U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

2015 Annual Merit Review, Vehicle Technologies Office

Results Report

November 2015

Prepared by New West Technologies, LLC for the U.S. Department of Energy Vehicle Technologies Office

(This page intentionally left blank)

Table of Contents

Introduction

The 2015 U.S. Department of Energy (DOE) Fuel Cell Technologies Office (FCTO) and Vehicle Technologies Office (VTO) Annual Merit Review and Peer Evaluation Meeting (AMR) was held June 8-12, 2015, in Arlington, Virginia. The review encompassed work done by the FCTO and the VTO: 258 individual activities were reviewed for VTO, by 170 reviewers. A total of 1,095 individual review responses were received for the VTO technical reviews.

The objective of the meeting was to review the accomplishments and plans for VTO over the previous 12 months, and provide an opportunity for industry, government, and academia to give inputs to DOE on the Office with a structured and formal methodology. The meeting also provided attendees with a forum for interaction and technology information transfer.

The peer review process followed the guidelines of the Peer Review Guide developed by the Office of Energy Efficiency and Renewable Energy (EERE). Each activity is reviewed every three years, at a minimum. However, the Office strives to have every activity reviewed every other year. The reviewers for the technical sessions were drawn from a wide variety of backgrounds, including current and former vehicle industry members, academia, government, and other expertise areas. Each reviewer was screened for conflicts of interest as prescribed by the Peer Review Guide. A complete list of the meeting participants is presented as Appendix A.

Evaluation Criteria – Research & Development Subprogram Projects

In the technical research and development (R&D) subprogram sessions, these reviewers were asked to respond to a series of specific questions regarding the breadth, depth, and appropriateness of the VTO R&D activities. The technical questions are listed below, along with appropriate scoring metrics. These questions were used for all formal VTO project reviews, including any American Recovery and Reinvestment Act (ARRA) reviews.

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. (Scoring weight for overall average = 20%)

- 4.0=outstanding (sharply focused on critical barriers; difficult to improve approach significantly).
- 3.5=excellent (effective; contributes to overcoming most barriers).
- 3.0=good (generally effective but could be improved; contributes to overcoming some barriers).
- 2.5=satisfactory (has some weaknesses; contributes to overcoming some barriers).
- 2.0=fair (has significant weaknesses; may have some impact on overcoming barriers).
- 1.5=poor (minimally responsive to project objectives; unlikely to contribute to overcoming the barriers).
- 1.0=unsatisfactory (not responsive to project objectives; unlikely to contribute to overcoming the barriers).

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. (Scoring weight for overall average = 40%)

- 4.0=outstanding (sharply focused on critical barriers; difficult to improve significantly).

- 3.5=excellent (effective; contributes to overcoming most barriers).
- 3.0=good (generally effective but could be improved; contributes to overcoming some barriers).
- 2.5=satisfactory (has some weaknesses; contributes to overcoming some barriers) 2.0=fair (has significant weaknesses; may have some impact on overcoming barriers).
- 1.5=poor (minimally responsive to project objectives; unlikely to contribute to overcoming the barriers).
- 1.0=unsatisfactory (not responsive to project objectives; unlikely to contribute to overcoming the barriers).

Question 3. Collaboration and coordination with other institutions. (Scoring weight for overall average = 10%)

- 4.0=outstanding (close, appropriate collaboration with other institutions; partners are full participants and well-coordinated).
- 3.5=excellent (good collaboration; partners participate and are well-coordinated).
- 3.0=good (collaboration exists; partners are fairly well-coordinated).
- 2.5=satisfactory (some collaboration exists; coordination between partners could be significantly improved).
- 2.0=fair (a little collaboration exists; coordination between partners could be significantly improved).
- 1.5=poor (most work is done at the sponsoring organization with little outside collaboration; little or no apparent coordination with partners).
- 1.0=unsatisfactory (no apparent coordination with partners).

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. (Scoring weight for overall average = 10%)

- 4.0=outstanding (sharply focused on critical barriers; difficult to improve significantly).
- 3.5=excellent (effective; contributes to overcoming most barriers).
- 3.0=good (generally effective but could be improved; contributes to overcoming some barriers).
- 2.5=satisfactory (has some weaknesses; contributes to overcoming some barriers).
- 2.0=fair (has significant weaknesses; may have some impact on overcoming barriers).
- 1.5=poor (minimally responsive to project objectives; unlikely to contribute to overcoming the barriers).
- 1.0=unsatisfactory (not responsive to project objectives; unlikely to contribute to overcoming the barriers).

Question 5. Does this project support the overall DOE objectives of petroleum displacement? Why or why not? (Scoring weight, not included with overall average = 20%)

- yes
- no

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

- excessive
- sufficient
- insufficient

Evaluation Criteria – Technology Integration Projects

Reviewers for the Technology Integration (TI) technical session answered questions tailored to TI's 2015 AMR focus on petroleum reduction technologies and practices, alternative fuels, infrastructure, and related efforts. These technical questions are listed below, along with appropriate scoring metrics.

Question 1. Project approach to supporting deployment of petroleum reduction technologies and practices, alternative fuel vehicles, infrastructure and related efforts—the degree to which the project is well-designed, feasible, and integrated with other efforts. (Scoring weight for overall average = 20%)

- 4.0=outstanding (difficult to improve project approach significantly).
- 3.0=good (generally effective but could be improved).
- 2.0=fair (has significant weaknesses).
- 1.0=poor (not responsive to project objectives).

Question 2. Project accomplishments and progress toward overall project and DOE goals—the degree to which progress/significant accomplishments have been achieved, measured against performance indicators and demonstrated progress toward project and DOE goals. (Scoring weight for overall average = 40%)

- 4.0=outstanding (excellent progress toward objectives).
- 3.0=good (significant progress toward objectives).
- 2.0=fair (rate of progress has been slow).
- 1.0=poor (little or no progress towards objectives).

Question 3. Collaboration and Coordination among the Project Team—the degree to which the appropriate team members and partners are involved in the project work and the effectiveness of collaboration between and among partners. (Scoring weight for overall average = 10%)

- 4.0=outstanding (close, appropriate collaboration within project team; team members are well-suited to effectively carry out the work of the project).
- 3.0=good (some collaboration exists; team members are fairly well-suited to project work).

- 2.0=fair (a little collaboration exists; team membership could be improved).
- 1.0=poor (little or no apparent collaboration between team members; project team is lacking critical expertise to effectively carry out the work of the project).

Question 4. Alternative Fuel Market Expansion and/or Petroleum Reduction Potential—the degree to which the project has the potential to contribute to a sustainable alternative fuel vehicle market and/or reduce petroleum dependence in the transportation sector, including the potential to reduce barriers to large scale alternative fuel vehicle market penetration and make information about alternative fuels and petroleum reduction opportunities widely available to target audiences. (Scoring weight for overall average = 10%)

- 4.0=outstanding (Project clearly contributes to alternative fuel vehicle market expansion and/or petroleum reduction; project is sharply focused on barriers and provides highly effective and widely available information resources.).
- 3.0=good (project has the potential to contribute to alternative fuel vehicle market expansion and/or petroleum reduction; project generally addresses overcoming barriers and provide for public information needs.).
- 2.0=fair (Project may lead to market improvements and petroleum reduction, but needs better focus on overcoming barriers and providing information.).
- 1.0=poor (Project has little relevance toward advancing an alternative fuel vehicle market or reducing petroleum consumption; project fails to eliminate barriers or inform appropriate audiences).

Question 5. Relevance—Does this project support the overall DOE objectives of reducing reliance on petroleum based fuels? Why or why not? (Scoring weight for overall average = 20%)

- yes
- no

Question 6. Use of resources—Are DOE funds being used wisely? Should DOE fund similar efforts in the future? If not, what would be a better use of DOE resources to achieve alternative fuel vehicle and infrastructure expansion?

- yes
- maybe
- no

Project Scoring

For R&D subprogram sessions, reviewers were asked to provide numeric scores (on a scale of 1.0-4.0 in one-half point increments, as indicated above) for Question 1 through Question 4 of each formally reviewed activity. For each reviewed project, the individual reviewer scores for Question 1 through Question 4 were averaged to provide information on the project’s question-by-question scoring. Scores for each of these four criteria were weighted using the formula below to create a Weighted Average for each project. This allows a project’s question-by-question and final overall scores to be meaningfully compared against another project:

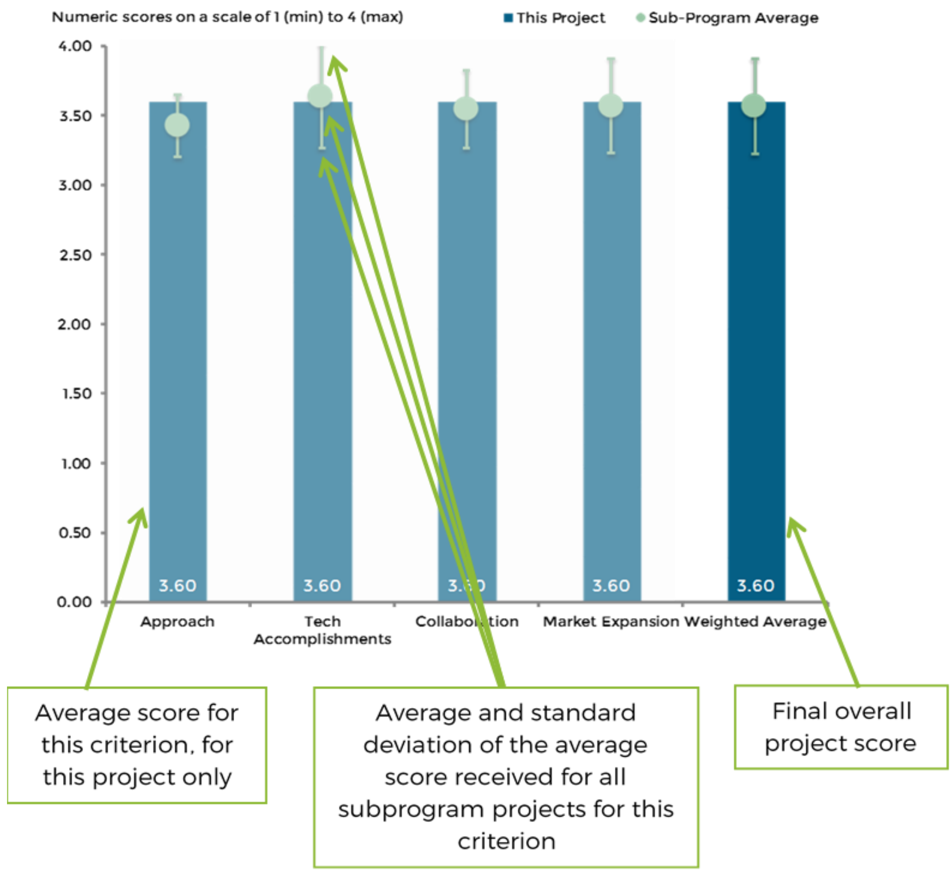

Figure 1: Sample Question 1 through Question 4 score averages, standard deviations, and overall Weighted Average for a TI project

Each reviewed activity has a corresponding bar chart representing that project's average scores for each of the four designated criteria. As demonstrated in Figure 1, a bullet and red error line are included within the green bars representing the corresponding average and standard deviation of criteria scores for all of the reviewed projects in the same subprogram.

Reviewers were also asked to evaluate a given project's relevance and funding through Question 5 and Question 6, which were each scored on a different scale than Question 1 through Question 4. For the R&D subprogram sessions, while Question 1 through Question 4 were rated on a 1.0 to 4.0 scale in one-half point increments, Question 5 was rated on a yes or no scale, and Question 6 was rated on an excessive, sufficient, or insufficient scale. Consequently, Question 5 and Question 6 results were excluded from the Weighted Average calculation because the scoring scales are incompatible. As demonstrated in Figure 2, each reviewed activity has pie charts representing that project's population distributions for each reviewer rating associated with Question 5 and Question 6:

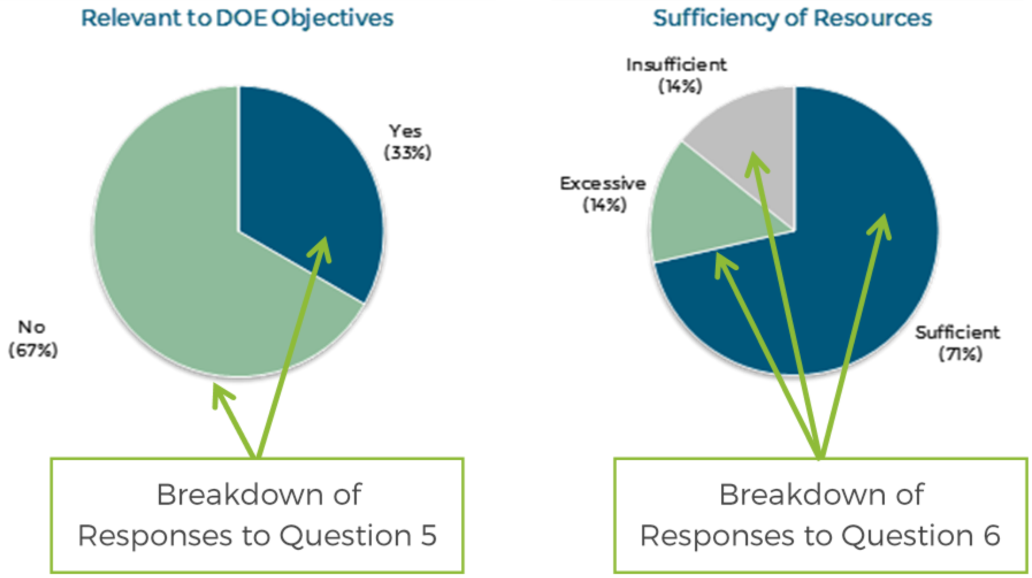

Figure 2: Sample Question 5 and Question 6 population distributions for R&D subprogram project

For TI projects, Question 1 through Question 4 were rated on a 1.0 to 4.0 scale in one-point increments, whereas Question 5 was rated on a yes or no scale, and Question 6 was rated on a yes, maybe, or no scale. Consequently, Question 5 and Question 6 results were excluded from the Weighted Average calculation because the scoring scales are incompatible. Similar to the R&D subprograms, each reviewed activity for TI projects has pie charts representing that project's population distributions for each reviewer rating associated with Question 5 and Question 6.

Text responses and numeric scores to the questions were submitted electronically through a web-based software application, PeerNet, operated by Oak Ridge Associated Universities (ORAU). Database outputs from this software application were analyzed and summarized to collate the multiple-choice, text comments, and numeric scoring responses and produce the summary report.

Responses to the questions are summarized in this report, with summaries of numeric scores for each technical session, as well as text and graphical summaries of the responses for each individual technical activity. For each project, the reviewer sample size is identified.

Each reviewed activity is identified by the project title, followed by the Principal Investigator (PI), the PI's organization, and the project identification (ID) number. For each subprogram area, reviewed activities are ordered numerically by project number. Figure 3, below, provides an example project title:

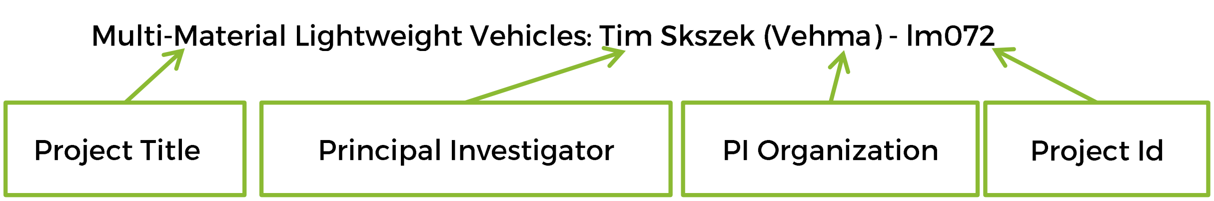

Figure 3: Sample project title with project title, PI, PI organization, and project number

For each project, in addition to the PI, the presenter at the AMR is identified, along with the reviewer sample size. For some projects, the presenter at the AMR was a project team member rather than the PI.

Individual reviewer comments for each question are identified under the heading Reviewer 1, Reviewer 2, etc. Note that for each question the order of reviewer comments may be different; for example, for each specific project the reviewer identified as Reviewer 1 in the first question may not be Reviewer 1 in the second question, etc. Not all reviewers provided a response to each question for a given project.

The report is organized by technical subprogram area. Each technical area section includes a summary of that subprogram, reviewer feedback received specific to the subprogram overview presentation(s) given by DOE, a subprogram activities score summary table (and page numbers), and project-specific reviewer evaluation comments with corresponding bar and pie charts.

(This page intentionally left blank)