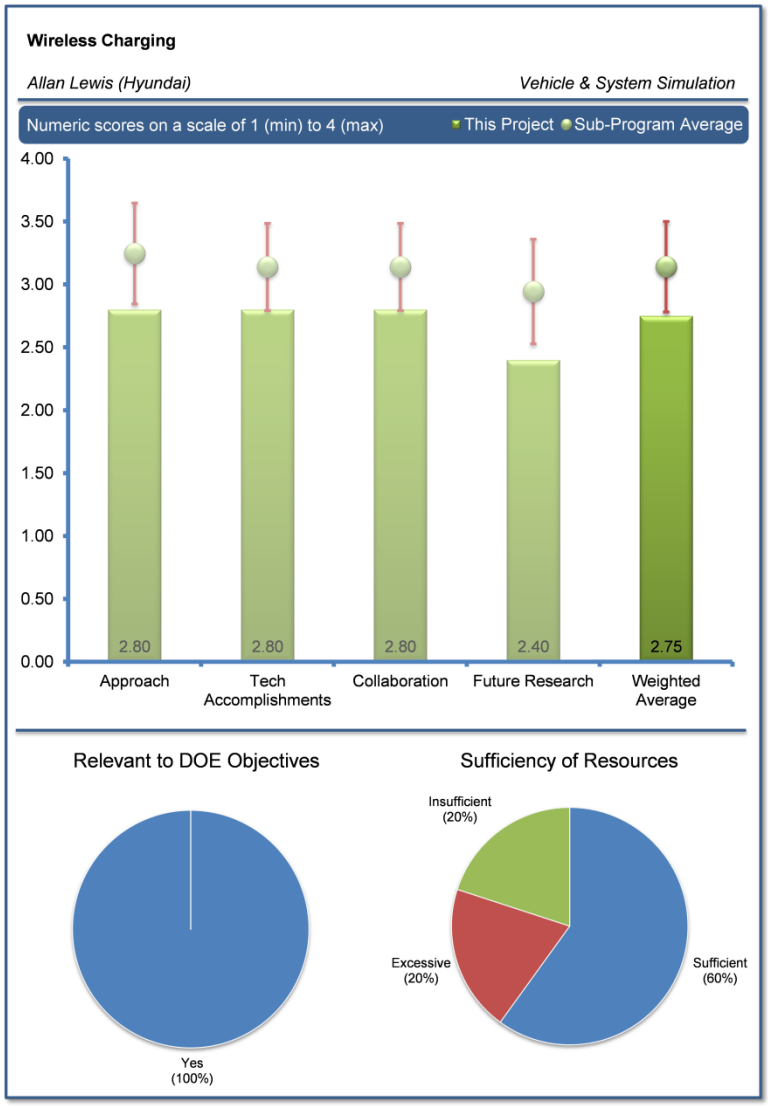
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer said that aside from the lack of more OEM participation, the resources looked adequate.

Reviewer 2:
The reviewer hoped that this was just one of a number of projects that DOE had on TEGs. The reviewer added that not only was this an important area of research, but that it is also an area that is not well advanced and in which DOE work can make a difference.

Reviewer 3:
The reviewer observed that funding for this project was so small as to be almost non-existent and therefore, it does not appear capable that this project would be able to achieve the stated milestones in a timely fashion.

Wireless Charging: Allan Lewis (Hyundai) - vss102



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer stated that this project is a system development that is intended to create a salable design for a wireless charging system by the end of 2015. The reviewer noted that the approach is not fully explained as the company claims it is pursuing intellectual property (IP) filings and therefore offered limited information regarding the product and/or approach. The reviewer commented that it is distinctly different from VSS103 which is designed to explore the limits of wireless charging in the area of flow rate.

Reviewer 2:

The reviewer stated that the general objectives are appropriate but the plan of attack is somewhat generic. This reviewer believed that technical hurdles and means to overcome them were not outlined. The reviewer remarked that the reader is left with the impression that technical barriers may not exist and that this is primarily an application development problem.

Reviewer 3:

The reviewer specified that this appears to be in the planning stage. The reviewer noted that the relevant standards and organizations were identified. The reviewer observed that barriers were described on a technical level, but not a practical one. For example, the reviewer asked why these degrees of alignment tolerances were necessary when many cars could now parallel park themselves.

Reviewer 4:

The reviewer pointed out that the presenter provided very high level generalities and very little technical details. The reviewer noted that it was hard to see if the approach was appropriate or whether it produced significant progress. Perhaps, the expectations were not very high to begin with, but according to the reviewer it was very hard to tell.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer remarked that the project started late last year so progress was limited. The reviewer observed that the modeling showed promise of meeting some performance objectives.

Reviewer 2:
This reviewer thought that technical barriers were identified and a framework was described, but there was no mention of technical advantage over other approaches that are being pursued. Perhaps it is too early to tell.

Reviewer 3:
The reviewer stated that because there is a near term salable product objective it seemed that the approach is intended to limit risk and take a next generation product to market. The 6.6 kilowatt-hours (kWh) is a sizable gain from the 3.3 kWh units in commercial use today but is a conservative gain when compared to the work of VSS103. The reviewer remarked that the entire schedule also seemed to be very slow. A greater use of modeling and quick builds, to gain hardware earlier, would be a great addition.

Reviewer 4:
This reviewer stated that the team has made very little technical progress in the first year compared to the other teams that have been working on the project for the last year.

Reviewer 5:
The reviewer noticed that no quantitative data was presented to show technical progress towards the go/no-go criteria, which was quantitative [i.e., wireless power transfer of at least 6.6 kW with at least 85% efficiency with at least a 20 centimeter (cm) gap]. In addition, the presenter excused himself from presenting data on the results of misalignment on wireless power transfer on the basis of intellectual property.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer indicated that project division of labor seems well defined between Hyundai and Mojo Mobility. Also, the reviewer said coordination and participation with SAE J2954 committee was good.

Reviewer 2:
This reviewer stated that the partnerships identified appear to be appropriate for the time being. This reviewer added that the anticipated list, upon fruitful results, should be expanded, such as the DOT.

Reviewer 3:
This reviewer observed that only one collaborator was listed (i.e., Mojo mobility). The reviewer expected other collaborators that should be included on a project like this, such as suppliers, to the automotive industry, of rectifiers, AC/DC converters, electronic controllers, and dedicated short-range communications (DSRC).

Reviewer 4:
This reviewer stated that collaboration is somewhat limited. This reviewer noticed that only a potential charger manufacturer, who is a sub-contractor, seems to be providing serious input. This reviewer has not seen significant collaboration with DOE labs or other industrial entities.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said it is good but aimed at a low risk implementation.

Reviewer 2:
This reviewer stated that future research forecasts are understandably limited to the maturity of the project; however, some vision would be refreshing considering the dynamic nature of the topic.

Reviewer 3:
This reviewer thought that the steps were appropriate to meet the project objectives. Also, the reviewer observed that it appears that a lot of work remains to be done in FY 2013.

Reviewer 4:
This reviewer listed the following Proposed Future Work tasks, which the reviewer thought were meaningless and needed details: first generation system test and corrections; second generation wireless power transfer prototypes; and second generation system test and corrections.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer observed that electrification of a significant portion of the passenger vehicle population would be a great benefit to not only the DOE, but also the Federal Highway Administration (FHWA), EPA, and areas striving to meet attainment status under the clean energy act.

Reviewer 2:
This reviewer stated that this could create a greater rate of EV adoption.

Reviewer 3:
The reviewer indicated that this project helps commercialization of high-power wireless charging for PEVs. The reviewer added that this will help to improve market acceptance PEVs due to better usability.

Reviewer 4:
This reviewer noticed that all wireless power transfer projects meet DOE objectives of petroleum displacement.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

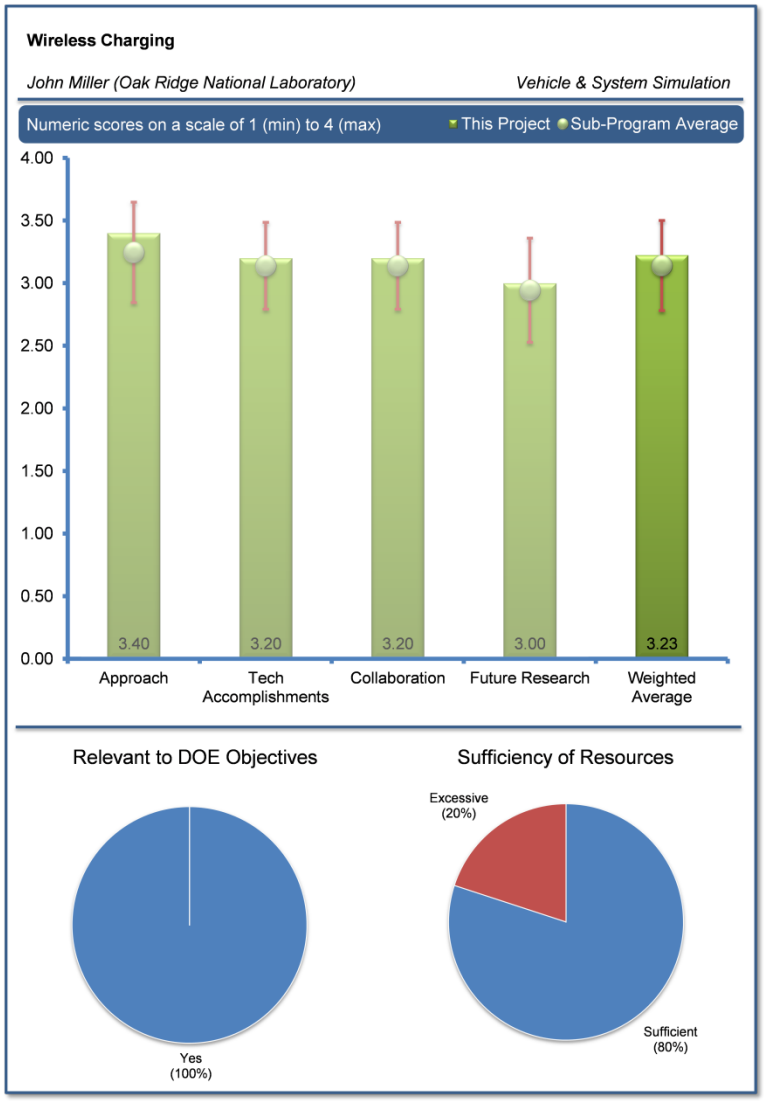
Reviewer 1:
This reviewer said compared to the VSS103, it seems this project intends to accomplish more (more vehicles, higher performance) with less funding.

Reviewer 2:
This reviewer said quite.

Reviewer 3:
This reviewer thought at first glance, the schedule just seems to be so long. Also, the reviewer said it looks like this project is intended to fit the Funding Opportunity Announcement's (FOA's) time limits. The reviewer added that there was not enough information given to really understand the phases and tasks in any detail, but it looks like this has been done to protect some IP that is in the process of registration.

Reviewer 4:
This reviewer said this project was priced at $6 million. The reviewer thought that without a cost breakdown, it is hard to understand why so much money is being spent on this project.

Wireless Charging: John Miller (Oak Ridge National Laboratory) - vss103



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer indicated that there was a detailed research plan and targets. The reviewer also added that the project team had a clear understanding and appreciation of technical issues, including safety.

Reviewer 2:

This reviewer stated that unlike the other wireless project, this one is designed to push the envelope on the capability of wireless charging. In addition, the reviewer noted that while it may be extremely aggressive to target a 19 kW transfer rate, the commercial value of establishing the parameters and challenges of reaching that level are worthwhile. The reviewer strongly encouraged the project to go higher.

Reviewer 3:

This reviewer said that the team has made a lot of progress in the first year of the project and that the technical accomplishments of the project were substantial.

Reviewer 4:

This reviewer stated that the principal investigator has done excellent work in identifying the parameters that have a significant effect on wireless power transfer (e.g., gap, current, and voltage) and performing a good parametric analysis (e.g., frequency versus power). However, the principle investigator's approach could be improved by depicting in quantitative terms where the contributions (or losses) in efficiency from each of the major components (on the grid side as well as on the vehicle side) are and whether they add up to achieve the target goal of 85% efficiency.

Reviewer 5:

This reviewer noticed that the project is well within the bounds of the scope. The reviewer indicated that the milestones have been established; however, go/no-go decisions do not include options for the no-go condition. Also, the reviewer noted that coil durability was not identified as a barrier.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer observed that the accomplishments to date are outstanding. This reviewer stated that the project gives us a superior understanding of the quantitative effects or relationship of current and frequency, power and frequency, misalignment and (primary or

secondary) power, tilt and efficiency, tilt and power, tilt and coupling coefficient, and dynamic frequency versus gap changes. This reviewer said that this understanding led to development of a new theory of wireless power transfer operation and control (e.g., tuning the input control achieves efficient power delivery). The reviewer noticed that the project even included potential conducting materials such as aluminum foil wrapper debris that may intervene between the charging pad and the vehicle.

Reviewer 2:

This reviewer stated that the accomplishments indicate excellent progress and point to eventual success; given 7 kW charging is already demonstrated in this project. The reviewer indicated that the theoretical accomplishments are noteworthy. Also, the reviewer thought that the testing seems thorough so far.

Reviewer 3:

The reviewer remarked that the program seems to be on track as designed. In addition, the reviewer said that it is in the first year of a multiyear endeavor so should be evaluated more critically next year.

Reviewer 4:

This reviewer stated that the approach described the following investigations, all of which are highly important and not covered in other projects to this detail: alignment starts to decline when x and y misalignment reaches 10%; tilt did not affect efficiency; ferrite plates 4 mm thick; only project offering manufacturing details; coil resistance increases exponentially with frequency; frequency needs adjustment with Z; investigation of radio frequency communication.

The reviewer then went on to comment on the presentation. According to the reviewer, there are those in the audience who may not work with differential equations on a daily basis, but remember enough to understand the physical significance if the presenter would walk them through the terms. Otherwise, the equations are useless in the time allowable for the presentation and should probably not be presented unless requested. It can be a distraction otherwise. The reviewer commented that if presented patiently, the equations can be more information than any text and even more so if accompanied by a graphic. This reviewer also added that the implications of coil spacing and geometry on continuous charging may not be realized in the laboratory environment for a number of factors, such as geometric space and speed. Also, the reviewer said the lab is not considering interference or losses associated with placement in pavements.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer stated that ORNL seems to be doing most of the work at this stage of the project. The reviewer noted that the project team was keeping SAE J2954 updated on progress. The reviewer added that the collaboration seems to be primarily in the deployment phase.

Reviewer 2:

This reviewer said all the essential partners were present (i.e., electric/electronics equipment packaging, test vehicles, vehicle testing, communications technology, vehicle integration, utility power grid, and high-speed power rectifier). The reviewer suggested that possible ancillary partners or experts who should be added are those who specialize in human safety with respect to magnetic and electric non-ionizing radiation.

Reviewer 3:

This reviewer stated that broad collaborations to define and solve technical challenges were presented.

Reviewer 4:

This reviewer indicated that the project team needs to include the DOT.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer indicated that the project team had a well-planned approach with roles and responsibilities of partners identified. The reviewer also stated that the project team needs to include the DOT.

Reviewer 2:
This reviewer indicated that with many challenges identified, the technical work plan is designed to progress along those critical paths.

Reviewer 3:
This reviewer indicated that the future steps focused on demonstrating a particular wireless charging implementation in a production vehicle. The reviewer said that one barrier not directly addressed is uncertainty in product offerings regarding control method, but the project findings appear geared to help clear up some of the uncertainties.

Reviewer 4:
This reviewer commented that a shortcoming of the research or possibly the presentation, was the failure to identify the barriers to, or showing the technical progress in achieving, the wireless power transfer efficiency of 85% at 10 kW. The reviewer remarked that it was not clear from the slide on future work, that there are either no barriers or feasibility; it just describes prototype factor correctors, DSRC, a demonstration of prototype, and SAE J2954.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer indicated that electrification of vehicles not only support the DOE, but also DOT and EPA objectives.

Reviewer 2:
This reviewer said that this project is an enabler for improved usability of Electric Vehicles (EVs), which will help commercialization prospects of the technology and improve market acceptance of EVs.

Reviewer 3:
This reviewer said that this project could enable higher adoption rates of battery EVs.

Reviewer 4:
This reviewer said all wireless power transfer projects support DOE objectives of petroleum displacement by facilitating the deployment of electric vehicles.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

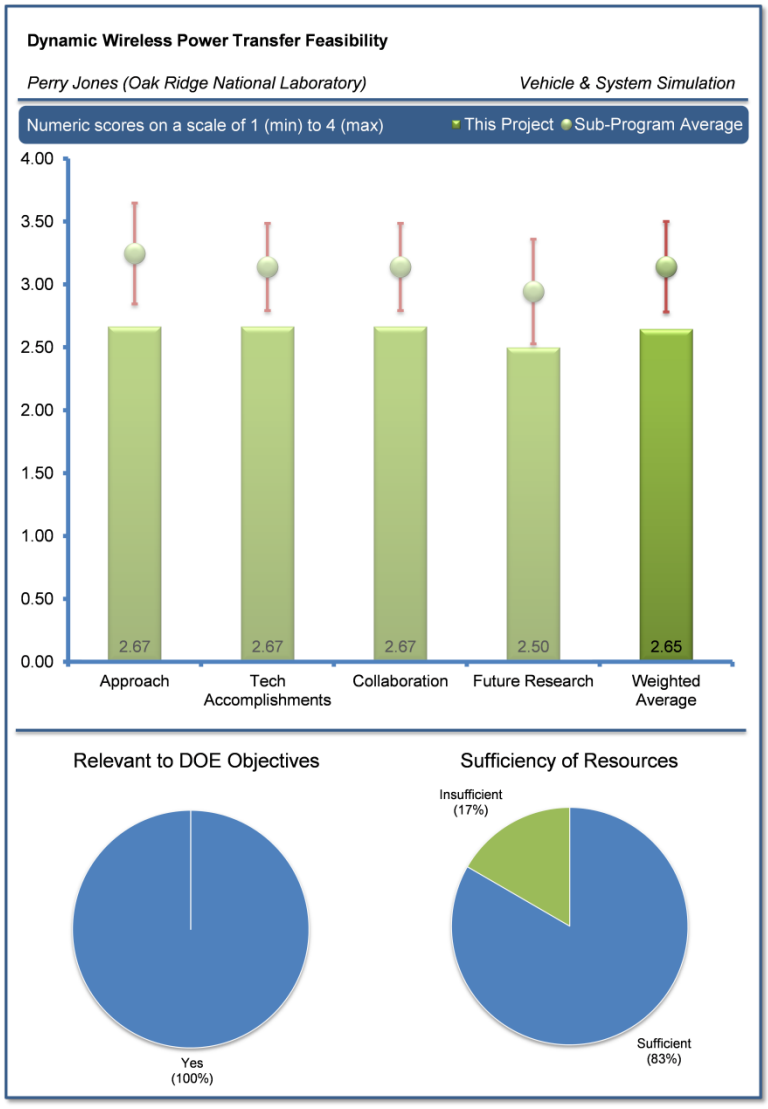
Reviewer 1:
This reviewer said resources appear to be sufficient for this project.

Reviewer 2:
This reviewer stated that no specific resource challenges were presented.

Reviewer 3:
This reviewer stated that the timeline is optimistic, especially if infrastructure (pavement) integration is considered, which is not.

Reviewer 4:
This reviewer indicated that without a breakdown of the expenditures, it is difficult to see how $11.3 million is justified.

Dynamic Wireless Power Transfer Feasibility: Perry Jones (Oak Ridge National Laboratory) - vss104



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer said the project is well designed. Also, the reviewer stated that an inherent difficulty of this project is projecting cost and benefits of Direct Wireless Power Transfer (DWPT) given market uncertainties. The reviewer added that the approach assumes existing DWPT technology is adequate, which is unclear.

Reviewer 2:

This reviewer noticed that the approach is appropriate for this short term program.

Reviewer 3:

This reviewer indicated that the barriers were stated up front in broad terms along with corresponding objectives. The reviewer added that being that this is such a new exploratory topic a high level approach is appropriate. The reviewer warned that care should be taken in the communication of the results of this study that clearly indicate the maturity level. The reviewer stated to avoid giving the impression to the public that this is coming soon, as there are many obstacles to be overcome even with stationary WPT. This reviewer added that emphasis should be placed on the vertical gap factor when comparing with stationary WPT requirements as opposed to DWPT which may be embedded below the pavement surface. The reviewer said the project team made a good use of existing data sources from ANL and INL.

Reviewer 4:

This reviewer stated that the approach is a good first start; however, the approach misses an important step related to "quasi-dynamic" charging which comes after static charging. The reviewer thought that this should be considered as a "bridging technology" to the dynamic charging. In addition, the reviewer stated the approach seems to be developed in a vacuum (except National Laboratory input) without industry input. The reviewer thought that the dynamic charging needs to be joined with the static, and quasi-dynamic also through joint discussions with the industry and standardization efforts.

Reviewer 5:

This reviewer said that the goal of the project is very relevant to the investment that DOE is making into wireless charging research; however, it is unclear what the outcomes of the project are so far. The reviewer added that the physical implementation and maintenance issues are critical for successful deployment, and the team seems to be looking at these issues to a degree, but no insight into the issues was given in the presented work.

Reviewer 6:

This reviewer thought the approach to this effort is not the best. The reviewer said that the results of the literature survey to date were not presented. The reviewer added it is hard to identify what needs to be done in the future without understanding what has been done in the past. The past is important to finding a future direction. In addition, the reviewer commented this project did not elucidate the baseline application for dynamic wireless power transfer very well. The reviewer did not get a good understanding of what specific scenarios, what types and classes of vehicles, what vehicle platforms, and for what vehicle duty cycles, dynamic wireless power transfer is best suited for. Instead the reviewer heard that we should just pursue it because it is a good idea for the future.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer indicated that there was a set up good partners for collaboration and data sharing, such as the J2954 effort for static wireless charging. The reviewer added that early performance and evaluation metrics, as well as scenarios of interest are a good logical start. The reviewer also said evaluation of the impact of DWPT on grid is crucial, as well as clearly conveying the assumptions that need to be made. The reviewer added that the example of differences in funding between United States and Korea Advanced Institute of Science and Technology (KAIST) in Korea is a very good place to start. The reviewer added that fundamental differences in the power transfer technology in terms of configuration and operations should be brought forward for that particular scenario of interest (SOI).When identifying and evaluating SOI (i.e., dedicated lanes, changes in construction, etc.) consider additional data sources, such as the National Household Travel Survey (NHTS) available through the FWHA: http://nhts.ornl.gov/introduction.shtml.

Reviewer 2:

This reviewer observed that there was good progress towards goal of assessment of DWPT from the performance side (vehicle power requirements, proposed routes, etc.) and that there was less clarity around cost/benefits.

Reviewer 3:

This reviewer stated the project is achieving the originally defined objectives.

Reviewer 4:

This reviewer was not sure what accomplishments have been made to date.

Reviewer 5:

This reviewer indicated that this project was premature in two aspects: first, it was too early to provide any results; and second, not until the feasibility and understanding of stationary wireless power transfer is demonstrated, should there be a start on dynamic wireless power transfer.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer thought that the collaboration effort is quite strong so far and stated that it is expected that as the project moves forward, some additional outreach to utilities and perhaps state highway agencies with pavement testing facilities may be needed.

Reviewer 2:

This reviewer observed that collaboration and coordination is integrated with others where appropriate.

Reviewer 3:

The reviewer indicated that this project requires use of many resources from other laboratories and the DOT. The reviewer added that the results have been obtained by working closely with these groups.

Reviewer 4:
This reviewer would recommend discussing directly with KAIST/Conductix-Waempfler/SAE and others. The reviewer observed good collaboration between National Laboratories.

Reviewer 5:
This reviewer said that international or foreign partners should have been included as collaborators or coordinators.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that the project is 40% complete and that the remaining tasks are clear with respect to objective.

Reviewer 2:
This reviewer observed that this was a short program and that the only future work is completion of current tasks.

Reviewer 3:
This reviewer stated there was no slide on future work.

Reviewer 4:
This reviewer indicated that the project team did not list any proposed future research.

Reviewer 5:
This reviewer said that if possible a progress update should be provided to the DOT in the effort to develop a collaborative roadmap for future joint research needs. The reviewer added that a paper for submission to the Transportation Research Board (TRB) annual meeting should also be considered.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer noticed that although this is a high-level feasibility study, the petroleum displacement potential for scenarios of interest are included to shed light on where the most impact may be realized.

Reviewer 2:
This reviewer indicated that DWPT would be one major means to overcoming EV range anxiety. This reviewer added that this study is needed to begin practicality assessing this approach in terms of its impact on transportation infrastructure.

Reviewer 3:
This reviewer indicated that it is relevant to define implementation strategies for DWPT, evaluate potential costs, barriers and benefits of various scenarios.

Reviewer 4:
This reviewer stated that this project defines the technical agenda items for wireless charging that would increase EV adoption.

Reviewer 5:
This reviewer said that all wireless power transfer projects support the DOE objective of petroleum displacement.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer said that the resources seem sufficient for a one-year study without experimental requirements.

Reviewer 2:

This reviewer stated that the resources were proper for a short program.

Reviewer 3:

This reviewer said none.

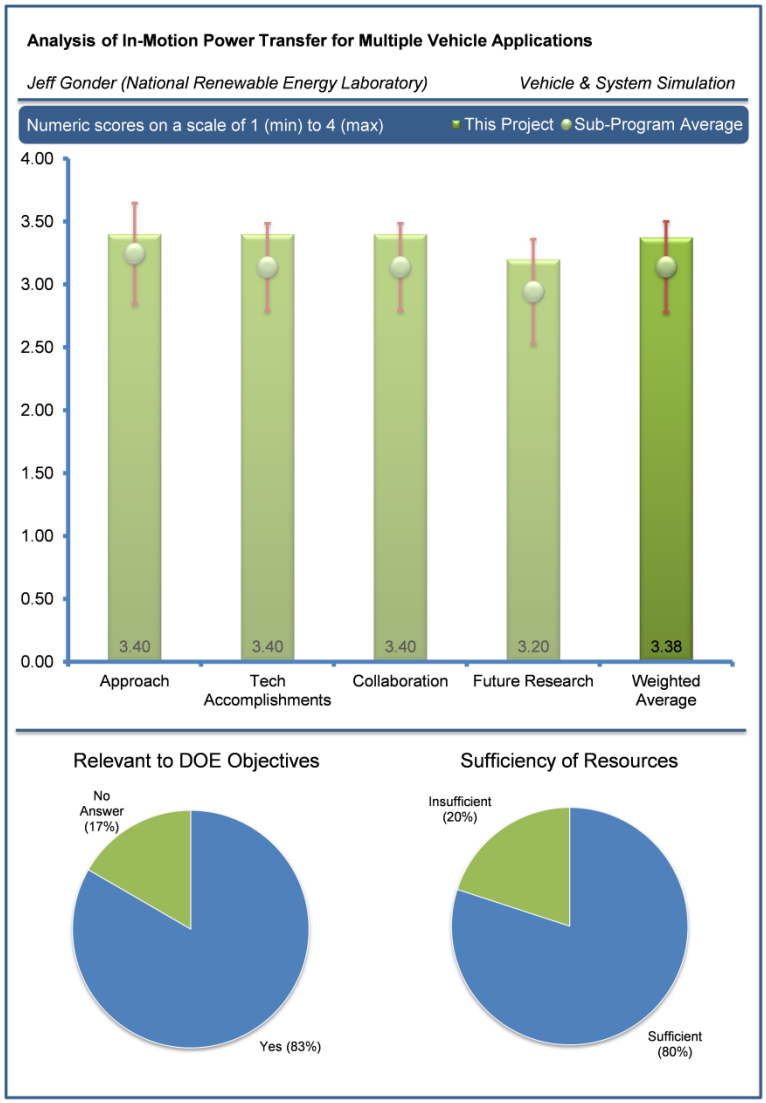
Reviewer 4:

This reviewer was not sure how realistic strategies for DWPT can be created without some analytical tools or cooperative projects with the U.S. DOT on electrified roadways, etc.

Reviewer 5:

This reviewer noted that the current resources appear sufficient to perform the high-level evaluation identified in the objectives. This reviewer added that a follow up on funding should be considered for future research needs identified as a result of this effort to prevent any loss in momentum.

Analysis of In-Motion Power Transfer for Multiple Vehicle Applications: Jeff Gonder (National Renewable Energy Laboratory) - vss105



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the project had well detailed methodology given the limits of available information.

Reviewer 2:

This reviewer said the project team had a good approach.

Reviewer 3:

This reviewer pointed out that this project is exploratory in that it is attempting to understand an aspect of EV adoption that has not been well understood in the past. The reviewer asked just how much charging infrastructure is really needed to gain broad adoption of EVs. Also, the reviewer said that the approach is very well conceived.

Reviewer 4:

The reviewer listed the following: address barriers; 50% complete; risk aversion; cost; infrastructure; will quantify petroleum consumption and greenhouse gases (GHG); coordination with Oak Ridge and other partners; spacing, efficiency, and alignment; grid load and Vehicle-to-Infrastructure (V2I) communications; NREL has a transportation secure data center with GPS data on driving type and location/ road overlap; good data set example for Atlanta; market analysis; grid load analysis shows potential problem; future work; Class 8 roadway impacts; 5% or roads equipped with WPT could double EV penetration; Annual Energy Outlook (AEO); DOT Federal Motor Carrier Safety Administration (FMCSA). The reviewer added that the project team needs be made aware of the NHTS Traffic user survey database.

Reviewer 5:

This reviewer thought that the approach was very good. The reviewer stated that the approach establishes a baseline with real-world data on vehicle usage and market factors from which to start. The reviewer added that the approach uses consumer choice models for passenger cars on preferences to make forecasts; however, it is weak on making forecasts for commercial vehicles, especially Class trucks and buses. In fact, the reviewer said the project looked at only hybridization, only Class 8 benefit potential without taking into account the future market for hybrid Class 8 trucks and buses as well as for battery electric and plug-in battery electric Class 8 trucks and buses. Also, the reviewer noted that the project did not take into account the changes in the future brought about with the DOE SuperTruck program with the development hybridization for long haul, over-the-road trucks.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer indicated that the project is only about 50% completed, and that there are already significant, noteworthy accomplishments. The reviewer then listed the accomplishments: first, the summary of travel distribution across the road infrastructure showing that relatively little infrastructure can cover a large amount of travel for charging; second, the infrastructure placement showing opportunities for low-range and slow recharge improving consumer preference for battery electric vehicles; third, a model enhanced for infrastructure rollout facilitating a rollout impact analysis to determine best approach and its impact on market adoption; fourth, initial estimates of reduced petroleum use and GHG emissions showing potential impact on achieving DOE goals; fifth, initial estimates of loads on the electric utility grids implying load shifting away from the peak may be needed; and sixth, the validation of the Class 8 truck model and duty cycle considerations.

Reviewer 2:
This reviewer stated that there was good technical progress.

Reviewer 3:
This reviewer said that the draft results indicate clear progress toward meeting objectives. The reviewer appreciated the detailed presentation of accomplishments. The reviewer then stated the project team should check impact of EVs on GHG, or state assumption that EV energy source is 100% renewable.

Reviewer 4:
This reviewer stated that some of the early information is quite enlightening and should, if used properly, contribute to understanding the real infrastructure needs of an EV fleet for the U.S.

Reviewer 5:
The reviewer stated that this is an important project that looks at the effects of WPT charging on the fleet efficiency and makeup. The reviewer added that the work builds on the substantial database that NREL has available, which makes them uniquely portioned to do this work.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer observed that the project team was utilizing inputs and background work of many collaborators and integrating it very well.

Reviewer 2:
This reviewer indicated that there was a lot of data from other partners but most of the work was done by NREL.

Reviewer 3:
This reviewer noticed that all topical aspects of dynamic wireless power transfer appeared to be covered in the collaboration: consumer preference modeling, dynamometer test data, Class 8 trucks duty cycles, and passenger car GPS profiles.

Reviewer 4:
This reviewer noted that there were good collaborations and stakeholders. This reviewer would expand on stakeholders to include U.S. DOT efforts on electrified roadways and survey teams such as J2954.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that this is a short term project and it can hopefully help define a path for other projects that will define a rational EV infrastructure system.

Reviewer 2:
This reviewer stated that the role that commercial vehicles can play in in-motion wireless power transfer should not be underestimated because of their current high consumption of fossil fuel that could be displaced by adoption of electric and hybrid-electric technologies. This reviewer would have liked to see the inclusion of forecasts for increasing deployment of electric and hybrid-electric Class 7 and 8 trucks and buses (transit and motor coaches).

Reviewer 3:
This reviewer thought that the next logical step is to refine the conclusions, given the levels of uncertainty involved. The reviewer indicated that it was not clear how well the cost impact on infrastructure can be developed with high reliability given chicken-and-egg nature of making DWPT practical.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer indicated that two slides addressed this question and answered it very well. The reviewer then listed the answers: increased electric energy available, battery electric vehicle enabler, and opportunity to improve electrification cost-effectiveness.

Reviewer 2:
This reviewer stated that this project helps address questions of viability and GHG impact of dynamic wireless power transfer, which would be a significant enabler to EV adoption.

Reviewer 3:
The reviewer said that understanding the real infrastructure need and therefore investment levels can and should offer the opportunity to increase EV adoption rates.

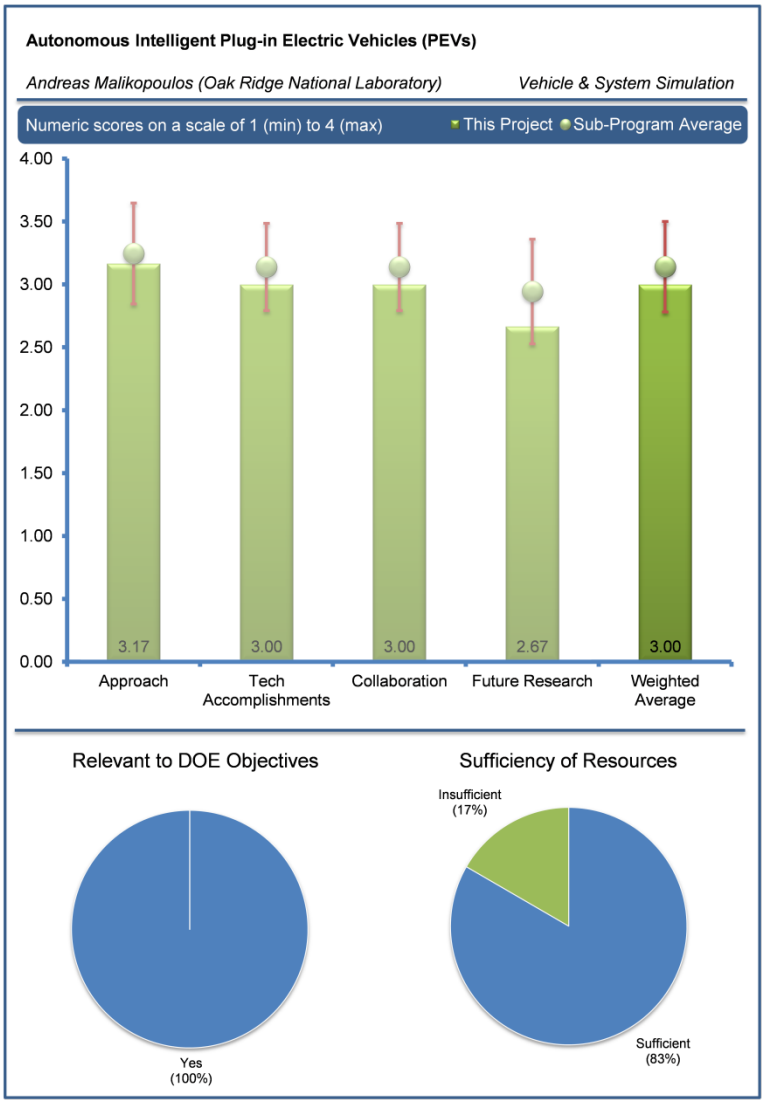
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer would suggest supporting this project.

Reviewer 2:
This reviewer thought that the resources appear sufficient given progress to date.

Reviewer 3:
This reviewer indicated that the resources are appropriate for the tasks described.

Autonomous Intelligent Plug-in Electric Vehicles (PEVs): Andreas Malikopoulos (Oak Ridge National Laboratory) - vss107



Reviewer Sample Size

A total of six reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer remarked that the approach was good and that more insight from OEMs should be considered. The reviewer added that complex control and optimization strategies can be a difficult to sell to most companies, where there is not a lot of control expertise. Also, the reviewer stated that drivability and customer acceptance of control strategies requires more focus. The reviewer noticed there is risk that the results of this study will not have a significant influence on hybrid powertrain (PT) design without it.

Reviewer 2:

This reviewer noted that the project is integrated well with Arvin on the DOE projects. This reviewer added that hybrids need to have customer payback to be accepted by the customer and OEMs. The reviewer said that by saving more fuel than traditional control schemes, this work will help hybrid acceptance.

Reviewer 3:

This reviewer pointed out that the approach looks solid for the type of advanced controls work at which this project is aimed. Additionally, the reviewer remarked that it is understood that the research has started with simulation and will advance to a real application when an OEM is identified with collaborative interest.

Reviewer 4:

This reviewer thought that the overall the presentation was very clear; however, the reviewer felt that there could have been more emphasis on explaining how the project addressed the technical barriers and other barriers that were mentioned briefly (cost, constant advances in technology).

Reviewer 5:

This reviewer commented that the primary issue the reviewer had with the approach is it was not grounded by benchmarking a state of the art hybrid controller in simulation and then comparing an alternative controller to it. The reviewer could not tell if the new controller strategy was five years behind or five years ahead. Plus, the reviewer thought the controller claimed approximately 6% better FE, but questions indicated that basic hybrid features such as electrical launch, engine stop start, regeneration, electrical assist, shifting of engine operating points, shifting of Electric Motor (EM) operating points, and battery temperatures were not considered. As these were not considered, the reviewer then inquired about what the new controller was better than by approximately 6%.

Additionally, this reviewer observed that it appears that the architecture was picked due to OEM hardware availability, which at some point will be important, but for now, getting all of the strategies into the algorithm and creditably demonstrating the value of the algorithm would appear to be a higher priority (hardware constraints may be limiting this goal). The reviewer would have picked the most common architecture that offered the full range of control strategy options for the first studies, even if it was not available yet.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer stated that the accomplishments reflect both improved system performance with stochastic control versus baseline (of greater than 5%) as well as the intended equivalent performance to offline dynamic programming, thus achieving key objectives.

Reviewer 2:
This reviewer stated that significant progress on optimization of hybrid electric vehicles (HEV) was demonstrated through five technical accomplishments.

Reviewer 3:
This reviewer stated that the models appear to be running and producing results; this is an important tool for the design of future powertrain systems.

Reviewer 4:
This reviewer noted that more correlation with other working hybrid systems will prove the controls work in more situations than just one or two.

Reviewer 5:
This reviewer observed that the project appears to be moving forward, meeting goals, but a key question is to what level does the control strategy in this project need to be at to declare success and either achieve OEM adoption or justify a follow on program. Additionally, the reviewer said that there seems to be many control strategies not yet incorporated, and for adoption, the strategy needs to be more encompassing. The reviewer went on to say that the third goal of developing an online self-sustainability algorithm for an HEV electrical path is a very tough goal, and is missing a key phrase: viable and comprehensive leveraging the full range of strategies for improved FE.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer indicated that an industry partner is working with the results/process developed here and that is very encouraging. The reviewer went on to say that the other collaborations provide much of the data required for the project.

Reviewer 2:
This reviewer indicated that the project team is close collaborations with Meritor, CLEERS, and Centers at ORNL.

Reviewer 3:
This reviewer pointed out that the control algorithm appears to have been developed too much in isolation, and broadening the collaboration could help improve the algorithm, in addition to begin to socialize the community to concepts. The reviewer added that one OEM on the project has a single architecture and thus there may be a limited number of strategies that can be utilized. As a result, the reviewer thought the focus may be limited and may not capture many other strategies. The reviewer noticed that if there was an advisory board helping the project, then it would help get that community input into the project. The reviewer stated that the advisory board would help generate interest on the project and help achieve adoption.

Reviewer 4:
The reviewer stated that this is a difficult topic to establish broad collaborations early on. The reviewer commented the fact that Meritor started down the path is a plus even if there were later decisions to shift their priorities and participation. The reviewer thought that the other collaborative groups/initiatives are also very relevant. The reviewer would anticipate a successful quest in finding an OEM partner to further the work and advance to a real application test.

Reviewer 5:
This reviewer said that the project just needs more demonstration partners especially now that Arvin has pulled out.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer observed that the presentation concluded with a clear statement of logical next steps. The reviewer added that the project seemed to be well managed.

Reviewer 2:
This reviewer remarked that the comparison of this algorithm with others is an important next step. The reviewer observed that an OEM collaborator will greatly help this project, so this is a good future goal. The reviewer felt that one should have been identified by this point of the project though. The reviewer thought that having an OEM collaborator is critical for the results of this project to have a path to commercialization.

Reviewer 3:
The reviewer pointed out that it would be good to try the controls out in a mass produced passenger vehicle, if possible, as is noted in the proposed future work; hopefully there are some ongoing discussions to do that.

Reviewer 4:
This reviewer would like to see a little more into the future of what will be done once an OEM is identified for implementation. The reviewer asked what would be proposed to engage that OEM to follow on in FY 2014. The reviewer acknowledged that this specific project ends in September 2013, and would like to know the vision or proposal for continuing into 2014.

Reviewer 5:
This reviewer observed that one of the proposed future work recommendations is to look at other architectures, but the reviewer would prefer to see all of the control strategies into the logic and understand how the control algorithm performs when it has all the strategies available. The reviewer is amazed to see future work as compare to existing literature as the reviewer would have thought that would have been the first step in understanding where the new algorithm fits and provides opportunities where other algorithm cannot.

The reviewer went on to say that the market pull on the algorithm will be through its Finite Element (FE) benefit relative to a mature baseline, so the reviewer thinks the focus needs to be on getting creditable and robust benefit. The reviewer stated that two of the proposed future work items focus on publishing rather than developing a robust case for market pull for a technology that should have appeal if it can be validated.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said advanced control and related improvement in emissions and efficiency is highly relevant.

Reviewer 2:
This reviewer stated that the project supports DOE objective of petroleum displacement by optimizing power management control in HEVs. The reviewer added that this project will reduce petroleum fuel consumption.

Reviewer 3:
This reviewer observed that this project supports the development and understanding of advanced vehicle powertrains that are aimed at significantly reducing fuel consumption from the transportation sector.

Reviewer 4:
This reviewer stated that this project saves fuel in hybrid vehicles.

Reviewer 5:
This reviewer noticed that the control strategy could have benefit in reducing petroleum, but it is hard to qualify as the presentation is missing the data to establish creditably.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer pointed out that this is a big subject with significant upside potential. The reviewer added that software updates are low cost relative to the FE savings. Additionally, the reviewer commented that to be effective and convince folks in this complex subject, $200,000 per year is not enough money to develop a robust and creditable case in a timely fashion.

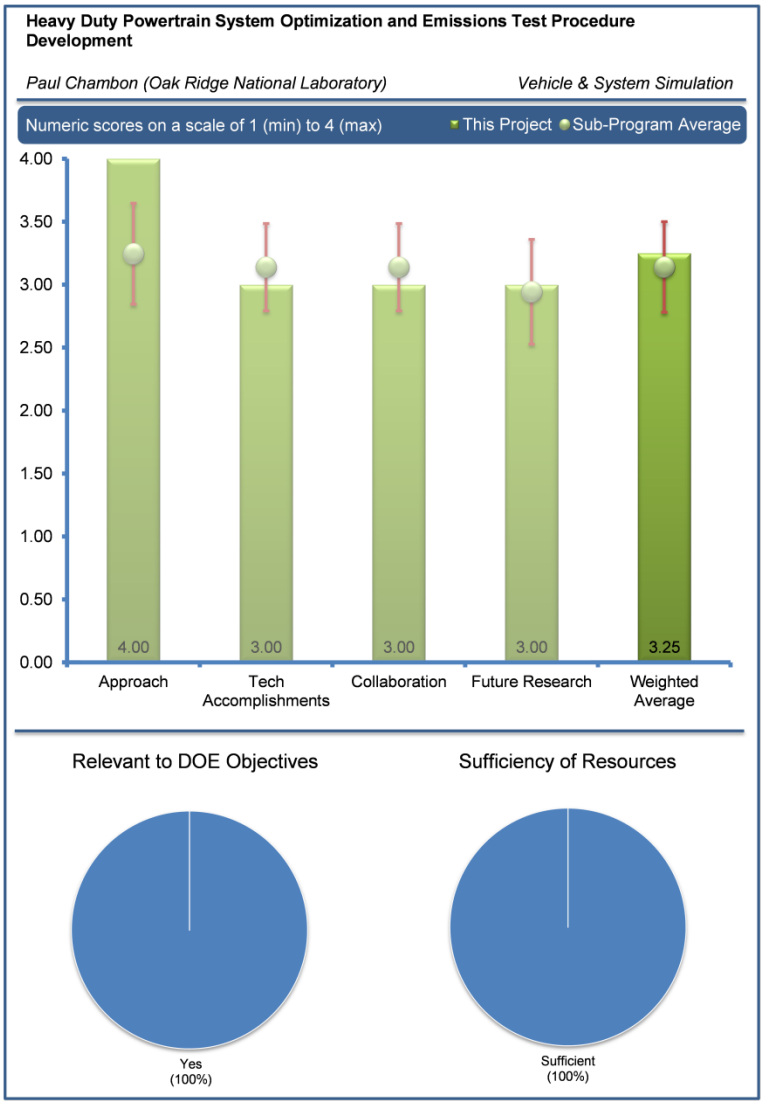
Reviewer 2:
This reviewer observed that resources do not seem to be in question to closeout project by September 2013 as planned for this round of funding.

Reviewer 3:
This reviewer indicated that computing power seems to be sufficient, but experimental results would greatly add to the outcome of this project. This reviewer does not believe this is in the original scope though.

Reviewer 4:
This reviewer stated that it should be checked that sufficient resources exist to try the controls out in several vehicles and check the fuel savings from using the controls.

Reviewer 5:
This reviewer said no insights on sufficiency of resources were provided in the presentation.

Heavy Duty Powertrain System Optimization and Emissions Test Procedure Development: Paul Chambon (Oak Ridge National Laboratory) - vss108



Reviewer Sample Size

A total of two reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that development of valid test procedures requires hardware in the loop experimentation. The reviewer added that this project is applying the correct approach.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer observed that the project has constructed a capable hardware in the loop test harness and is exercising the test harness to produce project milestones.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer indicated that the project has strong collaboration between DOE, EPA, and prominent members of the heavy duty (HD) truck powertrain industry.

Reviewer 2:

This reviewer stated that the collaboration and coordination efforts are currently adequate but the reviewer believed other component and truck OEM system partners need to be participants. The reviewer stated that the ORNL laboratory program needs better advertisement amongst industry, maybe this should be an added objective and would reduce cost barrier.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:

This reviewer said that the project is focused on providing useful information to the EPA.

Reviewer 2:

This reviewer requests that more project detail for hardware in the loop variations be considered for this lab besides Meritor's DMHP, Eaton's Ultrashift, other OEM engines, other Advanced Hybrid Drives (AHD), and other conventional advanced transmissions that will proceed AHD's to the market.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:

This reviewer stated that this project should have been started prior to EPA GHG regulations being implemented. Hence, the scheduled results will come too late to offer value for truck OEMs' product implementation processes. This reviewer said that this dynamometer lab unfortunately will be in effect after 2014 calendar year (CY) JOB1 dates and will be marginally beneficial for 2017 GHG regulations. The reviewer added that the EPA GHG work should take highest priority, which will benefit DOE objective of petroleum displacement.

Reviewer 2:

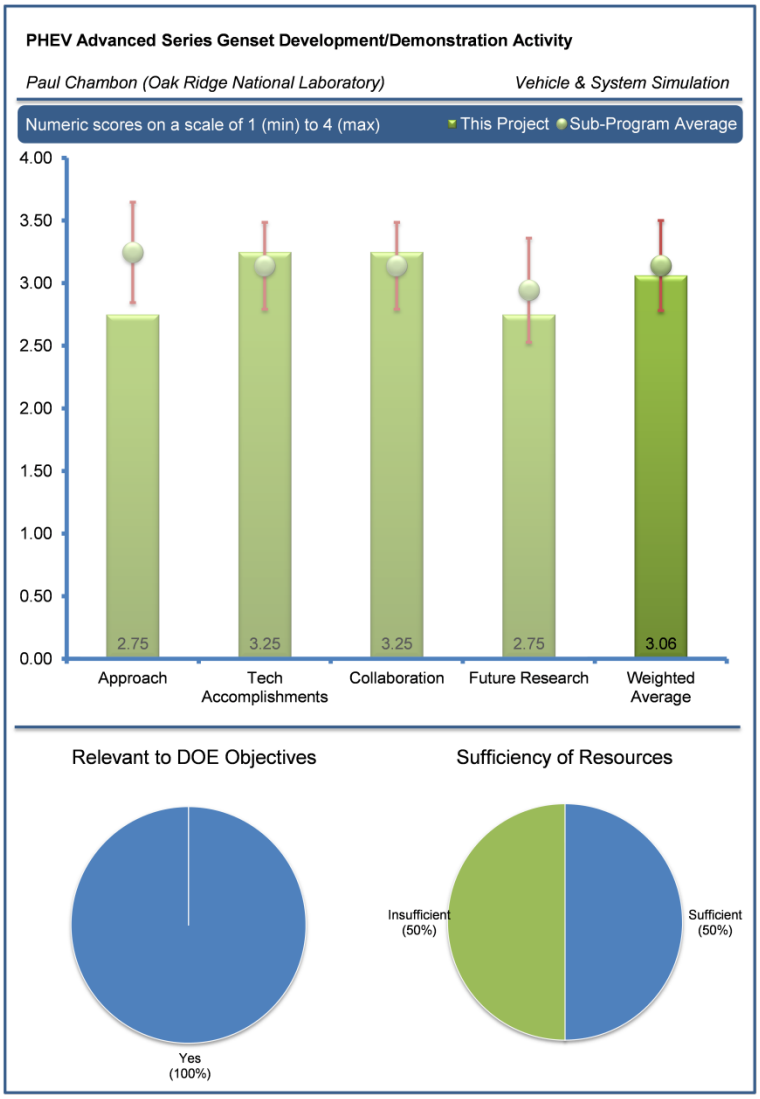
This reviewer pointed out that DOE and EPA programs need to complement each other to effect practical solutions to petroleum displacement. This reviewer added that the emissions produced by new HD vehicle technologies must be quantified properly for the true costs and benefits of those technologies to be fully understood.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

This reviewer said that this presentation does not state that resources are any issue; however, it was mentioned that bringing controls systems online was an issue.

PHEV Advanced Series Genset Development/Demonstration Activity: Paul Chambon (Oak Ridge National Laboratory) - vss109



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer thought the approach to the work was practical and reasonable. The reviewer thought this was a worthwhile project that will give some interesting results.

This reviewer stated that every project has practical constraints in terms of scope, but in this case the reviewer thought there were a couple additional considerations the reviewer wished were covered. In particular, the reviewer would like a more detailed exploration and definition of engine requirements for the genset. The reviewer said that this could include both exploration of the system architecture and the engine operating strategy. For example, the reviewer asked if the engine load were allowed to vary, would this impact the battery requirements. Also, the reviewer asked how different sized gensets may impact overall system performance and cost.

The reviewer added that the requirements for engine operation for this system are significantly different as compared to a traditional powertrain; significantly different engine requirements could lead to significantly different engine design. The reviewer therefore remarked that the definition of those engine requirements, and consideration of how the requirements might impact design, would be very interesting. This reviewer went on to say this might take the form of some trade-offs at the system level (expanding on the battery cost versus genset size) of cost or performance versus engine requirements, which might then lead to some different options for engine design. In other words, a single speed genset which allows load to vary might have lower battery usage than a single speed, single load genset. However, the single speed, single load genset might present more opportunities to optimize the air handling system (the reviewer does not know if that is true, it is just an example to try and illustrate the point).

Reviewer 2:

This reviewer observed that there were mismatched performance specifications between the engine and electric machine (which was not designed as a system) that might delay the project. The reviewer added that although this mismatch is not an outright barrier, it is clearly an issue that should have an alternative path for project success.

Reviewer 3:

This reviewer said that the hardware portion of the project does not go as far as it might in developing an optimal range extender unit. The reviewer added that demonstrating a compromised design does not advance the state of the art or provide the best performance.

The reviewer indicated that the project develops a range extender but this is already being done by many suppliers and even OEMs, so the benefit of ORNL doing one too is not so clear-cut.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer indicated the project is making good progress.

Reviewer 2:
This reviewer pointed out that it was good that Autonomie model and simulation study are well under way with results. The reviewer was concerned that hardware in the loop will take longer to evaluate and yet contract paperwork for engine technology is not completed.

Reviewer 3:
This reviewer stated that the simulation portion of the project could be improved by exploring the control strategy fully. This reviewer added that the hardware partners were selected based on available offerings, which leads to a compromised design.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that the project team did an excellent job in getting everything aligned, given the project constraints.

Reviewer 2:
This reviewer noticed that the collaboration strategy seems like a reasonable mix of industry and National Laboratory partners. The reviewer thought that additional partners with expertise in engine design might bring some additional perspective (existing partners are good, but sometimes some additional input brings new ideas).

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the proposed work stream is good. The reviewer commented that it would be worthwhile to find a partner to simulate an optimal motor design to go with the MAHLE engine performance characteristics.

Reviewer 2:
This reviewer remarked that the next steps of demonstrating the system capabilities in hardware should help validate the initial modeling results.

Reviewer 3:
This reviewer said that the program is hard coded with a single powertrain and single induction machine. The reviewer thought it would be beneficial to incorporate a broader supplier/partnership opportunity to truly have the opportunity for future research and collaboration.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer indicated that yes, this project does support the goal of reducing petroleum consumption. The reviewer added that the use of a genset in a PHEV can dramatically reduce product cost, increasing likelihood of adoption of the technology (which could

displace traditional IC engine powertrain technology). Additionally, the reviewer said that the use of a genset in a PHEV may result in lower carbon dioxide (CO_2) emissions as compared to an EV, depending on the source of electricity used for charging.

Reviewer 2:

This reviewer commented that this project helps promote electrified vehicles, and strategy to overcome the range anxiety of EVs.

Reviewer 3:

This reviewer stated that the goal of increasing the range of electric vehicles can include the use of range extension IC engines that provide generator power. The reviewer added that highly efficient range extenders are needed to increase the market share of electric vehicles.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:

This reviewer thought that the project resources seem reasonable to meet the stated project goals. The reviewer said it would be nice to have additional resources to expand the scope slightly to allow further consideration of system trade-offs versus engine requirements, and engine design options that result from those requirements.

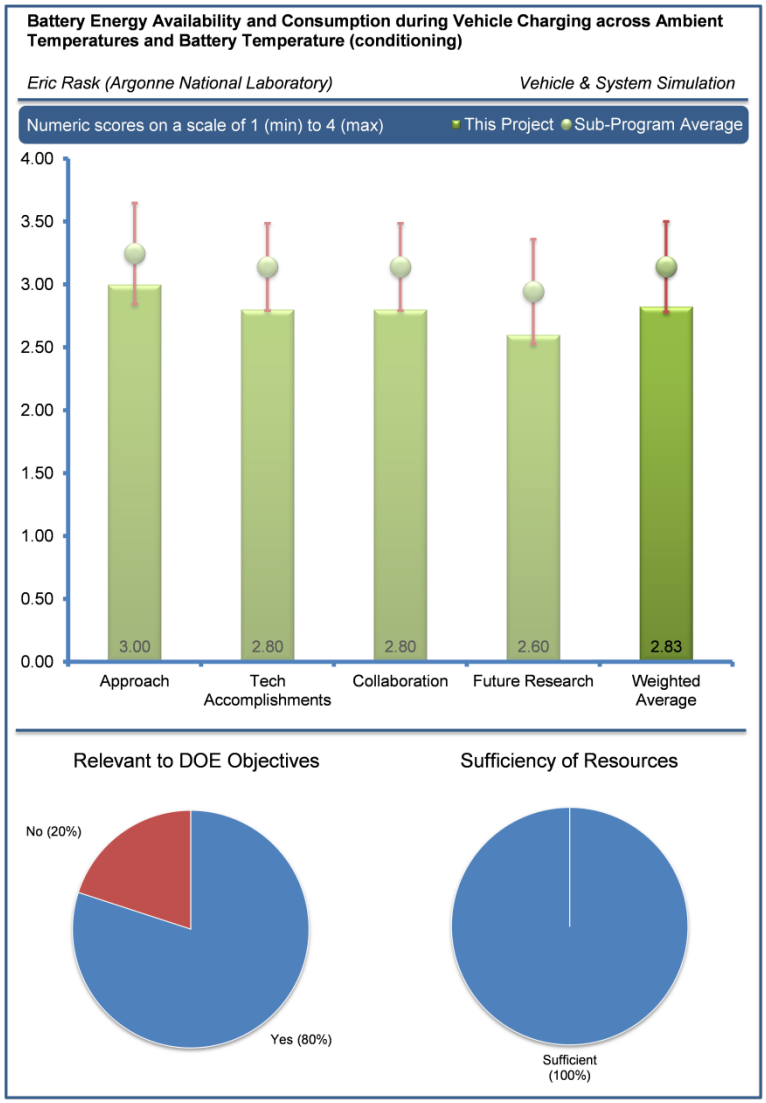
Reviewer 2:

This reviewer stated that since the idea is to demo a range-extender power unit, the best case would be to make it as optimal as possible. The reviewer added that funding to make the best hardware demo possible would seem to be required.

Reviewer 3:

This reviewer noted that the amount of resources is only sufficient for scratching the surface when it comes to developing highly efficient range extenders. The reviewer added that R&D programs need to start somewhere and this project will help the DOE R&D laboratories to increase the knowledge base to support future development.

Battery Energy Availability and Consumption during Vehicle Charging across Ambient Temperatures and Battery Temperature (conditioning): Eric Rask (Argonne National Laboratory) - vss110



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer thought this was a really good piece of work.

Reviewer 2:

This reviewer stated that the project seeks to answer questions for what appears to be third order technical barriers.

Reviewer 3:

This reviewer stated that the work is useful, but as the PI indicated, getting decent measurements can be tricky. The reviewer added that for best data results, the project team would need to measure operation of the cooling system inputs (fans, pumps, etc.).

Reviewer 4:

This reviewer said that a good mix of PHEV and BEV was used in the evaluation. This mix had a range of operating styles, charger capabilities and thermal management capabilities. The reviewer went on to say that the testing approach and strategy took into account several important factors such as ambient recharge temperature, vehicle soak times, and battery usage prior to charging and vehicle HVAC settings.

Reviewer 5:

This reviewer observed that the presentation did not state a clear concise objective. The reviewer discovered bits and pieces of objectives throughout presentation, embedded within title, relevance and summary sections.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer pointed out that most of the testing on the four vehicles is complete. The reviewer added that the testing yielded several important results which include: the Chevrolet Volt showed two cooling operations when plugged-in under hot conditions; the Volt also showed intermittent stand-by heating when plugged-in; other vehicles showed reduced battery power during low temperature testing, which may mean more thermal management during recharge is necessary.

Reviewer 2:
This reviewer stated that the project has managed to capture quite a bit of data, and made good progress toward stated goals.

Reviewer 3:
This reviewer thought that the testing program is on track and looks to be heading for completion in the desired time frame.

Reviewer 4:
This reviewer stated that the barriers were addressed.

Reviewer 5:
This reviewer stated that the project team performed the tests, but the barriers overcome are missing.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer indicated that the collaboration approach seems reasonable. The reviewer commented that inclusion of battery manufacturers in the project, as partners, may have helped provide some additional insights.

Reviewer 2:
This reviewer observed that most of the work is done by ANL and that there is good data sharing.

Reviewer 3:
This reviewer stated that in addition to the four vehicles being evaluated, groups such as National Laboratories, SAE International and U.S. Driving Research and Innovation for Vehicle Efficiency and Energy sustainability (U.S. DRIVE) are involved in shared data and analysis and the development of test procedures.

Reviewer 4:
This reviewer said that these are production vehicles and that the project does have the support of vehicle OEMs. Also, the reviewer asked if the thermal management issues of battery energy availability and consumption findings are a surprise to the OEMs.

Reviewer 5:
This reviewer commented that the degree of coordination with other organizations is unclear.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that the focus on BEVs is a good next step.

Reviewer 2:
This reviewer remarked that a good next step would be to consider how this work might be incorporated into new test procedures for vehicles.

Reviewer 3:
This reviewer noted that it appears future work will only include in-depth benchmarking of the Ford Focus BEV.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer observed that this project improves the understanding of electrified vehicle behavior so that DOE can make proper technology assessments.

Reviewer 2:

This reviewer noticed that thermal management of the battery during recharge can have a major impact; therefore this project supports the overall DOE objective of petroleum displacement.

Reviewer 3:

The reviewer stated that this project highlights the need for a comprehensive evaluation of system performance. The reviewer added that if battery thermal state is not considered in evaluation of FE, the results could be misleading.

Reviewer 4:

The reviewer commented that this appears to be a third order issue. The reviewer added that information regarding battery cooling and heating during motion would be more useful.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

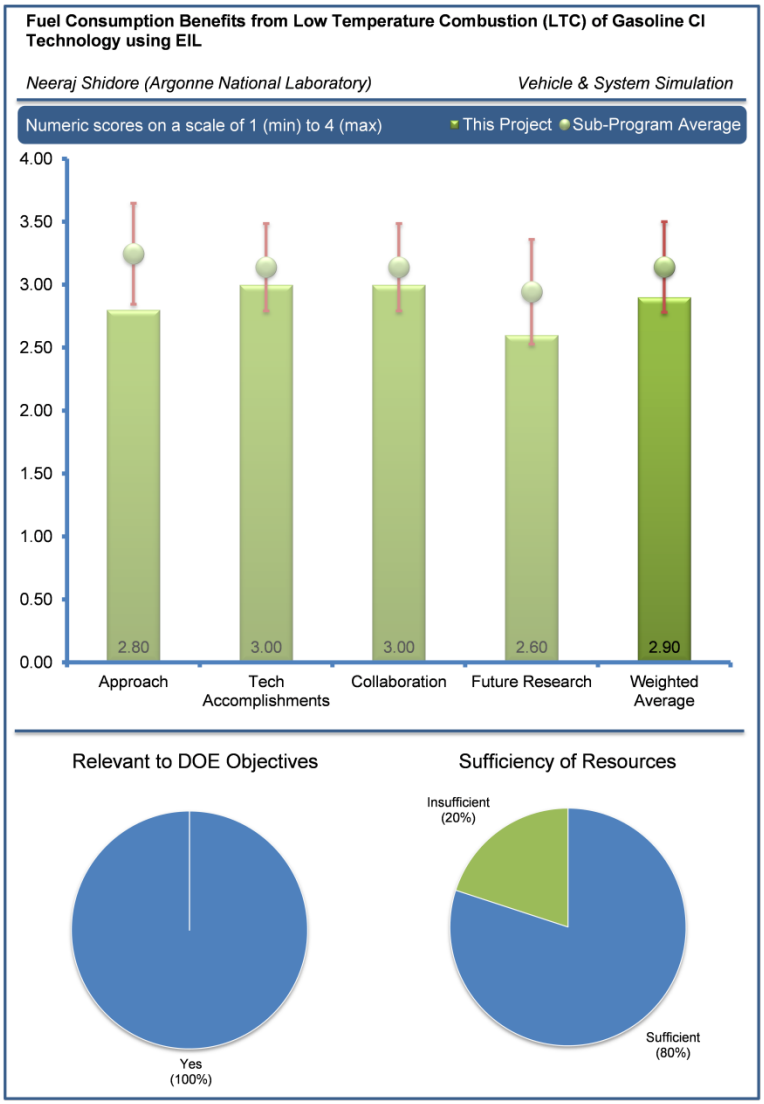
Reviewer 1:

This reviewer stated that the resources appear to be sufficient. In fact, the reviewer said it seemed that for the funding available there is a lot of work and results being reported.

Reviewer 2:

This reviewer noted that the resources are adequate, the handicap being that it is difficult to take some types of measurements.

Fuel Consumption Benefits from Low Temperature Combustion (LTC) of Gasoline CI Technology using EIL: Neeraj Shidore (Argonne National Laboratory) - vss111



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the approach of leveraging existing expertise in vehicle system simulation and low-temperature combustion (LTC) research at ANL is a good use of federal funds. The reviewer added that the approach of evaluating a variety of fuels, engines technologies and drive cycles in the project's design of experiments will provide useful results.

Reviewer 2:

This reviewer said that the project seems like good work to complete. The reviewer noted that transient control of LTC modes is an issue. The reviewer liked to see the comparison of simulation and test. The reviewer liked to see the simulation used before going to test. The reviewer added that the use of engine in the loop (EIL) is a good approach for repeatable fuel consumption measurements on a transient cycle. The reviewer did not note any reference to include some noise factors like driver behavior or shifting pattern. The reviewer said that would be nice to see. The reviewer went on to say that extrapolation of the LTC points for the engine map is a little questionable. The reviewer asked if that is needed how will the real cycle run if it needs to get to those other operating points.

Reviewer 3:

The reviewer noted that the barrier identified is developing robust control of LTC over different operating points, but this project seems to be trying to identify FE improvements of LTC through Hardware in the Loop (HIL) testing. This reviewer went on to say that what is actually being done is very useful, but it is not clear that it will directly help the technical barrier at this point.

Reviewer 4:

This reviewer said that this seems like a reasonable approach. The reviewer understand the need to limit the scope of the work, but the reviewer does wonder if the selection of Urban Dynamometer Driving Schedule (UDDS) and Highway Fuel Economy Driving Schedule (HWFET) as the test cycles will really test capabilities of the technology. The reviewer added these cycles are quite lightly loaded and it is likely it will not require the engine to operate at high torques. Also, the reviewer stated the evaluation of LTC at high torque and high transient conditions seems like it should be an objective of the work.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer said good progress.

Reviewer 2:
This reviewer said the development of models and test cell approach is good.

Reviewer 3:
This reviewer indicated that the process developed to generate an engine map to compare LTC to Spark Ignition Direct Injection (SIDI) and Port Fuel Injection (PFI) by simulation will be able to be used for future projects. This reviewer added that significant improvements in FE were shown during the simulation of LTC with PFI and SIDI.

Reviewer 4:
This reviewer stated that simulations have been performed to demonstrate the benefit of LTC combustion. The reviewer noted that it appears that this group is simulating that the LTC engine will operate in that mode throughout the operating range. The reviewer then asked is this a practical assumption. The reviewer also asked will this really be a mode-switching engine.

Additionally, the reviewer remarked that FE results from simulation are given, but the LTC case has very different gear ratios than the other two. One would expect very different FE results from this. The reviewer noted that the investigators should run the same simulation for all combustion modes with the same ratios to compare apples-to-apples, or justify why this was done.

The reviewer went on to say that it would be good to plot and compare where each engine operated over the drive-cycles. Maybe a scatter plot of every few seconds on the Torque/Rotations per Minute (RPM) plot would help. The reviewer observed that this type of experimental setup can be complex, but can provide a significant amount of data in a short time once working. The reviewer added that the timeline could still be met. The reviewer thought that it was not clear how the group plans to run or control the LTC engine during transients. This should be clarified.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that a strong group has been assembled. The reviewer has no concerns.

Reviewer 2:
This reviewer observed that the project team has a good mix of industry and National Laboratory partners. The more industry participation is the better it is for this project.

Reviewer 3:
This reviewer stated that collaboration and coordination exists between several National Laboratories, OEMs and U.S.DRIVE to share test plans, data and analysis.

Reviewer 4:
This reviewer indicated that all the work has been done at ANL, but giving credit that for the LTC work there is collaboration with more partners. This reviewer commented that using an Autonomie vehicle model in a manner that has been done before is not really that much collaboration. The reviewer said that it is commercially available.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the plan looks good, and also to compare the baseline and LTC.

Reviewer 2:
This reviewer noted that potential follow-up activities to evaluate the impact of hybridization on FE gains due to low temperature combustion gasoline comparing SIDI and PFI will be a good addition to the project.

Reviewer 3:
This reviewer stated that this project will generate very useful data, but it does not seem to be addressing the control of LTC issues stated as a barrier.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated yes, this project focuses on testing and understanding the FE benefits of advanced engine concepts.

Reviewer 2:
This reviewer said that the LTC is a promising technology for lowering fuel consumption but transient controls is a barrier. The reviewer added that this project is focused on that issue.

Reviewer 3:
The reviewer pointed out that the low temperature combustion research is being conducted to improve efficiency of engines which will help to displace petroleum. The reviewer stated that the objective of this project is to evaluate FE impact of low temperature combustion technology using engine-in-the loop will help meet the DOE objectives.

Reviewer 4:
This reviewer commented that the LTC could be an effective technology to reduce fuel consumption as compared to traditional spark ignition (SI) gasoline engines. This reviewer stated that the fuel efficiency seems to be comparable to diesel. The reviewer added that some additional considerations going forward might be how the cost of this technology compares to alternatives that have similar efficiency, identifying the fuel sensitivity to this form of combustion, and whether it can be successful with commercially available fuels.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

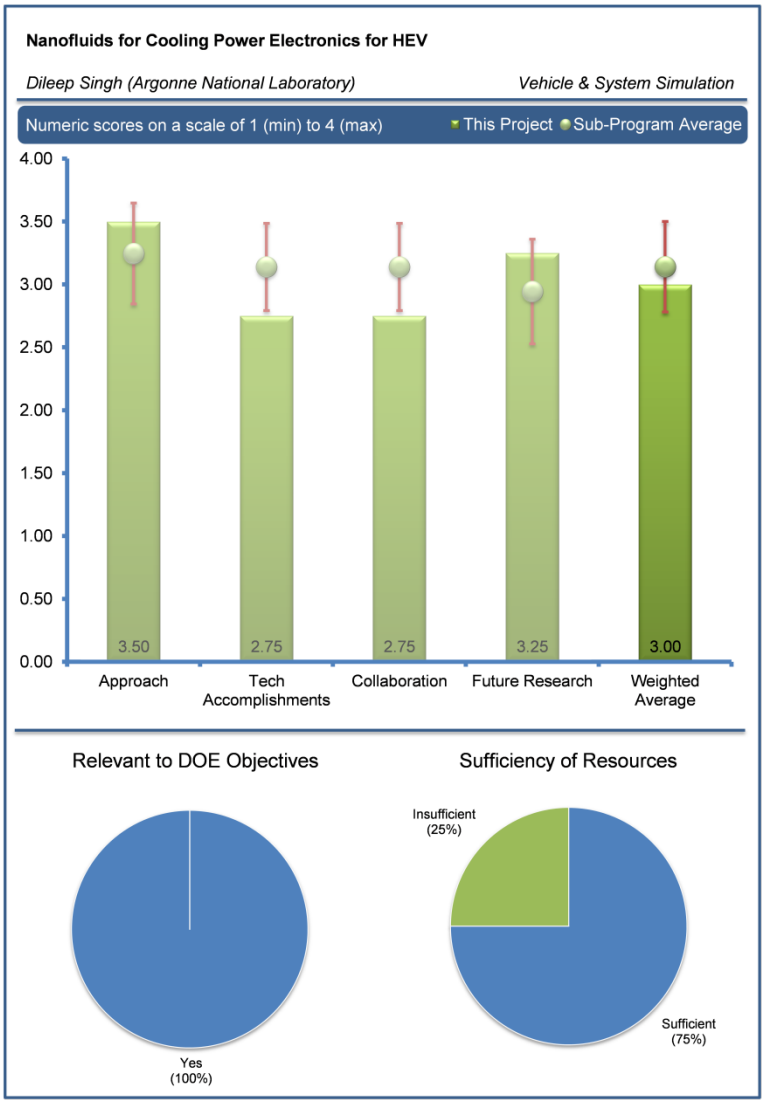
Reviewer 1:
This reviewer stated that as always additional resources could help expand the scope. The reviewer said in particular some additional funds could expand the program to include consideration of alternative cycles (higher load and transients) and a range of fuels.

Reviewer 2:
This reviewer indicated that for the amount of work to be performed the funding in sufficient.

Reviewer 3:
This reviewer described resources as okay.

Reviewer 4:
This reviewer said the hardware, software, and technical expertise are sufficient.

Nanofluids for Cooling Power Electronics for HEV: Dileep Singh (Argonne National Laboratory) - vss112



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that this is an outstanding project. The reviewer added that the DOE discovered nanofluids back with Dr. Steve Choi in 1995; this group is building on this earlier work.

Reviewer 2:

This reviewer said the plan is highly organized with multi-year glide path.

Reviewer 3:

This reviewer observed that the project actions seem to be very well aligned with stated technical barriers. The reviewer added that the only barrier that does not seem to be addressed at this point is industrial acceptance of the technology. The reviewer thought that the final cost of the coolant and results will address that.

Reviewer 4:

This reviewer stated that there was no clear answer presented regarding the degree to which there is a need for larger heat transfer coefficient fluid for converter. The reviewer stated no value was established. The reviewer stated that cost analysis seems to be the last item to be studied. The reviewer observed no effort planned to establish value versus non-fluidic technologies; or to understand value of liquid cooling in general. The reviewer stated that it appears that long-term particle suspension stability studies under aggressive conditions not planned. Additionally, the reviewer pointed out that no investigation on impact of particle deposits on tube walls impacts fouling factors in hex tubes. The reviewer stated that manufacturability and scalability were not addressed. The reviewer went on to say that industry acceptance of a new working fluid; particularly one that may be in a combined cooling loop, would have a difficult time being adopted without broad acceptance, commercial development, fully scalable and sustainable formulation, and the ability to ensure long-term costs.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer thought that this was a well-planned research plan, the PI is an expert in this field, and the project had an excellent team.

Reviewer 2:

This reviewer observed that there was confirmed viability with relatively low-cost material (graphite-based nano-particles)

Reviewer 3:
This reviewer noted that there was outstanding progress on technical barriers. Some of the barriers rely on industry partners (demonstration in HEV, and industrial acceptance), but it is not clear how these are being addressed at the moment.

Reviewer 4:
This reviewer said that the project addresses the use of nanofluids to cool power electronics. The reviewer observed that no specific requirements from industry were cited; only non-industry sources were cited for requirements. The reviewer added that engineering issues for implementing these fluids and managing long-term usage issues were not addressed. The reviewer stated that the heat transfer experiments were not completed in the current phase of project, but planned for final phase of project. The reviewer asked does the key-life test for the converter enable assessment under rigorous conditions. No interaction with module manufacturers or OEMs. This reviewer noted that it was not clear how project addresses secondary objective in heavy vehicle cooling. Additionally, the reviewer commented that the nanofluid engineering approach was not clear.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that the project team was partnering with suppliers and manufacturers.

Reviewer 2:
This reviewer said that it appears that project partners such as Valvoline and Dynalene are appropriate for the test plan and stage of development.

Reviewer 3:
This reviewer said there appears to be some collaboration, but it was not discussed in the presentation.

Reviewer 4:
This reviewer stated that collaborations appear to not be well coordinated, other than sharing some laboratory facilities. The reviewer said that the project does not appear to be closely tied with any industry or cross-cutting teams to help establish or evaluate benefits and value of high temperature coolants. The reviewer stated that the project would benefit from involvement with OEMs or suppliers who help to guide the requirement necessary for assessment and commercialization of the technology.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that the project needs long time stability, corrosion. The reviewer commented that the PI knows this and has a plan.

Reviewer 2:
This reviewer stated that the project team has a firm multi-step plan in place for what is next in the development. The reviewer added that it is critical to get to the cost and efficiency assessments to move the project along and progress toward commercialization.

Reviewer 3:
This reviewer said more industry collaboration is needed to help address the technical barriers.

Reviewer 4:
This reviewer indicated that the decision points for future efforts were not clearly laid out. The reviewer stated that key milestones were not established (either technical or business); development pathways not fully planned. The reviewer added that there are no clear plans to address key barriers to entry into marketplace: value equation, establishment of technical need, requirements from industry, etc.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer noticed that this project is highly relevant to keep bringing system costs down through simplification and greater effectiveness of cooling

Reviewer 2:
The reviewer indicated that this project could help powering electronics cheaper, more reliable, and lighter. The reviewer added that all of these issues are barriers to HEVs making further penetration in the marketplace.

Reviewer 3:
This reviewer said that increasing heat transfer in fluids will improve FE efficiency and reduce the weight of the vehicle.

Reviewer 4:
This reviewer commented that these fluids, if they meet technical and commercial requirements, may benefit transition to electrified vehicles.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

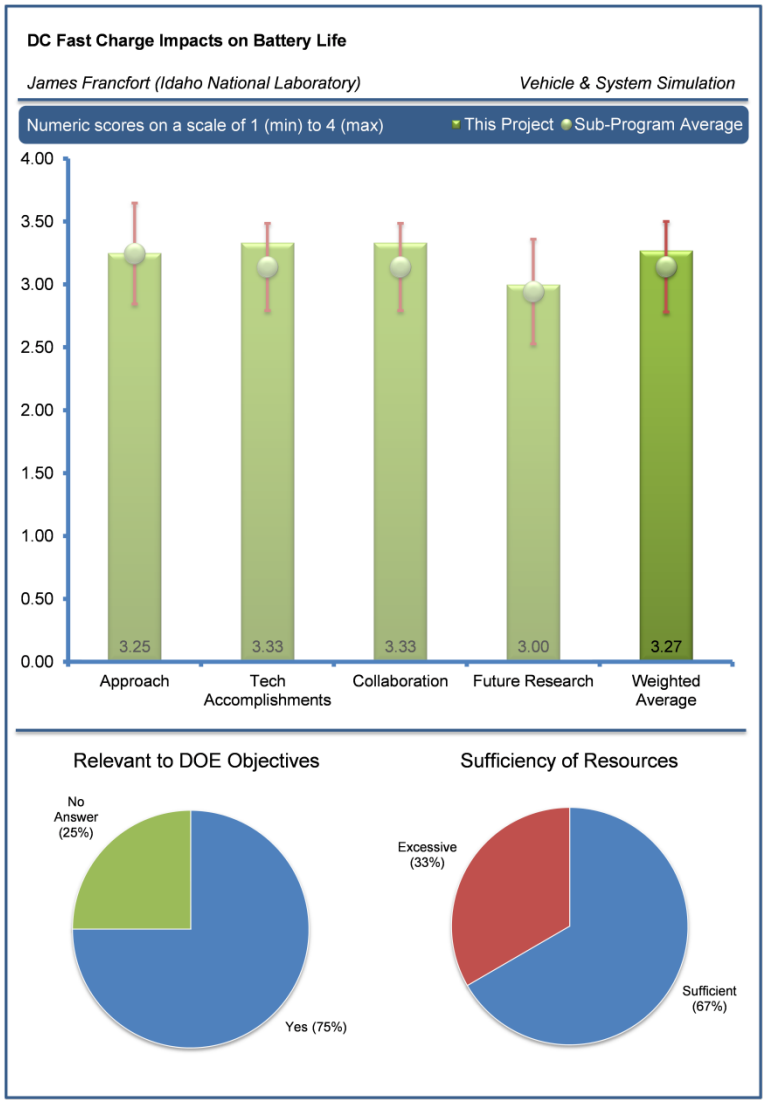
Reviewer 1:
This reviewer noticed that the project resources do not appear a concern to achieve the objectives in the allotted time.

Reviewer 2:
This reviewer thought that the budget is sufficient for the amount of effort expended in this project.

Reviewer 3:
The reviewer observed that this technology could also improve heat transfer in refrigerants, thereby reducing FE.

Reviewer 4:
The reviewer stated that facilities to produce the coolants seem to be sufficient. The reviewer added that the testing of the coolants in-vehicle seems to be lacking currently, but may be outside of the original project scope.

DC Fast Charge Impacts on Battery Life: James Francfort (Idaho National Laboratory) - vss113



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated the key points of the approach as follows: data is being shared with other labs; combining track and lab testing; there are four vehicles; only 30,000 miles is used; this is low mileage. The reviewer stated that the research plan includes looking at contact temperature in environmental chambers. The reviewer added that this is a well thought out research plan.

Reviewer 2:

This reviewer remarked that the controls on the test activity and the understanding of the baseline performance are very well designed. The reviewer added that to understand the differences, the specific drive cycle and charge controls are very well designed.

Reviewer 3:

This reviewer listed the barriers addressed as follows: cost risk aversion; on-road mileage accumulation and testing using 4 vehicles; pack testing every 10,000 miles; end of test lab and track performance testing at 30,000 miles. The reviewer then asked for what reason are the packs tested every 10,000 miles. The reviewer detailed various parts of the experiment, specifically the project is using 2012 Nissan LEAFs; the project team track constant speed and acceleration; 2 cycles per day about 220 miles per vehicle; Nissan recommends one fast charge/day; in the lab there is a constant current discharge; dedicated drivers and routes, cars run simultaneously, two cars DC fast-charge and two at Level 2 only.

The reviewer listed various data logging characteristics of the experiment: 1 Hertz (Hz) data logging on cars, electronic and manual, power levels and energy throughput, as well as ambient temperature and internal; cycle accumulation based on road vehicle testing from onboard data collections; after first 10,000 miles, there was no significant effect in constant current discharge test; 30,000 test data not yet available. The reviewer detailed the various companies' roles in the experiment: ECOtality is road testing vehicles; INL cycling/testing two lab vehicle pack; Round Robin testing of two packs at each lab. The reviewer added that the batteries were tested at constant moderate temperature in lab.

Reviewer 4:

This reviewer said that given the objectives, the approach seems reasonable; however, the reviewer asked whether running four vehicles for 30,000 miles of a single chemistry with a single Battery Management System (BMS) is going to conclude much about the fundamental effects of fast charging. Also, the reviewer asked would the research be better served to have more varieties of packs under more controlled conditions with key parameters identified by battery chemists. The reviewer added that the road approach is

expensive, less controlled and thus sample limited. In addition, the reviewer asked is 30,000 miles a sufficient exposure in the lifecycle of a pack to draw conclusions. The reviewer does not know the answer to this question and defers to the battery experts to make that call.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer said that the project is on schedule and completion of the tasks to plan is excellent. The reviewer added that this is a simple set of tasks to perform but to consistently perform them day to day is not trivial.

Reviewer 2:
The reviewer stated that the progress seems to match the objectives and approach well.

Reviewer 3:
This reviewer thought that the sample size may be too small because the project team is only comparing only four vehicles.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer indicated that collaboration and coordination with other institutions is sufficient and appropriate for test objectives. This reviewer said that questions on the methodology (and what can be concluded) may require more core scientific interactions with battery expert groups; this is not clear.

Reviewer 2:
This reviewer observed that this project has a narrow set of collaborators and added that the project is coordinated with the partners that are necessary.

Reviewer 3:
The reviewer stated that the project team is exceeding the manufacturer's suggestions with two fast charges per day. The reviewer was not sure if DOE should be doing this because Nissan should be paying for this data. The reviewer added that the benefit to this data was not clear.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer commented that the proposed future research was to simply continue what has been designed and to get the lab version of the testing fully operational.

Reviewer 2:
This reviewer noted that only 30,000 miles may be too low to get meaningful data.

Reviewer 3:
This reviewer indicated that there were very broad statements on what will be accomplished and what will lead into the next phases. The reviewer added that the project team needs more substance here tied to a staged methodology.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said yes, this project can help to increase EV adoption.

Reviewer 2:
This reviewer stated that knowing more about fast charging is important to know if EVs are to be used. The reviewer observed that battery technology is changing and improving. The reviewer added that this project may be measuring something that is always changing.

Reviewer 3:
This reviewer remarked that it is relevant to understand potentials for fast charging and effects on batteries; charge times are a key barrier to widespread adoption.

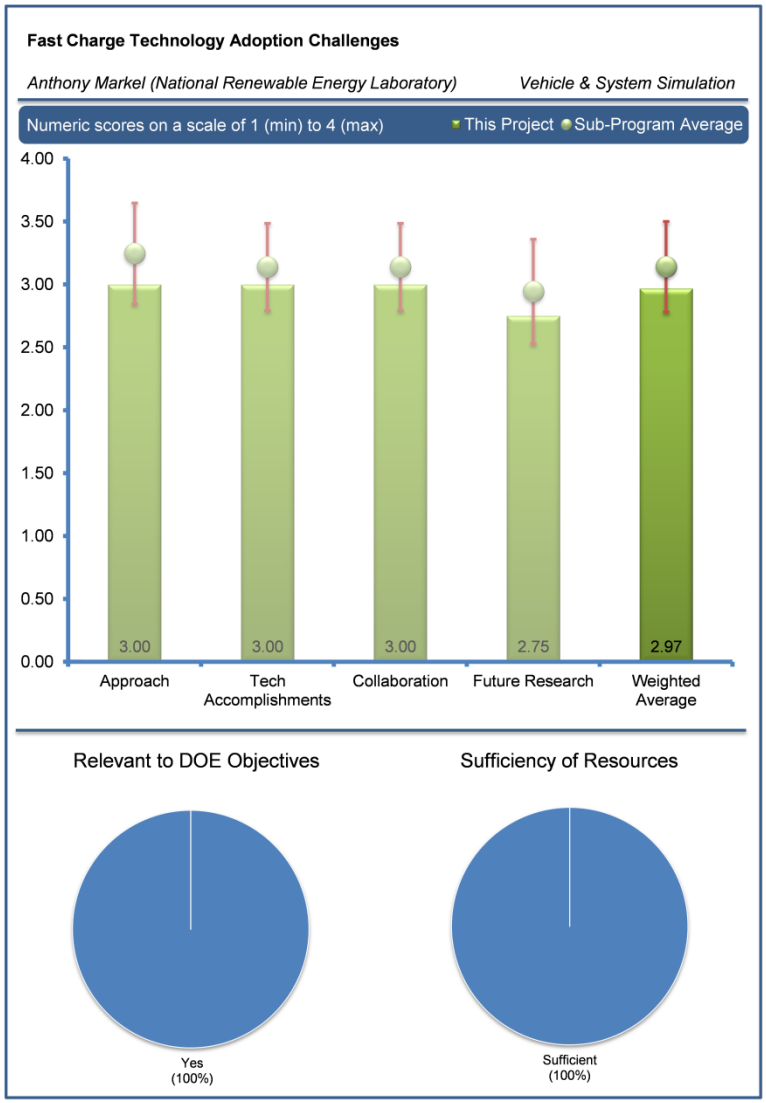
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer said that there was no indication of a mismatch of resources to the plan.

Reviewer 2:
This reviewer stated the project is well designed and has well trained resources.

Reviewer 3:
This reviewer was not sure DOE should be paying for this data. The reviewer added that this is very limited data, only 1 location and only 30,000 miles.

Fast Charge Technology Adoption Challenges: Anthony Markel (National Renewable Energy Laboratory) - vss114



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer noted important information to get. The reviewer added that the infrastructure will need to be improved if EVs are to take off.

Reviewer 2:

This reviewer indicated that this was a very difficult modeling topic conceptually and the PI has done a good job with an approach in absence of a real-world baseline (using a sampling of from Electric Avenue). The reviewer added that some more could have been said about the potential explanation of the time shift for on-demand charging. For example, the sample is skewed to yyyy population with specific behaviors given today's EV product offerings (versus the general population).

Reviewer 3:

The reviewer observed that the barriers were addressed, but not thought through in the sense that there was no mention made about the opportunity for renewable energy or the idea that hydrogen production may overcome electrification.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer stated that the project team pulled in a lot of data in year one.

Reviewer 2:

This reviewer noticed that the model was constructed and first results were achieved. The reviewer added that explanations for model outcomes were commented on with the next steps understood.

Reviewer 3:

This reviewer thought that there was no consideration or explanation for why the project team is using such a small car when most folks are driving full-size Chevrolet pickup trucks.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer observed that varied collaborations are appropriate and in place. Also, this reviewer stated that there was a good cross section including private industry. Additionally, the reviewer suggested that the project team may want to consider a gasoline retailer or oil company that has retail network planning expertise for approximations or modeling approaches.

Reviewer 2:
This reviewer said there were four collaborators on this project. This reviewer stated that the project cost is $220,000, that the contractors are not cost sharing, and that more utilities should be involved.

Reviewer 3:
This reviewer indicated that some explanation should have been provided as to how the project team decided on the partnerships.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that electrical utilities need this data.

Reviewer 2:
This reviewer pointed out that it seems an element of future work should include direct consumer behaviors and influences rather than purely macro assumptions (at least the impression of this reviewer). The reviewer then asked how the sample drivers would stack up against the assumptions of their behavior, for example, the forgetfulness factor seems high at 10%.

Reviewer 3:
This reviewer observed that there was no indication that the team was working with the fuel cell group to meet their shared energy storage needs.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer stated that renewables are a worthy goal for fast track.

Reviewer 2:
This reviewer stated that fast charge network modeling tools will be very relevant as the industry matures and BEVs become more commonplace in geographic pockets.

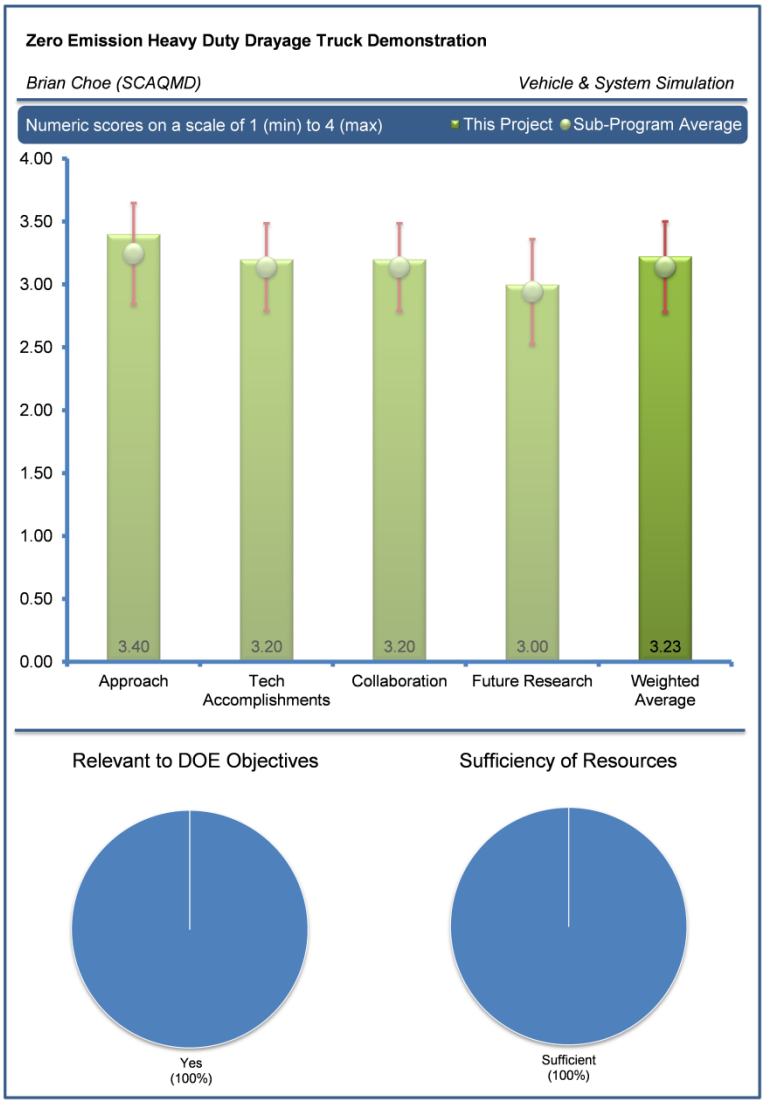
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
The reviewer noticed that it appears the project team has just enough resources to provide the resources required; however, their funding will be an inadequate number of resources to support the vehicle's potential.

Reviewer 2:
This reviewer indicated that this is a low cost project, $220,000, that the project is an important modeling goal and that the project team needs ROI on the fast charger.

Reviewer 3:
This reviewer remarked that resources do not appear to be a constraint, or surplus, for the stated scope.

Zero Emission Heavy Duty Drayage Truck Demonstration: Brian Choe (SCAQMD) - vss115



Reviewer Sample Size

A total of five reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the project approach and scope of developing four types of zero emission drayage truck technologies, testing and collecting data, both in the lab on a chassis dynamometer and in the field for two years, and analyzing the cost and performance data, will provide for an outstanding set of information to evaluate this technology.

Reviewer 2:

This reviewer stated that the project is impressive, and that it appears to be an excellent application of the electric vehicle technology to achieve both fuel savings and emission reductions.

Reviewer 3:

This reviewer indicated that the overall approach seems reasonable with three different types of battery electric drayage vehicles and one type of hybrid/fuel cell drayage vehicle being developed (over one year periods), dyno tested, and undergoing demonstration for two years. The reviewer commented that data on vehicle operations as well as maintenance will be collected and forwarded to NREL for analysis. The reviewer added that the total operations and maintenance (O&M) cost of drayage operation and different charger technologies (on board charger and DC-DC fast charger with 500kWh energy storage) will be assessed. The reviewer then asked why it was decided for Balqon to produce three vehicles, Transpower four vehicles, US Hybrid two vehicles, and Vision four vehicles as opposed to all of the vendors producing say two vehicles each. Additionally, the reviewer asked has an upfront modeling/duty cycle/cost analysis been conducted to help define technology and cost parameters for the project from the beginning.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer said that since this project recently started it is understandable there are few technical accomplishments reported so far. The reviewer added that the plans for the types of technologies to be evaluated and subsequent data collection will are very good.

Reviewer 2:

This reviewer noted that this project is a new start (kick-off October 2012) and there are no technical accomplishments to report, only contractual ones.

Reviewer 3:
This reviewer thought that the project was a bit slow on getting things in place. The reviewer observed that there are no subcontracts in place, and that the technical work is pending.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that there was good coordination with four vehicle types proposed. Also, the reviewer stated that there was good variability with the designs to see what actually works and guarantee at least a couple vehicles are placed in service.

Reviewer 2:
This reviewer stated that the collaboration and coordination of this project with other entities seems logical and well defined. The reviewer also said four vehicle manufacturers, two fleet/demo partners, UC Riverside, and NREL round out the project team. The reviewer noted that these are appropriate entities and cover all the required project elements.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer noted that the project team had an appropriate match for future work given the current state of the project, which will likely change as work commences.

Reviewer 2:
This reviewer stated that the project team may need to address the potential for reliability problems with the vehicles and what the alternative options are to complete the project in full.

Reviewer 3:
This reviewer pointed out that the majority of this project will be occurring in the future, including completing vehicle integration, testing the vehicles in the laboratory, getting the vehicles into the field and evaluating them for a two year period. The reviewer added that this project should provide an excellent set of data to evaluate the different technologies.

Reviewer 4:
This reviewer thought that the proposed future work activities are logical, but superficially defined. Also, the reviewer stated that it is essential to keep a focus on the overall durability of the systems and total cost of ownership for the different applications. The reviewer suggested that the project team clarify what defines overall project success as soon as possible.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said absolutely. The reviewer added that even though it is a niche application it is in line with the objectives of DOE and EPA for applying energy efficient vehicles. The reviewer said the project was very good.

Reviewer 2:
This reviewer said heavy-duty truck zero emission vehicles for drayage operations have the potential to mitigate stubborn air quality issues in highly populated urban areas and reduce consumption of petroleum in the transportation sector. The reviewer added that these applications are potentially suitable for application of electric drive technologies as they are centralized operations, with dedicated and often limited range requirements, and the vehicles frequently operate in creep mode.

Reviewer 3:

This reviewer stated that using battery and fuel cell technology to displace old diesel trucks in drayage service will reduce the petroleum used and help meet the DOE objective of petroleum displacement.

Reviewer 4:

This reviewer said direct displacement of petroleum one for one.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

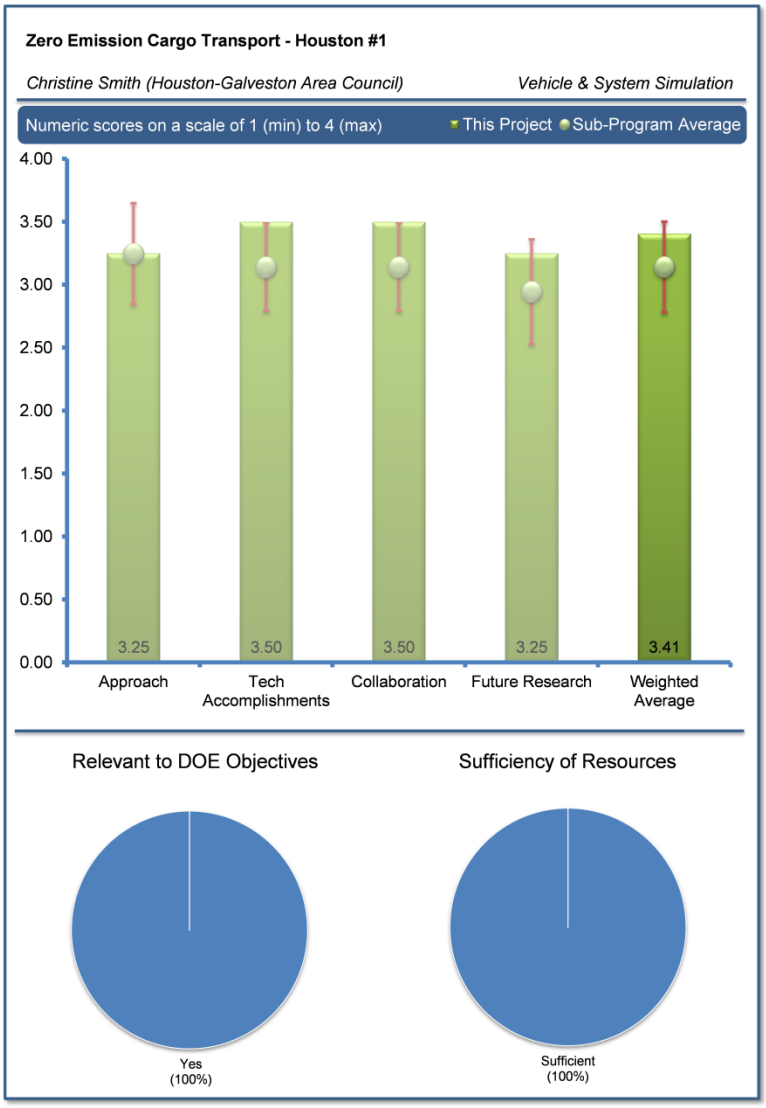
Reviewer 1:

This reviewer stated that the resources are sufficient for the projects that are identified.

Reviewer 2:

The reviewer observed that this project is 55% cost shared, resources are adequate, although it seems possible to achieve the desired project proof-of-concept and understanding with fewer overall vehicles.

Zero Emission Cargo Transport - Houston #1: Christine Smith (Houston-Galveston Area Council) - vss116



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer indicated that the approach to deploy 30 electric delivery trucks to be used in the Houston non-attainment area and collect data to demonstrate a 50% improvement in freight hauling efficiency is very good. The reviewer reported use by several nationally known companies such as UPS, Coca Cola, Fed Ex, and Frito-Lay. This reviewer added that using such well known organizations will help to promote the use of electric vehicles.

Reviewer 2:

This reviewer thought that the use of an all-electric vehicle for delivery applications is new and should be encouraged with the DOE support; however, there is very little detail on the program because of the late launch of the program. The reviewer stated that the project should be more specific on what kind of electric vehicles are used and added that the project is too vague.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer noted that because this project recently started, there are not many technical accomplishments that were reported; however, many of the milestones to be completed later this year, including the ordering of vehicles and charging equipment, and the plan to have the first vehicles delivered, are all on schedule. The reviewer added that vehicle procurement and charging station installation has been initiated.

Reviewer 2:

This reviewer indicated that there has not been much progress reported due to the very recent launch of the program.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer said that five fleets will be involved in the program, which is excellent.

Reviewer 2:
This reviewer pointed out that there is an outstanding group of national and local companies that are going to be the operators of these vehicles during the data collection phase of the project.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the future plan seems good

Reviewer 2:
This reviewer noted that because this project recently started, future work in FY 2013 will include getting the vehicle procured and on the road to start operational service. The reviewer said the planned future work in FY 2014 will be an important phase of the project since data will continue to be collected and that is when benefit analysis will be performed to show expected reductions in petroleum use, GHG emissions and criteria pollutants.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer indicated that this project definitely supports the DOE objective of displacing petroleum used.

Reviewer 2:
This reviewer pointed out that if the huge cost is not an issue, the program is relevant to the DOE overall objectives.

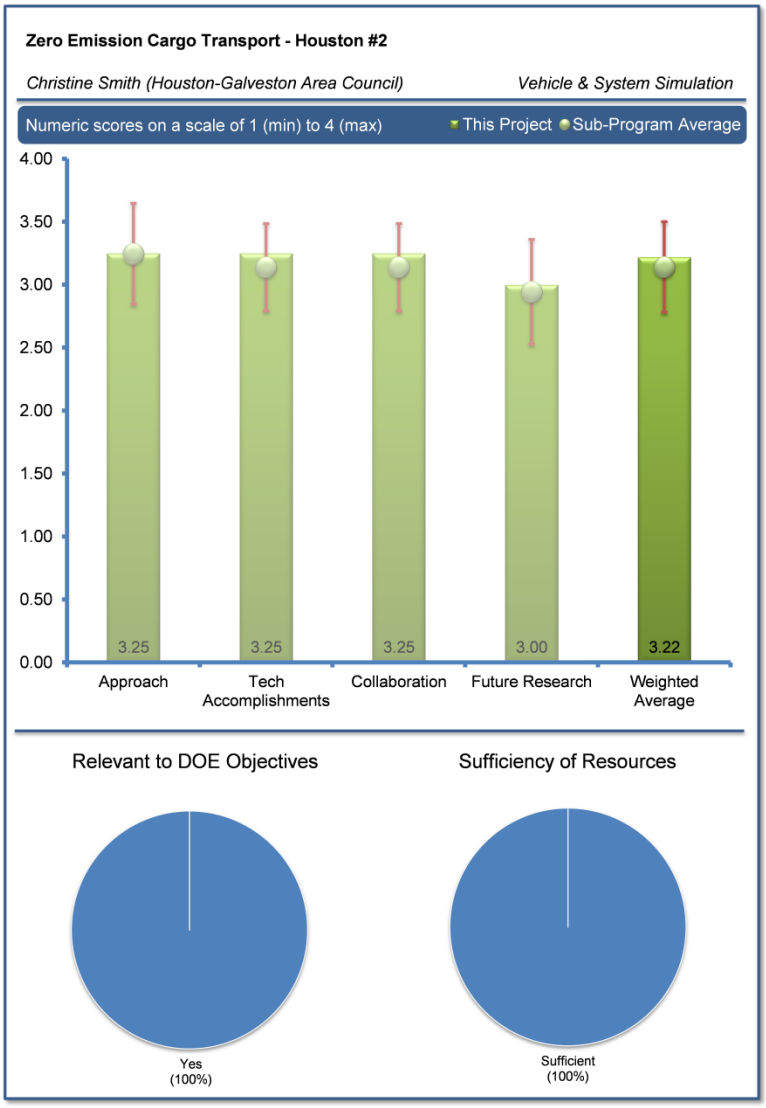
Reviewer 3:
This reviewer said direct one for one displacement of petroleum.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer thought that the resources should be sufficient to complete the work planned.

Reviewer 2:
This reviewer stated that it is not clear how much each electric vehicles costs, so it is hard to quantify the resource.

Zero Emission Cargo Transport - Houston #2: Christine Smith (Houston-Galveston Area Council) - vss117



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that the approach of introducing 20 hydrogen fuel cell electric hybrid drayage trucks into service is excellent. The reviewer added that this project will help reduce diesel fuel use, criteria pollutant emissions and greenhouse gas emissions.

Reviewer 2:

This reviewer pointed out that the concept of the program is new and should be encouraged by the DOE support. However, to the minimum, the contractor should describe what kind of the technologies would be used, it is so vague.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer said no technical milestones have been completed, but the timeline of milestones is to be completed over the next several years appears to be very manageable.

Reviewer 2:

This reviewer observed that no actual progress has been made due to the program's recent launch.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:

This reviewer stated that it is good the project is partnering with Wal-Mart stores since they are known all over the country and could create more public interest in the effort. In addition, Wal-Mart may want to expand this effort to other stores after seeing the results of using this technology.

Reviewer 2:

This reviewer indicated that the use of Wal-Mart is a solid starting point.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
The reviewer remarked that since this project recently started nearly all of the milestones are still to be accomplished, including the ordering assembly and delivery of the vehicles and initiating data collection.

Reviewer 2:
The reviewer stated that the future work plan seems to be doable, but the reviewer was unsure if the vehicle and technology will be available on time.

Reviewer 3:
This reviewer noted that the project team needs to discuss contingency plans if the vehicles do not function well (poor reliability and/or poor performance). The reviewer then asked how the project team will handle this.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said yes, the project supports the DOE objective of petroleum displacement. In fact, the reviewer indicated that the plan is to reduce petroleum consumption by over 1.1 million gallons of diesel fuel over the lifetime of the vehicles.

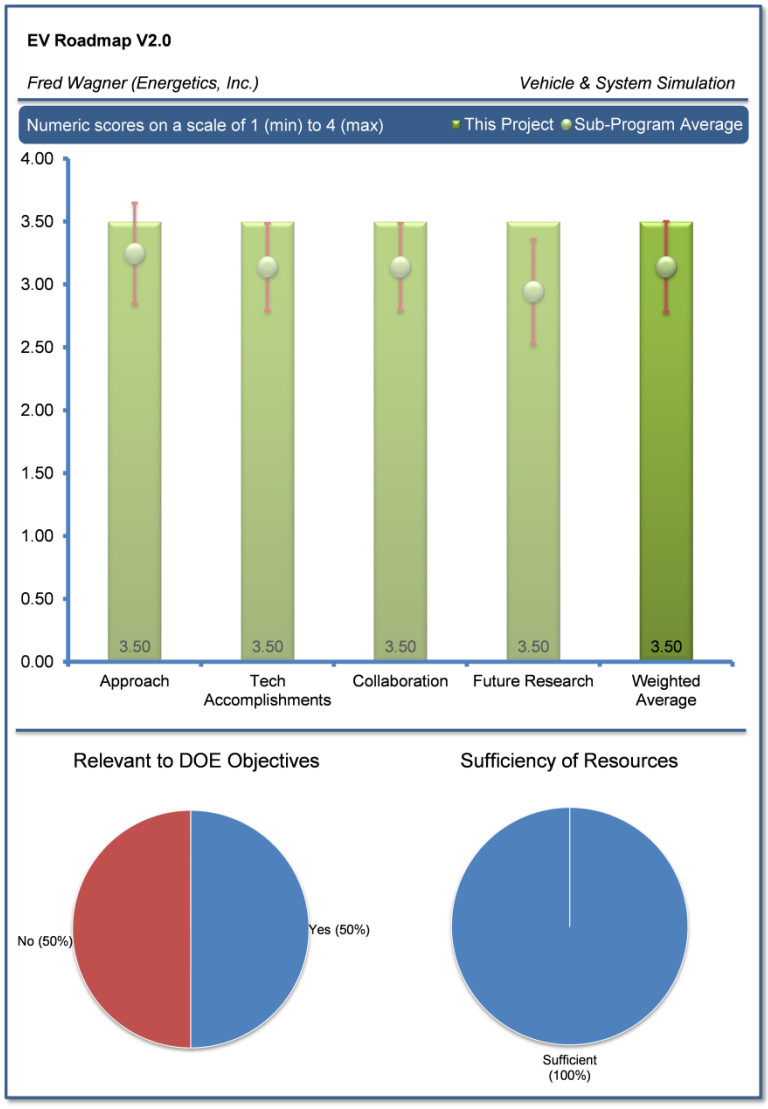
Reviewer 2:
This reviewer stated direct petroleum displacement one for one.

Reviewer 3:
This reviewer said the cost is a big deal. The reviewer added that this project should have significant impacts on improvement of the freight efficiency.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer stated that resources are sufficient to complete the planned work.

EV Roadmap V2.0: Fred Wagner (Energetics, Inc.) - vss118



Reviewer Sample Size

A total of two reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer thought that the approach of the American National Standards Institute (ANSI) roadmap seemed ok, and the project team has identified some barriers.

Reviewer 2:

This reviewer stated that the project has clearly addressed safety and interoperability barriers; however it was unclear whether performance and cost barriers received an equality of attention or focus.

Reviewer 3:

The reviewer indicated that the project identified barriers in wide ranging areas, both for the United States and internationally.

Reviewer 4:

This reviewer said that although the scope of the work was simply identification of gaps, the reviewer wanted to see some effort made to evaluate the effectiveness of standards as written. The reviewer would suggest adding a feedback step, where the results of the study are sent back to all of the organizations contacted or mentioned. The reviewer stated that this may already be included.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer noticed that with the project nearing completion, the single underlying accomplishment for this project is that the ANSI Electric Vehicles Standards Panel (EVSP) roadmap and EVSP Standards compendium both in their version 2.0 and these are well organized, acronyms defined, and written in readable English for broader than just the technical community to utilize. The reviewer added that a secondary accomplishment of establishing a fair assessment of gap status, priorities, timelines and Standard Data Objective (SDO) responsibility, is encouraging.

Reviewer 2:

This reviewer stated that there really are not barriers to this project; the point of this project is to identify gaps and provide suggestions on how others can address these gaps.

Reviewer 3:
This reviewer pointed out that just about all of the organizations/standards have been identified and tabulated. The reviewer added that it would be useful for the project team to include a short summary that identified the key areas to address, in addition to the generic list with time-ranking.

Reviewer 4:
This reviewer indicated that it was hard to gauge technical accomplishments with the presentation as it is. The reviewer observed many claims without real examples of what gaps were outlined; however, after reviewing the actual 170-page report from ANSI, it was apparent that it is indeed a comprehensive report.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer said that the project demonstrates collaboration at the highest level with over 100 private and public sector organizations involved.

Reviewer 2:
This reviewer stated that there is a very wide variety of organizations involved in this effort.

Reviewer 3:
This reviewer commented that the collaboration and coordination with other institutions is tricky because there are so many organizations the project needed to identify and coordinate with. The reviewer added that one organization that the project team seems to have missed is the UN Electric Vehicles and the Environment group, which is addressing the issues associated with EV standards internationally.

Reviewer 4:
This reviewer pointed out that this effort (with reference to the ANSI report) has a good cross-section of industry and institutions, although not all OEMs were contacted (e.g., German OEMs). The reviewer suggested having them on the invitation list as the other OEMs, including Japanese OEMs, were involved.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer said that the proposed future research seems like a solid list of topics though the reviewer stressed that there should be two specific points that need more focus: wireless communications for EVs; and wireless charging. The reviewer also suggested some tie into the standardization for Fuel Cell Vehicle standardization and the global technical regulations especially regarding EV Crash (and SAE J1766).

Reviewer 2:
This reviewer thought that the only future plan is to track the issues as they develop. The reviewer assumed that dissemination of results is also included.

Reviewer 3:
This reviewer described the proposed future work in FY 2013 and FY 2014 as only being in a discussion stage, which was somewhat disappointing. This reviewer also observed signs of limited direction. The reviewer added that the alignment with Europeans to harmonize standards is noteworthy and needed in a global economy to make EV's take a firm market acceptance. However, as this DOE co-funded project is closed out, the reviewer asked if ANSI carries the continuation of driving the standardization roadmap and EVSP Compendium forward. Also, the reviewer asked what funding will sustain these accomplishments.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer said that yes, this is a topic that supports coordination for codes and standards (C/S) for PHEV, EVs, and outlines topics needed to accelerate the standardization.

Reviewer 2:
This reviewer indicated that the development and dissemination of EV standards and codes promotes the expansion of the EV market and the DOE objective of petroleum displacement.

Reviewer 3:
This reviewer emphasized that EVs will not make it into the market place if there are regulatory barriers or incompatibility issues that make life difficult for owners.

Reviewer 4:
This reviewer indicated that battery-electric vehicles will never be more than a niche market unless recharge time can be brought down to about five minutes. This reviewer stated that mainstream customers will not accept long recharge times. Also, the reviewer indicated that the DOE needs to refocus its battery efforts on high-power batteries that can be rapidly recharged, not high energy batteries.

The reviewer added that until batteries that can be rapidly recharged are developed, the standardization efforts in this project will only support reduction of a tiny amount of petroleum.

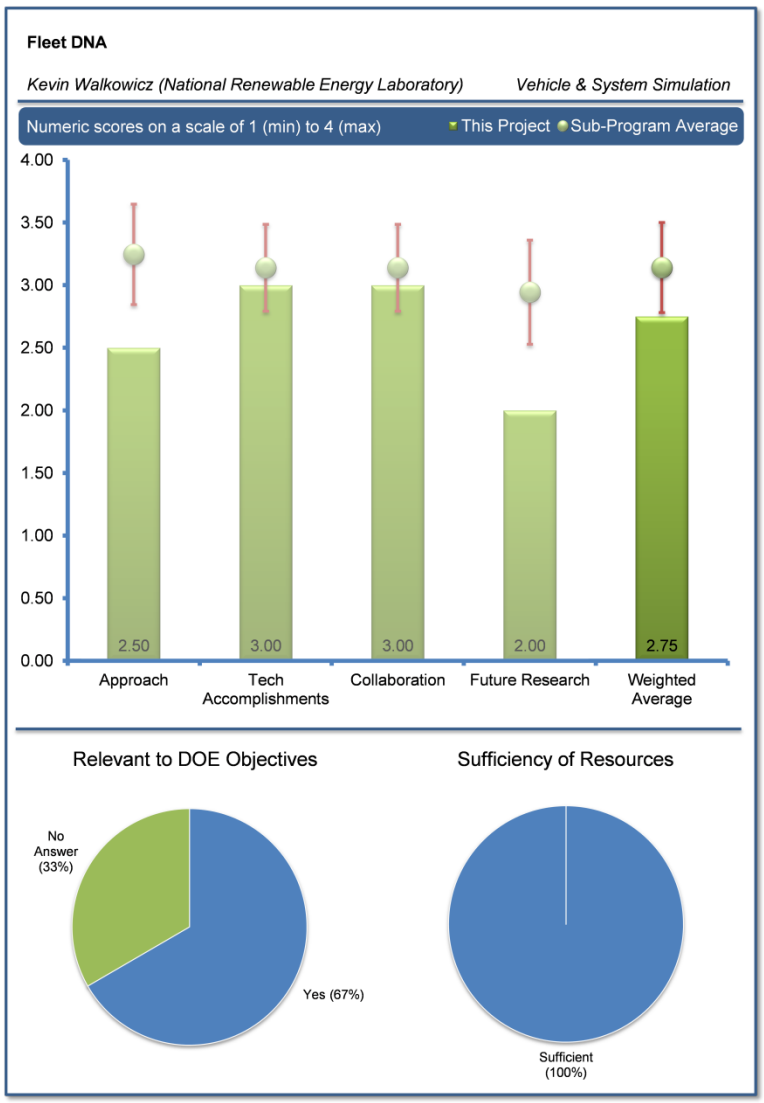
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer stated that this was a pretty small project, and thought that the project team did quite well with its limited resources.

Reviewer 2:
This reviewer thought that this project has demonstrated over the two and a half year period that sufficient resources were in play to yield the published accomplishments and roadmap promotions both in the United States and the international venues.

Reviewer 3:
The reviewer would not add further resources to this effort, as the document is published.

Fleet DNA: Kevin Walkowicz (National Renewable Energy Laboratory) - vss119



Reviewer Sample Size

A total of three reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

The reviewer commented that the approach contributes to overcoming some barriers and is generally effective, but could be improved.

Reviewer 2:

This reviewer stated that the cost and risk aversion barriers were clearly addressed by examples; however, no specific explanation of how the Computation Models, Design and Simulation barriers were addressed. The reviewer added that a few examples would be beneficial of either internal DOE or partners' use in these areas.

Reviewer 3:

This reviewer pointed out that in the area of data selection and collection, DOE VTO goals, priorities, and technology focus areas should be used to help guide fleet selection. Just as a single example, the reviewer said that hybrids are an area with significant funding from the DOE. Also, the reviewer indicated that data collection could highlight applications that could be good candidates for hybrid technology. The reviewer added that with that data, the OEMs can design hybrid systems and calculate fuel savings from hybrid systems. The reviewer stated that this information can be used in business cases to get more hybrid systems into production and encourage fleets to adopt those systems. The reviewer went on to say that more niche applications like bucket trucks are needed to help hybrid technology cross the chasm. The data from this project could help identify those niches. The reviewer stated that there are likely other areas besides hybrid technology. Controller Area Network (CAN) sensor data is relatively easy to obtain. The reviewer commented that although it is more expensive, more work could be done on getting energy usage and torque for components that are not on CAN but can have a significant effect on FE.

Reviewer 4:

This reviewer said that there appears to be no protocol for data dissemination or security in this plan. This reviewer added that protocol for data security, redundancy, and dissemination should be documented and made prominent.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer stated that organizing how this large amount of the vehicle data is processed and stored was quite an undertaking that achieved demonstrated results in development of the master and web databases along with data collection and reporting.

Reviewer 2:
This reviewer noted that the technical accomplishments with establishing the data center, reporting, and some analysis seemed to be good.

Reviewer 3:
This reviewer thought that technical accomplishment appears to be in line with the plan. The reviewer added that the database work provides a good way to analyze the data. The reviewer was not sure how many more fleets/trucks are planned for data collection.

Reviewer 4:
This reviewer said there was no mention for a vision about the dataset in terms of modern social media. Also, the reviewer asked if it was safe to assume the format is Extensible Markup Language (XML).

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer noticed that the appropriate public institutions have been involved and the fleets will grow this year. Also, this reviewer said that hopefully, other DOE projects will use the data. The reviewer advised that continuing efforts should be made to reach out to PI's of appropriate projects that might be able to use the data.

Reviewer 2:
This reviewer observed that geographic regions are well represented to gain insight on climatic effects.

Reviewer 3:
This reviewer indicated that it appears that this is a good collaboration between organizations in California and throughout the United States, with perhaps a need to contact some of the HD manufacturers directly.

Reviewer 4:
This reviewer noted the collaboration with ORNL and preliminary industry/government/OEM partners were noted, but cautioned that this database will solely have isolated consumers if collaboration and coordination is not expanded upon. The reviewer recommended seeking input, comments, and discussions from actual vehicle OEM consumers now. The reviewer reported that additional fleet and OEM partners are planned sometime in the future.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer commented that the proposed future work is broader than just accumulating more data and expanding the partnership network. Again, having a broader OEM audience interacting and using the database should be an objective. The reviewer added that this would authenticate and justify the effort versus just primarily being an internal DOE lab use.

Reviewer 2:
This reviewer said that effort should continue to be made to match the needs of other DOE projects for data and to standardize ways to get needed data that is not on the CAN bus.

Reviewer 3:

This reviewer noted that the future work seems okay, but the reviewer suggested having some specific data mining goals defined from the DOE to be evaluated for presentations. The reviewer added that FE versus duty cycle and other factors, etc., should be able to be summarized. Also, the reviewer thought that it would be interesting to partner with some of the institutes in California working on intelligent highways to determine if any data synergies on data gathering with advanced MD/HD vehicles can be found (e.g., platooning, etc.).

Reviewer 4:

This reviewer stated that there was no mention of collaboration with renewable energy entities.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:

This reviewer stated that, in the universe of medium- and HD vehicle development to improve fuel consumption, this project is very relevant.

Reviewer 2:

This reviewer said yes, it is important to monitor the medium- and HD projects and use the data to assist in future developments.

Reviewer 3:

This reviewer indicated that vehicle electrifications promote electricity as an easily identified production source that is more easily managed than distributed source emissions such as the millions of ICEs.

Reviewer 4:

The reviewer said that this data will provide the information for business cases for fuel saving technologies and should help generate new ideas and projects to save fuel.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

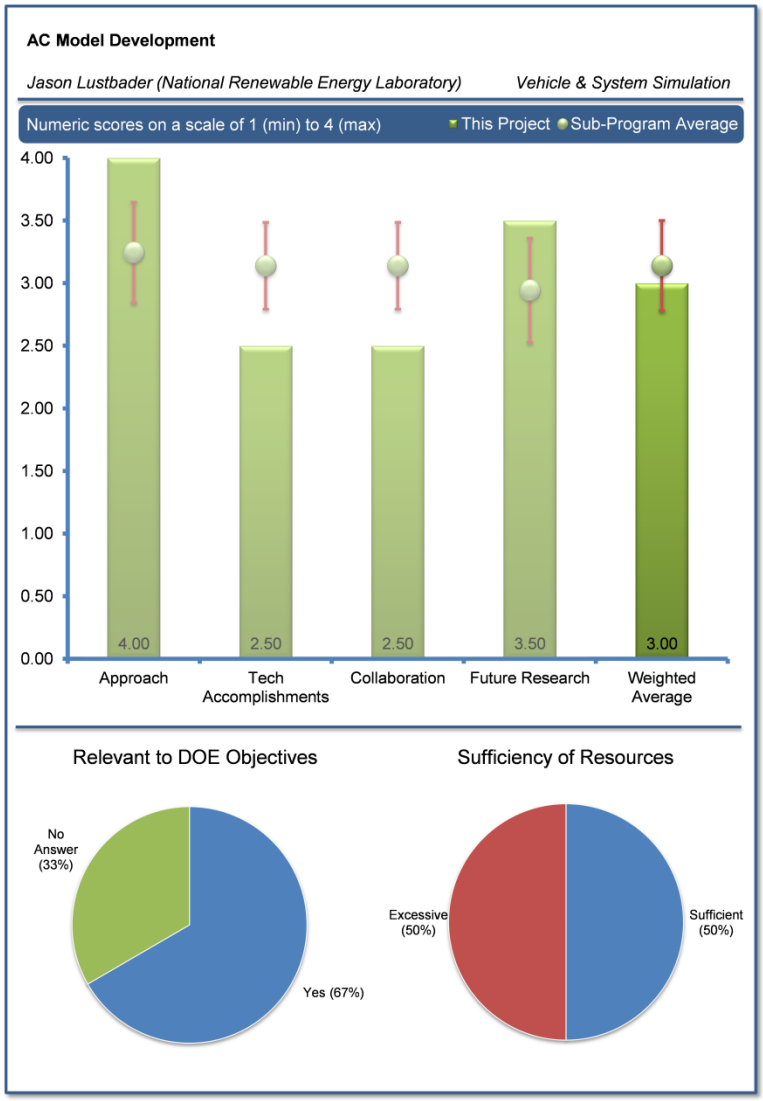
Reviewer 1:

This reviewer thought that a resource check should be done to see if the needed people are available to take data on the desired number of fleets.

Reviewer 2:

This reviewer indicated that no matter how data is drilled down, somebody will want something different or visualized differently. The reviewer went on to say that having the public data report with multiple vocations is a step in the right direction, but having access to the public database for personalized data analysis would be ideal. Additionally, the reviewer said that desktop database analytical tools are becoming more available and widespread that would allow this database more general use.

AC Model Development: Jason Lustbader (National Renewable Energy Laboratory) - vss120



Reviewer Sample Size

A total of three reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated that this was an outstanding project with appropriate objectives and goals appearing to match the resources available. The reviewer thought this project was a very interesting topic.

Reviewer 2:

This reviewer indicated that the project team's approach covers all bases. The reviewer observed that the project team is developing both a detailed model of air conditioning efficiency for use by component suppliers and a simplified model for use by vehicle manufacturers. The reviewer stated that the air conditioning model will be integrated with Autonomie.

Reviewer 3:

This reviewer observed that two of the three barriers were technically addressed, while the third (i.e., constant advances in technology) had limited scope.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

This reviewer indicated that there appears to have been substantial progress on the elements of the model and the project has maintained substantial flexibility to apply to similar applications.

Reviewer 2:

This reviewer stated that this project is mostly complete and appears to have completely met objectives.

Reviewer 3:

The reviewer reported that technical accomplishments with component modeling and validation, system validation, Autonomie integration, and drive cycle simulation were achieved.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated that there was good collaboration on both component technology support and application.

Reviewer 2:
This reviewer remarked that collaboration with stated partnerships was definitely achieved; however, the reviewer recommended broader collaborative effort with other vehicle and HVAC OEMs because Autonomie use is growing.

Reviewer 3:
This reviewer stated that more thought could be made towards how to use the model. For example, the reviewer asked how the model results compare to the new air conditioning test procedure (AC17) recently adopted by EPA and the National Highway Traffic Safety Administration (NHTSA) for CAFE/CO_2 standards.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer stated that the proposed future research was a good match with objectives, and that there were achievable tasks within work scope.

Reviewer 2:
This reviewer thought that the proposed future work for FY 2013 is adequate. The reviewer added that another area of increased focus for FY 2013 is to address specific advanced HVAC technologies. Another recommendation the reviewer had was to consider proposed alternative HVAC operating strategies and their impact to Fuel Used Rate.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
The reviewer explained that because HVAC has become commonplace, this project has DOE relevance to improve fuel consumption in all vehicle classes and especially EVs and hybrids.

Reviewer 2:
This reviewer pointed out that air conditioning is only 5% of light-duty petroleum displacement, but the proportion is growing and evaluating air conditioning efficiency is very difficult.

The reviewer added that to really be effective, the modeling should be incorporated into the air conditioning efficiency credits granted by NHTSA and EPA for their CAFE/CO_2 standards. The reviewer stated that this would apply to heavy-duty as well as light-duty vehicles.

Reviewer 3:
This reviewer remarked that developing an open model for user/industry use is an excellent project in a technical area that has substantial energy impact, but has received little attention relative to vehicle propulsion.

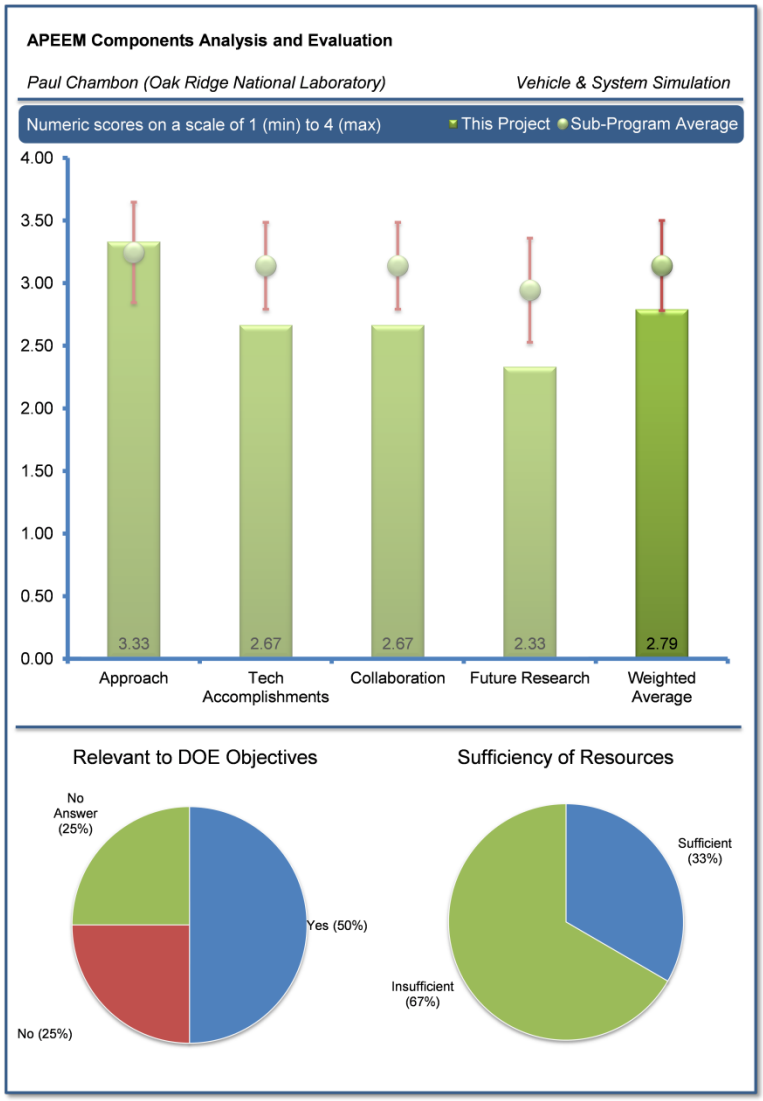
Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer indicated that the resources appear to be sufficiently managed and applied for yielding the technical accomplishments.

Reviewer 2:

This reviewer said that this is a really nice program, but $900,000 is a lot of money.

APEEM Components Analysis and Evaluation: Paul Chambon (Oak Ridge National Laboratory) - vss121



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer suggested that investigators may want to develop a consistent set of system level requirements as inputs to the component level Electric Motor Technology R&D team. The reviewer added that the results shown have usefulness but the results need to be refined further to increase the utility of the requirements information.

Reviewer 2:

This reviewer stated that the program goals are modest, so it is not difficult to fully address all of the technical barriers.

Reviewer 3:

This reviewer stated that the overall approach of trying to co-develop a modeling, simulation, and HIL test program that will be used to evaluate DOE project outputs is quite a lofty goal. The reviewer found the depth of the individual project elements lacking or very optimistic given the funding level and time associated with the project. The reviewer relayed previous experience emanating from three government labs and two industry labs proposing very similar objectives and all have taken multiple years and tens of millions of dollars. The reviewer indicated that this project would serve well as an introductory program for ORNL to understand the issues of each area (modeling, simulation, and lab testing) to be followed by a more thorough proposal for a real evaluation project. The reviewer added that the DOE should be prepared for a large capital project followed by a long-term support cost for labor and infrastructure.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:

The reviewer commented that the objectives are modest, so it is not difficult to fully overcome barriers.

Reviewer 2:

This reviewer stated that the program objectives do not match the project capabilities. The project will not be able to properly evaluate the technologies with the little effort, time, and funding assigned to the task.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer pointed out that the project has strong collaboration between DOE's systems level vehicle R&D and component level R&D programs.

Reviewer 2:
This reviewer said that little collaboration is needed to meet the objectives of benchmarking current technologies and enhancing the prototype evaluation capabilities of the DOE Advanced Power Electronics and Electric Machines Program (APEEM).

Reviewer 3:
This reviewer observed that collaboration is limited to accessing previously developed battery models.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer remarked that the project team has adopted an approach for future work that will perform laboratory based component characterization. The reviewer said that the connection between future component characterization work and impacting market barriers should be clarified.

Reviewer 2:
This reviewer noticed that the primary barrier is simply that test equipment does not currently exist. The reviewer added that the project is spending much of the funding simply to install a new high-speed, transient dynamometer and use it to do transient benchmarking.

Reviewer 3:
This reviewer said that the future research was very much of an overrepresentation of the project capabilities.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer observed that the development of more efficient electric vehicle systems and electric motor components will help to decrease petroleum use in the U.S. transportation sector. The reviewer added that this project supports the overall goal by providing more complete system requirements to component technology developers.

Reviewer 2:
This reviewer noted that motor and power electronics efficiency is already very high and only modest improvements can be made; however, as hybrids become widespread in the future, even modest efficiency improvements will have a measurable impact on petroleum consumption. Also, the reviewer indicated motor and power electronics have been relatively neglected, so this is an area where this research can make an impact.

Reviewer 3:
This reviewer noted that the project is a learning exercise for ORNL in electric power system modeling, simulation, and HIL testing.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer referenced previous comments that the project is way under scoped for the overall objective of evaluating the output of other DOE research projects.

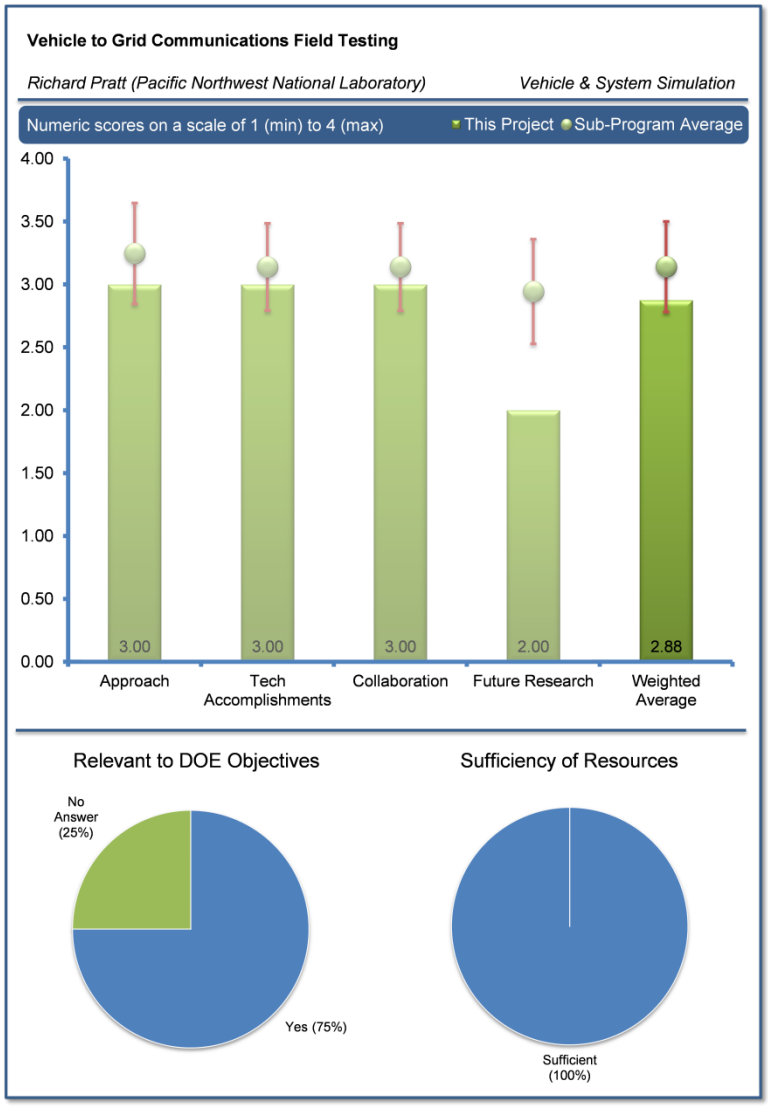
Reviewer 2:

The reviewer stated that this project would likely produce a bigger and timelier impact if it were allotted a bigger budget.

Reviewer 3:

This reviewer commented that $500,000 would be excessive just to do benchmarking, but some of the funds are being used to improve the DOE's test facilities, which will have benefits in the future.

Vehicle to Grid Communications Field Testing: Richard Pratt (Pacific Northwest National Laboratory) - vss122



Reviewer Sample Size

A total of four reviewers evaluated this project.

Question 1: Approach to performing the work – the degree to which technical barriers are addressed, the project is well-designed, feasible, and integrated with other efforts.

Reviewer 1:

This reviewer stated the project team had an excellent approach and were very tuned in to what the industry needs for grid communication evaluations.

Reviewer 2:

This reviewer remarked that participating with the SAE in working groups and document development is a very good approach to developing useful codes and standards. The reviewer stated that the project continues to address the barriers of the lack of codes and standards for communication between PHEV and the grid. The reviewer added that the project is in communication and collaboration with ANL to make sure that there is not a duplication of effort on codes and standard development.

Reviewer 3:

This reviewer commented that the approach will benefit from defining technical interaction products (e.g., operational requirements, use cases) based on technical interactions with utilities and academic partners involved in the Northwest Smart Grid Project. The reviewer said these requirements may help to increase the impact of the work as an input to codes and standards organizations.

Reviewer 4:

The reviewer recommended that some sort of gap analysis should be used to identify where codes and standards are lacking and to present a similar ANSI vehicle standards Roadmap format assessment (e.g., VSS118). The reviewer added that the project does appear to put a limited set of grid communication hardware for development, testing and interoperability assessments.

Reviewer 5:

This reviewer thought that there is not enough focus on how the data formats are being considered. The reviewer added that though this may be technical, it is a crucial aspect to meeting project objectives.

Question 2: Technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress toward DOE goals.

Reviewer 1:
This reviewer stated that good progress has been made since the 2012 review. The reviewer observed that the project team reviewed and completed the development of several SAE standards. The reviewer added that progress has been made during 2013 on field testing including development of an Electronically Stored Information (ESI) interface and implementing open standard based communication. The reviewer indicated that the project team was leveraging other activities at PNNL, such as the PNNL laboratory homes project, which allows for good use of government funds.

Reviewer 2:
This reviewer observed that the project appears to be on track and with a well-founded interaction with appropriate standards committees.

Reviewer 3:
The reviewer noted that the presenter indicated that tangible progress has been made for establishing a working prototype to investigate key concepts.

Reviewer 4:
This reviewer thought that the project had very good support of the SAE Hybrid communications committee regarding technical accomplishments.

Reviewer 5:
This reviewer indicated that the project had multiple location sites, and a variety of vehicles, vendors, and utilities involved with field testing, that put a real world spin on project outcome. The reviewer added that the standards and codes gap analysis needs improved clarity of status similar to ANSI roadmap on electrical vehicle Standards.

Question 3: Collaboration and coordination with other institutions.

Reviewer 1:
This reviewer stated the project team had an excellent approach and was very tuned in to what the industry needs for grid communication evaluations.

Reviewer 2:
This reviewer stated that the investigator has a potentially rich collaboration and coordination context for performing the research. The reviewer added that the investigator should work to increase the level of interaction and feedback from the Northwest smart grid project partners. The reviewer indicated that the increased level of interaction has the potential to increase the impact of this project.

Reviewer 3:
This reviewer said that it is important that the project continues to coordinate with the SAE and the Smart Grid Interoperability Panel to ensure the standards developed are useful to industry.

Reviewer 4:
This reviewer stated that the establishment of significant industry partnership is not yet demonstrated.

Question 4: Proposed future research – the degree to which the project has effectively planned its future work in a logical manner by incorporating appropriate decision points, considering barriers to the realization of the proposed technology, and, when sensible, mitigating risk by providing alternate development pathways.

Reviewer 1:
This reviewer pointed out that the future work addresses current hardware/software limitations.

Reviewer 2:
This reviewer thought that the continuation of SAE standard development is an important aspect of this project. The reviewer added that the utility and vehicle OEM field testing that will be accomplished in the future is an important activity.

Reviewer 3:
This reviewer commented that the project team had a good approach, however, it is very important that SAE J2836/6 is also evaluated for wireless communications to grid as it appears none where in this presentation, even though it is a published document.

Reviewer 4:
This reviewer indicated that the project documentation did not reflect specific decision points, although one could assume that their contributions to the standards committee work will inform decisions on the appropriate technical approaches for the Standard.

Reviewer 5:
This reviewer observed that there was no proposed future work given.

Question 5: Does this project support the overall DOE objectives of petroleum displacement? Why or why not?

Reviewer 1:
This reviewer noted that the project provides technical investigations regarding communications between grid connected electric vehicles and electric vehicle supply equipment. This reviewer added that electric vehicles can displace or reduce petroleum use by allowing vehicles to use energy supplied by the electrical grid (instead of petroleum).

Reviewer 2:
This reviewer stated that the project supports the DOE objectives by addressing codes and standards to require and enable widespread adoption of electric-drive transportation technologies.

Reviewer 3:
This reviewer observed that electrification will offset petroleum only to the extent that it is used in light weight transportation.

Question 6: Resources: How sufficient are the resources for the project to achieve the stated milestones in a timely fashion?

Reviewer 1:
This reviewer noted that funding should be increased and also to cover published documents such as SAE J2836/6 also for wireless power transfer communications with the grid.

Reviewer 2:
This reviewer thought that resources appear to be sufficient to complete the project.

Reviewer 3:
This reviewer thinks that the recourses are sufficient to the extent the project team details the next path for research.

Acronyms and Abbreviations

Acronym	Definition
A	Ampere
AC	Alternating Current
A/C	Air-Conditioning
AEV	All Electric Vehicle
AHD	Advanced Hybrid Drives
AMI	Advanced Metering Infrastructure
AMR	Annual Merit Review
ANL	Argonne National Laboratory
ANSI	American National Standards Institute
APEEM	Advanced Power Electronics and Electric Machines Program
ARPA-E	Advanced Research Projects Agency - Energy
APRF	Advanced Powertrain Research Facility (Argonne National Laboratory)
APU	Auxiliary Power Unit
ARRA	American Recovery and Reinvestment Act
AT-PZEV	Advanced Technology Partial Zero Emissions Vehicle
AVTA	Advanced Vehicle Testing Activity
AVTE	Advanced Vehicle Testing and Evaluation
BEV	Battery Electric Vehicle
BTE	Brake Thermal Efficiency
CAN	Controller Area Network
CAFE	Corporate Average Fuel Economy
CD	Charge Depleting
CEC	California Energy Commission
CFD	Computational Fluid Dynamics
CLEERS	Cross-Cut Lean Exhaust Emission Reduction Simulation
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
CPUC	California Public Utilities Commission
CRADA	Cooperative Research and Development Agreement
CS	Charge Sustaining
C/S	Codes and Standards
CSS	Cascade Sierra Solutions
CY	Calendar Year
D3	Downloadable Dynamometer Database
DC	Direct Current
DCFC	Direct Current Fast Chargers
DFT	Department of Transport

Acronym	Definition
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DR	Demand Response
DSRC	Dedicated Short-Range Communications
EIL	Engines in the Loop
EGR	Exhaust Gas Recirculation
EPA	Environmental Protection Agency
EPRI	Electric Power Research Institute
EREV	Extended Range Electric Vehicle
ESI	Electronically Stored Information
ESS	Energy Storage Systems
EV	Electric Vehicle
EVSE	Electric Vehicle Supplemental (Supply) Equipment
EVSP	Electric Vehicles Standards Panel
EVWPT	Electric Vehicle Wireless Power Transfer
FAT	Fleet Analysis Tool
FE	Finite Element
FE	Fuel Economy
FF	Flex Fuel
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FMVSS	Federal Motor Vehicle Safety Standards
FOA	Funding Opportunity Announcement
FY	Fiscal Year
FOA	Funding Opportunity Announcement
GEM	Greenhouse Gas Emissions Model
GEN 2	Generation 2
GIS	Geographic Information System
GM	General Motors Corporation
GSA	General Services Administration
GPRA	Government Performance and Results Act
GPS	Global Positioning System
GHG	Greenhouse Gas
GWh	Gigawatt hours
HAN	Home Area Network
HD	Heavy-Duty
HEV	Hybrid Electric Vehicle
HIL	Hardware in the Loop
HMI	Human-to-Machine Interface
HVAC	Heating Ventilating and Air Conditioning
HWFET	Highway Fuel Economy Driving Schedule

Acronym	Definition
IC	Internal Combustion
ICE	Internal Combustion Engine
IEEE	Institute of Electrical and Electronics Engineers
ITS	Intelligent Transportation Systems
INL	Idaho National Laboratory
IP	Intellectual Property
IPO	Initial Public Offering
ISO	International Organization for Standardization
ITS JPO	Intelligent Transportation Systems Joint Program Office
KASIT	Korea Advanced Institute of Science and Technology
kW	Kilowatt
kWh	Kilowatt Hour
Li-ion	Lithium Ion
LD	Light-Duty
LLNL	Lawrence Livermore National Laboratory
LNG	Liquid Natural Gas
LTC	Low-Temperature Combustion
MWh	Megawatt-hour
MEDC	Michigan Economic Development Corporation
MD	Medium-Duty
MDU	Multiple-Dwelling Unit
NASA	National Aeronautics and Space Administration
NC	North Carolina
NHTS	National Household Travel Survey
NHTSA	National Highway Traffic Safety Administration
NIST	National Institute of Standards and Technology
NREL	National Renewable Energy Laboratory
OEM	Original Equipment Manufacturer
O&M	Operations and Maintenance
ORNL	Oak Ridge National Laboratory
PEEM	Power Electronics and Electric Machines
PEV	Plug-in Electric Vehicle
PFI	Port Fuel Injection
PHEV	Plug-In Hybrid Electric Vehicle
PI	Principal Investigator
PLC	Programmable Logic Controller
PNNL	Pacific Northwest National Laboratory
PPG	Pittsburgh Plate Glass Company
R&D	Research and Development
ROI	Return on Investment

Acronym	Definition
RPM	Rotations per Minute
SA	Standards Association
SAE	Society of Automotive Engineers
SDG&E	San Diego Gas and Electric
SEP	Smart Energy Profile
SI	Spark Ignition
SIDI	Spark Ignition Direct Injection
SOC	State Of Charge
SOI	Scenario of Interest
SOFC	Solid Oxide Fuel Cell
SWRI	Southwest Research Institute
TARDEC	U.S. Army Tank Automotive Research, Development, and Engineering Center
TEG	Thermoelectric Generation
TMS	Thermal Management System
TPMS	Tire-Pressure Monitoring System
TRB	Transportation Research Board
TRU	Trailer Refrigeration Unit
TSB	Technology Standard Board
TSE	Truck Stop Electrification
UC	University of California
UDDS	Urban Dynamometer Driving Schedule
UK	United Kingdom
UL	Underwriters Laboratories
USCAR	United States Council for Automotive Research
U.S. DRIVE	U.S. Driving Research and Innovation for Vehicle efficiency and Energy sustainability
V2G	Vehicle-to-Grid
V2I	Vehicle-to-Infrastructure
V2V	Vehicle-to-Vehicle
VTO	Vehicle Technologies Office
WHR	Waste Heat Recovery
WPT	Wireless Power Transfer
XML	Extensible Markup Language