

2014 Annual Merit Review, Vehicle Technologies Office Results Report

November 2014

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Introduction

The 2014 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 16-20, 2014, in Washington, DC. The review encompassed all of the work done by the FCTO and the VTO: a total of 295 individual activities were reviewed for VTO, by a total of 179 reviewers. A total of 1,354 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%)

Scoring: 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%)

Scoring: 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%)

Scoring: 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%)

Scoring: 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%)

Responses: yes, no.

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

Responses: excessive, sufficient, insufficient.

Evaluation Criteria – Technology Integration Projects

Reviewers for the Technology Integration (TI) technical session answered questions tailored to TI's 2014 AMR focus on alternative fuels and alternative fuel vehicle deployment. These technical questions are listed below, along with appropriate scoring metrics.

Question 1: Project approach to deployment of 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%)

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

Question 2: Project accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated toward projects and DOE goals. (Scoring weight for overall average = 40%)

Scoring: 4.0=outstanding (sharply focused on achieving project objectives; difficult to improve progress significantly); 3.5= excellent (effective progress; strongly contributes to overall project objectives and DOE goals); 3.0=good (generally effective; progress is on schedule; contributes to some project objectives and DOE goals); 2.5=satisfactory (has some weaknesses; progress could be improved; contributes to some project objectives and DOE goals); 2.0=fair (has significant weaknesses; rate of progress is slow); 1.5=poor (minimally responsive to project objectives and progress is significantly behind schedule; unlikely to contribute to project objectives or DOE goals); 1.0=poor (not responsive to project objectives; limited or no demonstrated progress).

Question 3: Collaboration and coordination with Project Partners – the degree to which the appropriate partners are involved in the project work and the effectiveness of collaboration between and among the partners. (Scoring weight for overall average = 10%)

Scoring: 4.0=outstanding (sharply focused on collaboration with project partners; partners are well-suited to effectively carry out the work of the project and have very strong working relationships; no notable weaknesses); 3.5=excellent (effective; project partners meaningfully contribute to carrying out the work of the project; are well-suited to perform the work and have some excellent working relationships); 3.0=good (generally effective but could be improved; collaboration exists; partners are fairly well-suited to project work and have good working relationships); 2.5=satisfactory (has some weaknesses; collaboration among project partners is satisfactory for carrying out the work of the project; project partner team and working relationships are adequate); 2.0=fair (has significant weaknesses; little collaboration exists and partnerships need to be improved); 1.5=poor (minimally responsive; little collaboration exists and most work is done at sponsoring organization); 1.0=unsatisfactory (little or no apparent collaboration between partners; project partners are lacking critical expertise to effectively carry out the work of the project).

Question 4: Alternative fuel market expansion potential – the degree to which the project has the potential to contribute to a sustainable alternative fuel vehicle market, including the potential to reduce barriers to large scale alternative fuel vehicle market penetration and the potential to be successfully replicated in other geographic areas. (Scoring weight for overall average = 10%)

Scoring: 4.0=outstanding (sharply focused on critical barriers; clearly contributes to alternative fuel vehicle market expansion; difficult to improve significantly); 3.5=excellent (effective; contributes to overcoming most barriers; contributes to alternative fuel vehicle market expansion); 3.0=good (generally effective in overcoming barriers; has the potential to contribute to alternative fuel vehicle market expansion); 2.5=satisfactory (has some weaknesses; may contribute to market improvements but needs better focus on 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 advance an alternative fuel vehicle market); 1.0=unsatisfactory (not responsive to eliminating barriers or advancing an alternative fuel vehicle market).

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

Responses: 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?

Responses: yes, maybe, no.

Project Scoring

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:

$$\text{Weighted Average} = [\text{Question 1 Score} \times 0.20] + [\text{Question 2 Score} \times 0.40] + [\text{Question 3 Score} \times 0.10] + [\text{Question 4 Score} \times 0.10]$$

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.

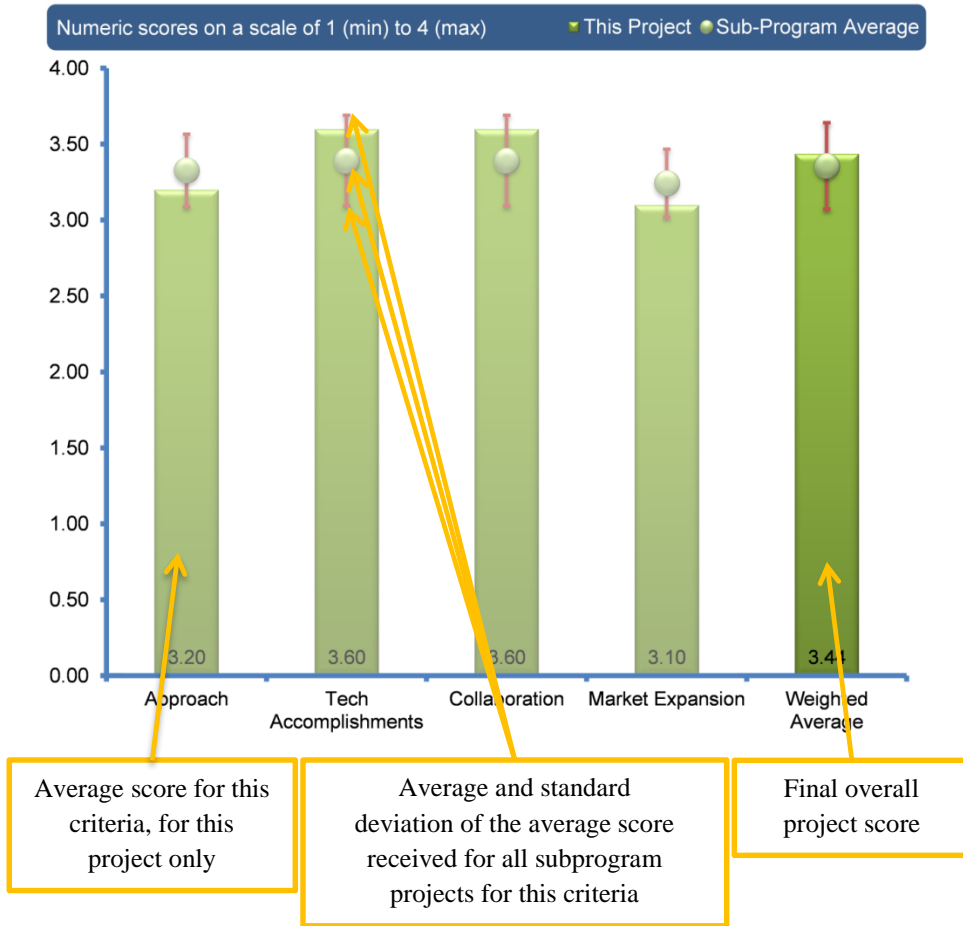


Figure 1. Sample Question 1 through Question 4 score averages, standard deviations, and overall Weighted Average for a TI project

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. Question 1 through Question 4 was rated on a 1.0 to 4.0 scale in one-half point increments, whereas Question 5 was rated on a yes or no scale, and Question 6 was rated on an excessive, sufficient, or insufficient scale for R&D subprograms, and a yes, no, or maybe scale for the Technology Integration subprogram. Consequently, Question 5 and Question 6 results were excluded from the Weighted Average calculation because the scoring scales are incompatible. Alternately, 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:

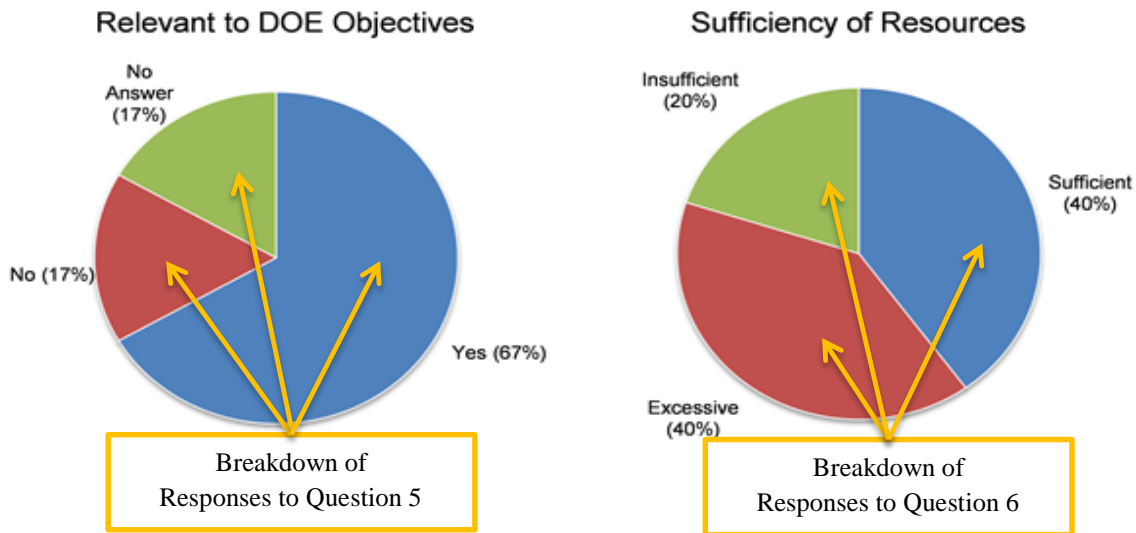


Figure 2. Sample Question 5 and Question 6 population distributions for R&D subprogram project

For TI projects, reviewers were asked to evaluate a given project’s relevance and effective use of funds through Question 5 and Question 6, which were each scored on a different scale than Question 1 through Question 4. Question 1 through Question 4 was rated on a 1.0 to 4.0 scale in one-half point increments, whereas Question 5 was rated on a yes or no scale, and Question 6 was rated on a yes, maybe, no scale. Consequently, Question 5 and Question 6 results were excluded from the Weighted Average calculation because the scoring scales are incompatible.

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 comment, 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. 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.