

# 2009 Infrastructure Platform Review Report:

An Independent Evaluation of Platform Activities  
for FY2008 and FY2009

December 2009

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Dear Colleague:

This document summarizes the recommendations and evaluations provided by an independent external panel of experts at the U.S. Department of Energy Biomass program's Infrastructure platform review meeting, held on February 19, 2009, at the Marriott Residence Inn, National Harbor, Maryland.

All programs in the Department of Energy's Office of Energy Efficiency and Renewable Energy are required to conduct a biennial peer review of their project portfolios, and this report is intended to officially document the process utilized by the Biomass program, the results of the review, the program's response to the results and recommendations, and a full compilation of information generated during the review of the Infrastructure platform. Additional information on the 2009 platform and program review meetings—including presentations for all of the individual platforms and the program review—is available on the program review Web site at [www.obpreview2009.govtools.us](http://www.obpreview2009.govtools.us).

The Biomass program peer review process included a systematic review of the project portfolios in the six separate technology platforms managed by the program and a separate meeting where the program is comprehensively reviewed. The Biomass platform reviews were conducted between March and April 2009 in the Washington, D.C., and Denver, Colorado, areas. The platform reviews resulted in the peer review of the program's projects in applied research, development, and demonstration, as well as analysis and deployment activities. The program peer review held in July 2009 was conducted to evaluate the program's overall strategic planning, management approach, priorities across research areas, and resource allocation.

The recommendations of these expert reviewers are routinely used by the Biomass program staff to conduct and update out-year planning for the program and technology platforms. The review results are reviewed in combination with other critical project information to result in a complete systematic evaluation of the accomplishment of programmatic milestones, project goals, and objectives.

I would like to express my sincere appreciation to the reviewers. It is they who make this report possible, and upon whose comments we rely to help make project and programmatic decisions for the new fiscal year. Thank you for participating in the 2009 Infrastructure platform peer review meeting.

John Ferrell  
Acting Biomass Program Manager  
Office of Energy Efficiency and Renewable Energy  
U.S. Department of Energy

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# Executive Summary

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## **2009 Infrastructure Platform Peer Review U.S. Department of Energy Biomass Program**

On February 19, 2009, the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Biomass program held a peer review of its Infrastructure platform. The peer review meeting featured introductory presentations by program staff to provide information on the platform and presentations by the principal investigators of the federally funded projects that make up the Infrastructure platform project portfolio. Approximately 60 people attended the Infrastructure platform review meeting and learned about the state-of-the-art research, development activities being performed by the program. Among the attendees was a panel of independent experts from outside the program who were tasked with reviewing the research, development, and demonstration (RD&D) activities managed by the Infrastructure platform.

Presentations given during each of the platform review meetings, as well as other background information, have been posted on the registration Web site: [www.obpreview2009.govtools.us](http://www.obpreview2009.govtools.us). Additional information—such as the reviewer comments, recommendations, meeting agendas, and a list of attendees—can be found in the individual platform reports.

### ***Infrastructure Platform Peer Review Process***

The Infrastructure platform review was one of six platform reviews and one program review held as part of the 2009 Biomass program peer review. The peer review is a biennial requirement for all EERE programs. The results of the peer review are used by Biomass program technology managers in the generation of future work plans and in the development of Annual Operating Plans, Multiyear Program Plans, and potentially in the redirection of individual projects.

The goals of the independent review panel were to provide an objective and unbiased review of the individual RD&D projects as well as the overall structure and direction of the Infrastructure platform. In forming its review panel, the Infrastructure platform evaluated 16 candidates from industry, academia, and environmental groups with a range of experiences in vehicle manufacturing, design, and testing, industrial-scale biofuel production, railroad infrastructure and logistics, fuel transport and delivery, and other technical areas related to the infrastructure platform. An outside, objective steering committee established to help ensure the independence and transparency of the overall peer review process reviewed available biographies for review panel candidates during the planning process and provided feedback and recommendations to the platform teams. Five reviewers were selected to ensure a breadth of experience and expertise

relevant to the platform portfolio. A list of review panel members for the Infrastructure platform can be found on page 4 of this report.

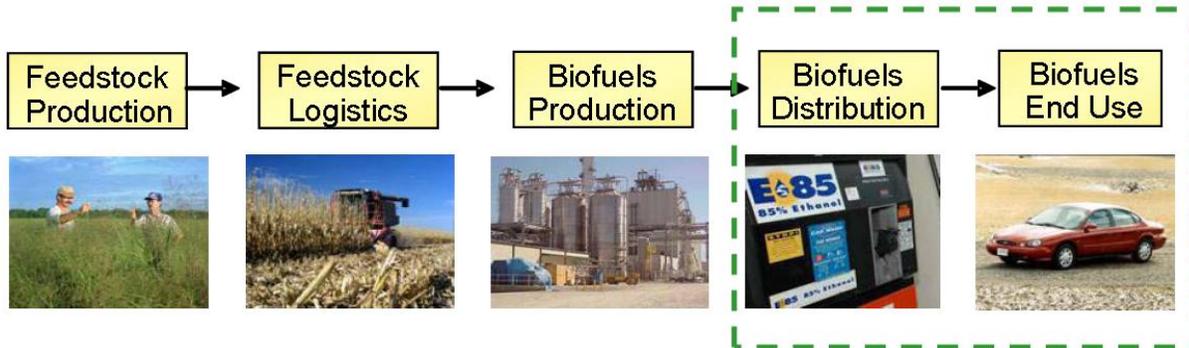
At the platform review meeting, project principal investigators (PIs) presented their project budgets, goals, accomplishments, challenges, and relevance to the Infrastructure platform and answered questions from the review panels and general audience. Projects were evaluated by the review panel solely on the basis of information that was either presented by the PI or contained in a standard program management plan. Reviewers used a software tool developed to facilitate both scoring and constructive comments on a range of evaluation criteria. The results of these evaluations (along with those of the other five platforms) formed the basis for the overall Biomass program review meeting, which was held on July 14–15, 2009.

### ***Infrastructure Platform Information***

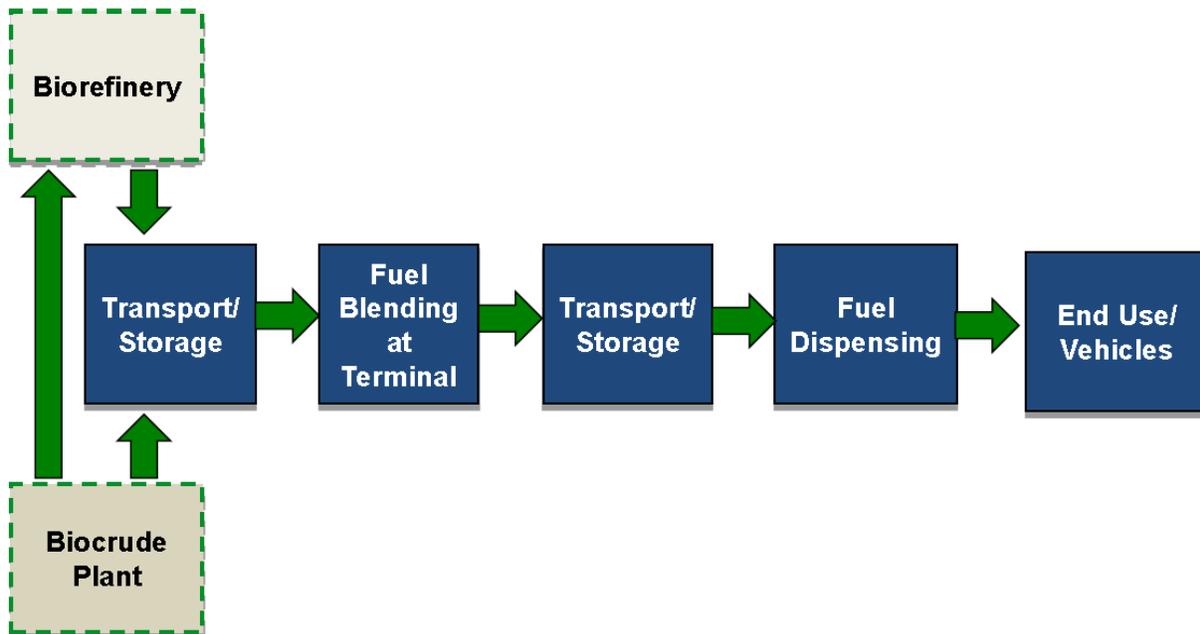
The Infrastructure platform's overall strategic goal is to develop a systematic approach to build a cost-effective infrastructure system that can adapt to market changes and ensure widespread biofuels use for transportation applications. The newest platform within the Biomass program, infrastructure activities began in August 2007 with the commencement of intermediate ethanol blends testing and other work. An Infrastructure Workshop was held in October 2007 to gain strategic insight from key stakeholders involved with biofuels infrastructure for future development of the Infrastructure platform. Although the Infrastructure platform exists within the Biomass program, it does not hold full platform status, nor does it have an official platform budget.

The Infrastructure platform focuses on transportation of biofuels from the biorefinery to the pump and consumer end use. Infrastructure related to transport of feedstocks remains housed within the Feedstocks platform. Exhibit 1 provides a graphical representation of where the infrastructure platform fits into the biomass supply chain. Exhibit 2 depicts a breakdown of key elements of the biofuel infrastructure.

**Exhibit 1 – Biomass Supply Chain and the Infrastructure Platform**



**Exhibit 2 – The Infrastructure Platform Breakdown**

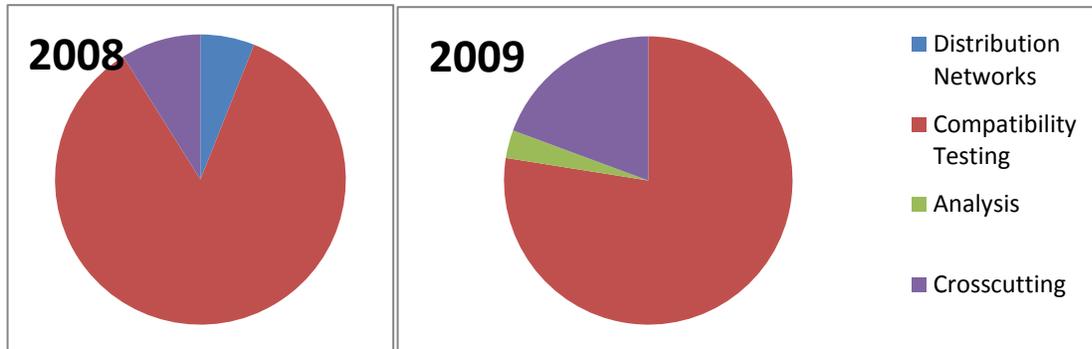


***FY 2008 and FY 2009 Budgets***

The Infrastructure platform does not have a line item in the Biomass program budget; rather, it is funded out of the Integrated Biorefineries platform budget. In FY2008, the total program discretionary funds were approximately \$7 Million and were divided amongst Compatibility Testing and Biofuel End Use (85%); Distribution Networks (6%); and Crosscutting Activities including Education, Outreach, and Planning (9%). In FY 2009, the total program discretionary

funds were approximately \$5 Million and were divided amongst Compatibility Testing and Biofuel End Use (78%); Crosscutting Activities including Education, Outreach, and Planning (19%); and Analysis (3%). Exhibit 3 shows the relative proportion of funding breakdown.

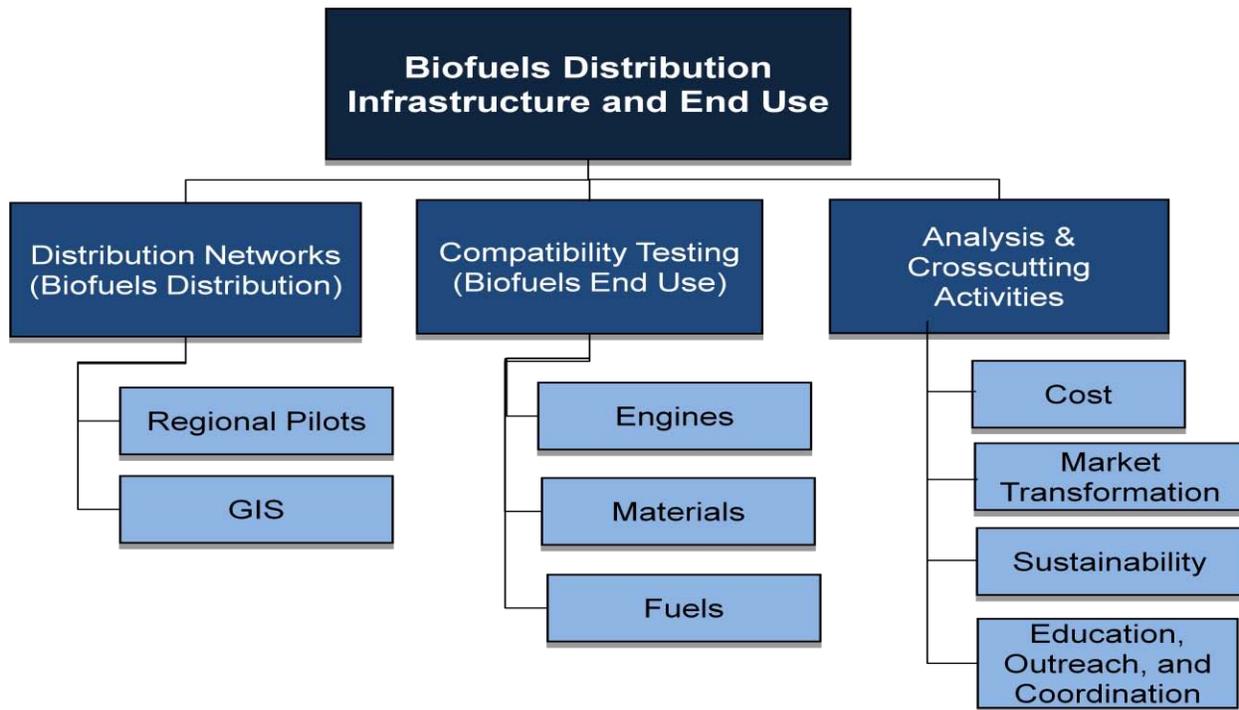
**Exhibit 3 – Program discretionary funds breakdown by focus area for FY2008 and FY2009**



### ***Platform Direction for FY 2010***

The overarching strategic goal of the Infrastructure platform is to create the conditions whereby all biofuels produced can cost effectively, safely, and sustainably reach their market, be delivered to the consumer, and be used by the consumer as a direct replacement of petroleum-based fuels. In FY 2010, the Infrastructure platform will continue to refine its focus and work to identify and address barriers to efficient distribution and end use of biofuels. The total discretionary funds that will be directed toward Infrastructure platform activities in 2010 are just over \$2 Million dollars. Specific activities will include a continuation of the Intermediate Ethanol Blends Test program, the Bioenergy Knowledge Discovery Framework (KDF), and funding of the Alternate Fuels Data Center (AFDC). Exhibit 4 provides a graphic representation of the new work breakdown structure that will be used for the infrastructure platform activities.

## Exhibit 4 – Infrastructure Platform New Work Breakdown Structure



### ***Key Accomplishments and Deliverables***

The Infrastructure platform breaks down its work under distribution and end use as they are the primary pieces within the supply chain under fuel transportation. Although ethanol is the largest commercial biofuel in the market today with its own infrastructure challenges, the Biomass program's Infrastructure platform is also looking at the possibility of current fuel infrastructure-compatible biofuels.

Major milestones of the Infrastructure platform since it unofficially began in August 2007, include the initiation of the Intermediate Ethanol Blends Test program along with the DOE Vehicle Technologies program. Work began on small engines in the summer of 2007, at the Oak Ridge National Laboratory and National Renewable Energy Laboratory and the Infrastructure platform team along with key staff at the national laboratories and Vehicle Technologies program further developed the test plan for vehicles, which began later in 2007. A preliminary report with results from the intermediate ethanol blends testing to date was released in October 2008, with an update to that report released in February 2009. Additional milestones of the Infrastructure platform include the Infrastructure Workshop among key stakeholders in October 2007, initial platform goals and platform inclusion in the Biomass program Multi-Year Program Plan in March 2008, and incorporation of biofuels transportation infrastructure into the Bioenergy Knowledge Discovery Framework (KDF) in August 2008.

### ***Summary from the Review Panel***

The infrastructure platform is a new element to the Biomass program development strategy and it is an important element that could benefit from increased focus on specific objectives. The project portfolio that was reviewed consisted of nine projects which were further categorized as:

- Crosscutting Activities (includes. Ed. Outreach, and Planning and Analysis) (3 projects)
- Compatibility Testing and Biofuel End Use (4 projects)
- Biofuel Distribution Networks (2 projects)

The 2007 review of the infrastructure activities achieved support for the development of an infrastructure platform within the Biomass program. The panel is encouraged by the progress to date, but reiterates what was stated in 2007, that this project area needs to be better focused and have better defined projects and goals. Overall, the projects need to be concise and move the practicum or science forward. Several of the infrastructure projects reviewed are meeting this level of achievement, but most are not. The Pipeline Feasibility and Mid Level Blend Studies are the type of focused projects that are appropriately directed, that said these projects will likely require additional funding to successfully meet program goals. These two projects were the highest scoring projects in the infrastructure platform.

It is the opinion of the panel that collaboration with industry groups is critical for leveraging federal spending for infrastructure development. This will be essential during the planning and execution phases of these projects. The panel also feels that the platform activities need to increase in sophistication of approach with regard its mid-level blend, E85, and retail infrastructure assumptions. Industry involvement in the program will help to expand the general understanding of the stakeholder's perspective. Additionally, future infrastructure projects can benefit from stronger understanding of the linkages between vehicle technology and end-use infrastructure.

In specific project areas, the Crosscutting Activities area (which includes Education, Outreach, & Planning, and Analysis Activities) needs to be substantially enhanced and matured. The three projects in this area are loosely fit platform objectives, and are insufficient to address the needs of the program. These projects scored between 2.20 and 2.75.

The Compatibility Testing and Biofuel End Use area featured 4 projects that scored between 2.52 and 3.96. The highest scoring project in this project area was the project on Intermediate Ethanol Blends Testing that is being performed by Oak Ridge National Laboratory and the National Renewable Energy Laboratory. The other projects in this area need to focus on specific objectives and issues to advance or influence increased biofuel use.

The Biofuel Distribution Networks area featured two projects, including the Pipeline Feasibility Study that was prepared as part of EISA Section 243. This was the highest scoring project

within the infrastructure platform. The other project in this section, the Missouri Biodiesel project, was the third highest scoring project within the infrastructure platform.

### **General Recommendations**

- The Infrastructure activities need full platform recognition in the Biomass program.
- The budget is inadequate to enable resolution of infrastructure related EISA target volumes.
- The funding for these activities must prioritize dollars on infrastructure related EISA constraints.
- The program must use existing knowledge in trade groups, industry associations, to leverage Federal dollars, avoid redundancy and increase speed
- Improve synergy among Infrastructure platform projects; Find ways to structure the transition between infrastructure and end-use (example: analog to digital TV transition)

#### Other Observations by the Panel:

- The EISA target volumes cannot be achieved without substantially enhanced emphasis on infrastructure.
- Infrastructure and end-use transition cannot be based upon “creeping” equivalency with regard to ethanol blends. Transition must be structured.
- There needs to be a better understanding of the impact of Renewable Identification Numbers (RINs) in infrastructure development and consumer pricing.
- The platform needs to focus on high impact projects that will lead to the removal of constraints and enhance consumer understanding.

### **Platform and Project Evaluation Results**

The Infrastructure platform management actively uses the qualitative and quantitative information resulting from the review process to consider the future direction of the platform RDD&D activities, and project and platform goals, approach, and targets and milestones. The numerical rating scale used for this review was a whole number scale, where 5=Excellent, 4=Good, 3=Satisfactory, 2=Fair, and 1=Poor.

Overall, the platform activities were evaluated positively. The overall average score given to the platform was a 3.40. The average of the 9-project score was 3.02. Copies of the platform and project evaluation forms can be found in Attachments 1 and 2 at the end of this report.

## Platform Evaluation

At the conclusion of the project review, the review panel evaluated the overall platform management on the basis of the five evaluation criteria, listed below.

### *Platform Evaluation Criteria and Rating System*

**Goals** – *Are platform goals, technical targets and barriers clearly articulated? Are platform goals realistic and logical? Do the platform goals and planned activities support the goals and objectives of the Biomass Program as outlined in the MYPP? How could the platform change to better support the Biomass Program’s goals?*

**Approach** – *How well does the platform approach (platform milestones and organization, RD&D portfolio, strategic direction) facilitate reaching the Program Performance Goals for each platform as outlined in the MYPP? What changes would increase the effectiveness of the Platform?*

**RD&D Portfolio** – *The degree to which the Platform RD&D is focused and balanced to achieve Biomass Program and Platform goals? (WBS, unit operations, pathway prioritization)*

**Progress** – *Based on the presentations given, how well is the platform progressing towards achieving Biomass Program and Platform goals? Are we meeting our performance targets? Is it on track to meet the goals presented? Please provide recommendations on improvements for tracking progress in the future.*

A summary of the reviewer evaluation scores of the Infrastructure platform is presented in Exhibit 5. The average score represents an equally weighted average of the four scored platform evaluation criteria. In addition to the platform evaluation scores, an evaluation of the subplatform areas was performed by aggregating individual project scores.

### **Exhibit 5 – Average Evaluation Scores of the Biomass Program Infrastructure Platform for Each of the Four Scored Criteria**

<b>Evaluation Criteria</b>	<b>Average Score*</b>	<b>StdDev</b>
Platform Goals	4.00	0.71
Platform Approach	3.20	0.84
Platform RD&D Portfolio	3.00	0.71
Platform Progress	3.40	0.89

*\* Average represents mean of individual reviewer scores. Review panels did not develop consensus scores.*

*Please see [Section IIB](#) for detailed explanations of the criteria. Please see the detailed responses to each evaluation criteria throughout [Section IIB](#) as well as [Section IIC](#) for the full summary response.*

## Project Evaluations

The review panel evaluated individual RD&D projects in four blocks by the three subplatform technology focus area (Crosscutting Activities, Compatibility Testing and Biofuel End Use, Biofuel Distribution Networks). This breakdown of work mirrors the platform management for the current review period; each project was evaluated on both the strength of the work and the relevance of the work to the platform objectives. Five scored evaluation criteria were used, applying the same 1–5 whole-number rating system used for the platform evaluations.

### *Project Evaluation Criteria*

**Relevance** – *The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program MYPP. Market application of the expected project outputs has been considered.*

**Approach** – *The degree to which the project uses a sound, well-designed RD&D approach and clear project management plan, which incorporates well-defined milestones for monitoring the progress of the project and methods for addressing potential risks.*

**Technical Progress** – *The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the Biomass Program MYPP and overcoming technical barriers outlined in the MYPP.*

**Success Factors** – *The degree to which the project has identified critical success factors (technical, business, and market factors) that will impact technical and commercial viability of the project and the degree to which the project has identified potential show-stoppers (technical, market, regulatory, legal) that will impact technical and commercial viability.*

**Future Research** – *The degree to which the project has effectively planned its future, considered contingencies, understands resource or schedule requirements, built in optional paths or off-ramps, or identified other opportunities to build upon current research to further meet Biomass Program goals and objectives.*

The evaluation scores were aggregated at the technology focus area level. Overall, the strength of work of the individual projects was clear—as, on average, the RD&D work in the four focus areas was evaluated as highly relevant to platform objectives, of sound technical approach, making good technical progress, aware of challenges and success factors, and generally on track for the future. The project presentations are available in PDF format at <http://www.obpreview2009.govtools.us/infrastructure/>. Each project was reviewed by 3–5 reviewers in five scored review criteria. The overall average scores of projects in each technology focus area are given in Exhibit 2.

**Exhibit 6 – Review Panel Average Scores\* for Infrastructure Platform SubPlatform Areas  
for Each Project Evaluation Criteria**

Technology Area	Relevance	Approach	Technical Progress	Success Factors	Future Research	Overall
Crosscutting Activities area	2.62	2.56	2.38	2.20	2.42	2.44
Compatibility Testing and Biofuel End Use	3.65	3.15	3.10	2.85	2.90	3.11
Biofuel Distribution Networks	4.20	3.50	3.80	3.60	3.40	3.70
All Infrastructure Projects	3.43	3.03	3.01	2.80	2.85	3.02

*\* Average scores represent the mean of individual reviewer scores. Review panels did not develop consensus scores.*

*Detailed explanations of the project evaluation criteria are can be found in [Section IIIA](#) with the individual project evaluations. The scores presented below are the mean scores of the all the projects evaluated in the IBR platform.*

**Summary Platform Management Response**

The platform Management Team appreciated the comments and recommendations provided by the reviewers through this review process and will consider and utilize this information to shape platform activities in the future. Ethanol is predominant renewable fuel available in the marketplace has been the primary focus of the Biomass program and the Infrastructure platform. The Renewable Fuel Standard (RFS) set forth in the Energy Independence and Security Act of 2007 (EISA), requires the consideration of infrastructure concerns associated with the fuels. In future years, the focus of the Infrastructure platform will expand beyond an ethanol focus to other biofuels, without abandoning the ethanol work. Biodiesel and other advanced biofuel projects will be integrated into the platform goals. The Infrastructure platform will continue to work closely with the Biochemical and Thermochemical Conversion, and Integrated Biorefineries platforms to ensure that infrastructure investments are consistent with the needs of the industry and the marketplace.

Platform goals will continue to be evaluated regularly to ensure that the infrastructure platform responds appropriately to changing fuel type and availability. While we cannot plan for certain at this time for what the platform will focus on beyond 2022, we believe that the 4 core areas that

we have identified as our platform focus (biofuel distribution networks, biofuel end use and compatibility testing, analysis, crosscutting activities) will allow us to adapt to changing priorities and address future challenges. Additionally, the increased emphasis on analysis and biofuel distribution networks will allow us to better identify priority focus areas.

Exhibit 7 lists each project that presented at the review and a summary of next steps determined by the platform management.

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Exhibit 7 – Summary of Evaluation Scores of Projects in the Infrastructure Platform Portfolio

Summary of Infrastructure Platform Project Portfolio						
WBS Number	Project Title; Presenting Organization; PI Name	Final Average Score	Next Steps			Technology Manager Summary Comment
			Continue Project	Continue w/ possible adjustments to Scope	Other	
1.1.1.5	Bioenergy Knowledge Discovery Framework; Oak Ridge National Laboratory, Budhendra Bhaduri	2.75	X			At the time of the review, this project had not yet received its initial funding. The Platform management appreciates the comments made by the reviewers and will take this information into consideration as the project advances.
5.8.3.1.	Freedom Prize, Public Health Foundation Enterprises, Inc., Karen Hanson	2.20	X			This project is the result of the Freedom Prize Foundation and US DOE EERE announced award process intended to lessen America's Oil Dependence. These activities were officially announced on June 26, 2008.
7.6.2.2.	New Uses Information and Entrepreneur Development, Growth Dimensions, Inc., Mark Williams	2.64			X	THIS IS A CONGRESSIONALLY DIRECTED PROJECT. The tasks associated with this project are not defined by the Program. Platform management will work with the project leads to address the reviewer comments.

Summary of Infrastructure Platform Project Portfolio

5.10.1.1. and 5.10.1.2.	Intermediate Ethanol Blends Testing, ORNL and NREL, Brian West and Steve Przesmitzki	3.96	X			This is a joint Project funded by the Biomass and Vehicle Technologies Program. This project will continue and reviewer comments will be considered in refining future activities.
7.8.1.7.	National Biofuel Energy Laboratory, Next Energy Center, Chuck Moeser	3.24			X	THIS IS A CONGRESSIONALLY DIRECTED PROJECT. The tasks associated with this project are not defined by the Program. Platform management will work with the project leads to address the reviewer comments.
7.8.1.11.	Appalachian State University Biofuels and Biomass Research Initiative, Jeff Ramsdell, Appalachian State University	2.52			X	THIS IS A CONGRESSIONALLY DIRECTED PROJECT. The tasks associated with this project are not defined by the Program. Platform management will work with the project leads to address the reviewer comments.
7.8.1.9.	Messiah College Biodiesel Fuel Generation Project, Messiah College, Michael Zummo	2.80			X	THIS IS A CONGRESSIONALLY DIRECTED PROJECT. The tasks associated with this project are not defined by the Program. Platform management will work with the project leads to address the reviewer comments.
5.10.1.3.	Pipeline Feasibility Study – EISA Section 243, Deloitte Consulting, Rebecca Ranich	4.08			X	This study has been completed.

Summary of Infrastructure Platform Project Portfolio

7.8.1.6	Missouri Biodiesel Demonstration Project, National Biodiesel Board, Jill Hamilton	3.32			X	THIS IS A CONGRESSIONALLY DIRECTED PROJECT. The tasks associated with this project are not defined by the Program. Platform management will work with the project leads to address the reviewer comments.
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\* Average represents mean of individual reviewer scores. Review panels did not develop consensus scores.

*Each project is identified by a unique code (WBS Number), as well as the project title, presenting organization, and PI name. Projects are listed in the chronological order by which they presented at the review meeting. The average overall score is the mean of the five evaluation criteria scores. The Next Steps column is a summary of the management response to the evaluation.*

## I. Introduction

On April 8–10, 2009, the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Biomass program held a peer review of its Infrastructure platform. The platform review was part of the overall 2009 program peer review implemented by the Biomass program. The peer review is a biennial requirement for all EERE programs to ensure:

*“A rigorous, formal, and documented evaluation process using objective criteria and qualified and independent reviewers to make a judgment of the technical/scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects.”*

The results of the peer review are used by Biomass Program Technology Managers in the generation of future work plans and in the development of Annual Operating Plans, Multiyear Program Plans (MYPPs), and potentially in the redirection of individual projects.

Alicia Lindauer-Thompson was designated by the Biomass program as the lead for the Infrastructure platform peer review. She was responsible for all aspects of planning and implementation including coordinating the review panel, coordinating with principal investigators, and overall planning for the platform review.

Approximately 60 people attended the Infrastructure Platform Review meeting. The project and platform review forms that were used to collect information from the reviewers are presented in Attachments 1 and 2 of this report. An agenda for the meeting is provided in Attachment 3. A list of attendees is provided in Attachment 4. Presentations given during each of the platform review meetings as well as other background information are posted on the registration website: [www.obpreview2009.govtools.us](http://www.obpreview2009.govtools.us).

The remainder of this section provides a brief description of the implementation process for the platform review meetings, identifies the Infrastructure Platform Review Panel, and describes the role of the Steering Committee.

### **A. Biomass Program Peer Review Process**

The 2009 Biomass program peer review process consisted first of a series of six platform peer review meetings followed by the overall program review meeting. The six platforms that were peer reviewed matched the manner in which the Biomass program organizes its research and analysis activities. The platforms are Integrated Biorefinery, Infrastructure, Analysis, Feedstocks and Sustainability, Biochemical Conversion, and Thermochemical Conversion. The platform review meetings were held during the February–April timeframe.

The six platform review meetings consisted of technical project-level reviews of the research projects funded in each of the six Biomass technology platform areas. The overall structure and direction of the platform was also reviewed. A separate review panel, and review panel chair, was

formed for each platform review. Review panels were comprised of independent, external technical reviewers with subject matter expertise related to the platform being reviewed.

The program review was held in July 2009 following each of the six platform reviews. During the program peer review, an independent external panel evaluated the strategic organization and direction of the Biomass program, using the results of the platform reviews and presentations from each of the platform review chairs as input. The panel for the Biomass program review consisted of a steering committee formed to provide overall oversight of the program peer review process. The program review panel also will include the chair from each platform review panel.

This report represents the results of the Infrastructure platform review and evaluation of the platform and the individual projects in its research portfolio. A separate program review report has been prepared for each platform review and the program review meeting. The program review report may also include additional comments related to the Infrastructure platform.

The Biomass program followed guidelines provided in the EERE *Peer Review Guide* in the design and implementation of the platform reviews and program peer review. An outside steering committee was established to provide recommendations and help ensure an independent and transparent review process. A description of the general steps implemented in each of the program peer review process is provided in Exhibit 4.

Neil Rossmeissl of the Biomass program was assigned by the Biomass Program Manager as the peer review leader. Mr. Rossmeissl managed all aspects of planning and implementation. He was supported by a planning team comprised of staff from the Biomass program, DOE Golden Office, National Renewable Energy Laboratory (NREL) Systems Integrator and contractor support. BCS, Incorporated was the lead contractor responsible for organizing each of the peer review. The team held weekly planning meetings beginning September 2008 to outline the review procedures and processes, to plan each of the individual platform reviews and subsequent program review and to ensure that the process followed EERE peer review guidance.

### ***B. Infrastructure Platform Review Panel***

Each platform portfolio was reviewed by a review panel of experts from outside the program. The purpose of the review panel is to provide an objective, unbiased and independent review of the individual research, development, and deployment (RD&D) or analysis projects as well as the overall structure and direction of the platform. One member from each review panel also served as the panel chairperson and was responsible for coordinating review panel activities—ensuring independence of the panel, overseeing the production of the platform review report, and representing the panel at the program peer review in July.

In forming its review panel, the Infrastructure platform evaluated 16 candidates for its review panel. Candidates were evaluated based on their subject matter knowledge in the technology platform area, willingness to commit the time and energy needed to serve on the panel, and lack of a conflict of

interest (COI), as represented by receipt of their COI form. An outside, objective steering committee—established to help ensure the independence and transparency of the overall peer review process—reviewed available biographies for review panel candidates during the planning process and provided feedback. Platform review planning teams considered the steering committee feedback in making final decisions on its review panel. Exhibit 5 lists review panel members for the Infrastructure platform. Per steering committee guidance, at least three of the Infrastructure platform reviewers were assigned to review each project. Reviewer assignments were based on reviewer expertise and to avoid conflict of interest.

## Exhibit 4 - Basic Steps in Implementing the Biomass Program Peer Review

1. The program's RD&D and Analysis project portfolio was organized by the six platform areas.
2. A lead was designated for each platform review. The platform review lead was responsible for all aspects of planning and implementation including coordinating the review panel, coordinating with principal investigators, and overall planning for the platform review.
3. Each platform identified projects for review. Target: review at least 80% of program budget.
4. A steering committee of external, independent experts was formed to provide recommendations for designing and implementing the review and the scope, criteria and content of the evaluation.
5. Draft project-level, platform-level and program-level evaluation forms were developed for the 2009 platform review meetings. Similarly, a draft presentation template and instructions were developed. EERE *Peer Review Guidelines* and previous forms were evaluated in developing the drafts. Separate forms were used for RD&D and Analysis projects. The forms were reviewed and modified by the steering committee before being finalized.
6. Each platform lead identified candidate members for the platform review panel. The peer review lead requested steering committee feedback of candidate reviewers. Biographies that were available were provided to the steering committee for review. Committee provided *Yes/No* recommendations on candidates and recommended other candidates for the platforms to consider. Results were provided to platform leads for consideration in final selection of review panels.
7. Upon confirmation, each review panel member was provided background information on the review, instructions, evaluation forms, presentation templates and other information needed to perform his or her duties. Project lists and COI forms were provided to each reviewer in advance of the review meeting and COI forms were collected. At least one conference call was held for each review panel to provide instructions, discuss panel member responsibilities and to address any questions. To the extent possible, steering committee members participated in those calls.
8. The Biomass Program performed outreach to encourage participation in each of its platform review meetings by sending announcements to over 3,000 program stakeholders, principal investigators, and attendees at previous program events. The program reviews were also announced on the Biomass Program Web site.
9. Platforms invited PIs to present their projects at the platform review. PIs were provided with presentation templates and instructions, reviewer evaluation forms, and background information on the review process. Follow-up calls were held with PIs to address questions. If PIs chose not to present they were requested to submit a form stating such.
10. Platform review meetings were held according to guidelines developed by the peer review lead and planning team, platform lead, and steering committee. Members of the steering committee participated in each review to ensure consistency and adherence to guidelines.
11. Review panel evaluations were collected during each platform review meeting using an automated tool. These evaluations were posted to a password-protected Web site following each review and review panelists were provided approximately 10 working days to update and edit their comments. PIs were then provided approximately 10 working days to go to the same password-protected Web site and see comments on their projects. PIs were given the opportunity to respond to review panel evaluations.
12. Results of review panel evaluations and PI responses were provided to each platform review lead for overall evaluation and response. The compilation of these inputs was then used to develop this report.

### Exhibit 5 – Infrastructure Review Panel

Name	Affiliation/ Title	Expertise
Mark Maher *	General Motors	Vehicles and Fuel Testing
Albert Hochhauser	Retired	Fuel Testing
John Schmitter	KEP, LLC	Railroad Lines and Distribution Infrastructure
Dave Sjoding	Washington State University	Biodiesel Fuel and Transport
Shaine Tyson	Rocky Mountain Biodiesel	Biodiesel Fuel and Transport

*\*Review Chair*

#### **C. Organization of This Report**

The remainder of this document provides the results of the Feedstock platform review meeting, including the following:

- Results of review panel comments on the overall Infrastructure platform
- Results of review panel comments on projects evaluated during the platform review and PI responses to reviewer evaluations for their projects
- The Biomass program Infrastructure platform Technology Manager response to review panel comments and discussion of next steps for each project.

## **II. Platform Overview and Evaluation Results**

### ***A. Platform Overview***

#### **i. Platform Goals and Objectives**

The Infrastructure platform's overall strategic goal is to develop a systematic approach to build a cost-effective infrastructure system that can adapt to market changes and ensure widespread biofuels use for transportation applications. The newest platform within the Biomass program, infrastructure activities began in August 2007 with the commencement of intermediate ethanol blends testing and other work. An Infrastructure Workshop was held in October 2007 to gain strategic insight from key stakeholders involved with biofuels infrastructure for future development of the Infrastructure platform. Although the Infrastructure platform exists within the Biomass program, it does not hold full platform status, nor does it have an official platform budget. The Infrastructure platform focuses on transportation of biofuels from the biorefinery to the pump and consumer end use. Infrastructure related to transport of feedstocks remains housed within the Feedstocks platform.

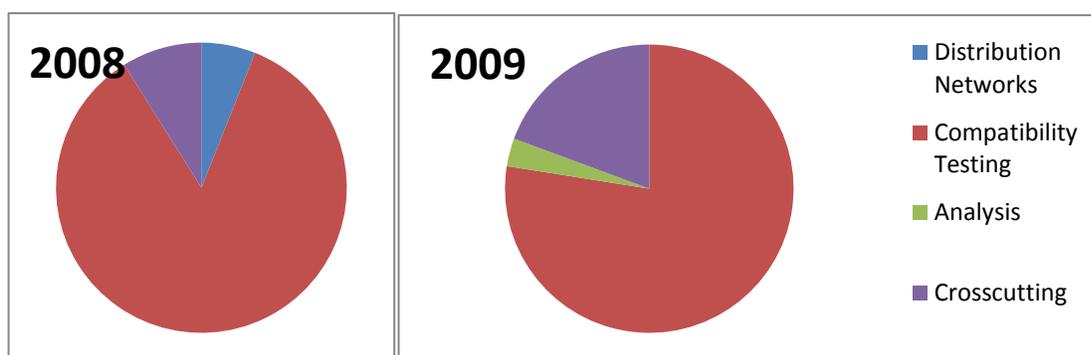
#### **ii. Platform Work Breakdown and Major Milestones:**

The Infrastructure platform breaks down its work under distribution and end use as they are the primary pieces within the supply chain under fuel transportation. Although ethanol is the largest commercial biofuel in the market today with its own infrastructure challenges, the Biomass program's Infrastructure platform is also looking at the possibility of current fuel infrastructure-compatible biofuels.

Major milestones of the Infrastructure platform since it unofficially began in August 2007, include the initiation of the Intermediate Ethanol Blends Test program along with the DOE Vehicle Technologies program. Work began on small engines in the summer of 2007, at the Oak Ridge National Laboratory and National Renewable Energy Laboratory and the Infrastructure platform team along with key staff at the national laboratories and Vehicle Technologies program further developed the test plan for vehicles, which began later in 2007. A preliminary report with results from the intermediate ethanol blends testing to date was released in October 2008, with an update to that report released in February 2009. Additional milestones of the Infrastructure platform include the Infrastructure Workshop among key stakeholders in October 2007, initial platform goals and platform inclusion in the Biomass program Multi-Year Program Plan in March 2008, and incorporation of biofuels transportation infrastructure into the Bioenergy Knowledge Discovery Framework (KDF) in August 2008.

### iii. FY 2008 and FY 2009 Budget by Technology Area

The Infrastructure platform does not have a line item in the Biomass program budget; rather, it is funded out of the Integrated Biorefineries platform budget. In FY2008, the total program discretionary funds were approximately \$7 Million and were divided amongst Compatibility Testing and Biofuel End Use (85%); Distribution Networks (6%); and Crosscutting Activities including Education, Outreach, and Planning (9%). In FY 2009, the total program discretionary funds were approximately \$5 Million and were divided amongst Compatibility Testing and Biofuel End Use (78%); Crosscutting Activities including Education, Outreach, and Planning (19%); and Analysis (3%). Figure 1 shows the relative proportion of funding breakdown.



**Exhibit 8: Program discretionary funds breakdown by focus area for FY 2008 and FY 2009.**

### iv. Platform Direction for FY 2010

The overarching strategic goal of the Infrastructure platform is to create the conditions whereby all biofuels produced can cost effectively, safely, and sustainably reach their market, be delivered to the consumer, and be used by the consumer as a direct replacement of petroleum-based fuels. In FY 2010, the Infrastructure platform will continue to refine its focus and work to identify and address barriers to efficient distribution and end use of biofuels. Specific activities will include a continuation of the Intermediate Ethanol Blends Test program, several new analyses projects, and increased efforts in working with partners and stakeholders to understand needs and challenges.

## B. Results of 2009 Infrastructure Platform Evaluation

The review panel evaluated the platform on criteria such as goals, approach, RD&D portfolio, and progress, and also provided comments on the strengths and weaknesses of each. The following are questions posed to each of the reviewers followed by average scores, reviewer comments, and the Infrastructure platform Technology Manager responses to those comments. The 5 independent evaluations of the Infrastructure platform as a whole are summarized numerically in Exhibit 7. In addition to the numerical scores, each reviewer provided written comments, which have been reproduced below. Additionally, the section provides verbatim results of the review panel evaluation of the Infrastructure platform.

**Exhibit 9 – Average of Reviewer Platform Evaluation Scores**

Evaluation Criteria	Average Score	Standard Deviation
<b>Goals</b> - Are platform goals, technical targets and barriers clearly articulated? Are platform goals realistic and logical? Do the platform goals and planned activities support the goals and objectives of the Biomass Program as outlined in the MYPP? How could the platform change to better support the Biomass Program's goals?	4.00	0.71
<b>Approach</b> - How well does the platform approach (platform milestones and organization, RD&D portfolio, strategic direction) facilitate reaching the Program Performance Goals for each platform as outlined in the MYPP? What changes would increase the effectiveness of the Platform?	3.20	0.84
<b>RD&amp;D Portfolio</b> - The degree to which the Platform RD&D is focused and balanced to achieve Biomass Program and Platform goals? (WBS, unit operations, pathway prioritization)	3.00	0.71
<b>Progress</b> - Based on the presentations given, how well is the platform progressing towards achieving Biomass Program and Platform goals? Are we meeting our performance targets? Is it on track to meet the goals presented? Please provide recommendations on improvements for tracking progress in the future.	3.40	0.89

*Rating System: 5=Excellent; 4=Good; 3=Satisfactory; 2=Fair; 1=Poor*

The following sections provide the full written comments of the review panelists for each of the five evaluation criteria.

**i. Platform Goals**

*Are platform goals, technical targets and barriers clearly articulated? Are platform goals realistic and logical? Do the platform goals and planned activities support the goals and objectives of the Biomass Program as outlined in the MYPP? How could the platform change to better support the Biomass Program’s goals?*

**Exhibit 10 – Platform Goals: Strengths and Weaknesses**

Strengths	Weaknesses
Goals and barriers clearly articulated. Focus is on ethanol, which is appropriate, since most of projected use will be ethanol.	Should include more discussion of biofuels for diesel vehicles, but see comment re appropriate focus on ethanol.
Good structure and well planned The recent emergence of sustainability and climate change issues into the broader platform thinking is a good step forward.	The middle distillate platform is still submerged or delayed. It is overdue to have its own coordinated platform. It is tough to ignore 1/3 of a barrel of oil.
The ethanol goals, technical targets and barriers seem clear and they make sense. Currently the program seems to be at the end of the early states of understanding the infrastructure issues. The next set of projects should be more narrowly focused on specific questions, i.e. truck infrastructure and likely prices. Gas stations, costs, market impacts, etc.	The other biofuels (biodiesel) platform goals do not seem very well fleshed out.
Four goals - Reduce dependence on foreign oil; promote diverse, domestic, renewable energy supply; Reduce carbon emissions; establish a domestic bioindustry. These support OBP goals.	
The goals of this project are clearly necessary to advance the US biofuels industry and to meet	Primary focus on ethanol is both a strength and a weakness, it is obviously the overarching issue based on volume and impact, but

federal mandates. The focus on ethanol is the only fuel with volume that is likely to succeed. Improving markets and infrastructure for biodiesel will advance its volume targets.

limits a wider distribution of fuels and technologies.

*Technology Manager Response*

Ethanol has been the primary focus of the Biomass program and, consequently, the Infrastructure platform because it has been the predominant renewable fuel available in the marketplace. Because ethanol will be a key fuel in meeting the Renewable Fuel Standard (RFS) set forth in the Energy Independence and Security Act of 2007 (EISA), the infrastructure concerns associated with the fuel are important to consider. In future years, the focus of the Infrastructure platform will expand beyond an ethanol focus to other biofuels, without abandoning the ethanol work. Biodiesel and other advanced biofuel projects will be integrated into the platform goals. We plan to work closely with the Biochemical and Thermochemical Conversion, and Integrated Biorefineries platforms to ensure that infrastructure investments are in line with the type of fuel that is coming to market.

**ii. Platform Approach**

*How well does the platform approach (platform milestones and organization, RD&D portfolio, strategic direction) facilitate reaching the Program Performance Goals for each platform as outlined in the MYPP? What changes would increase the effectiveness of the Platform?*

**Exhibit 11 – Platform Approach: Strengths and Weaknesses**

Strengths	Weaknesses
<p>Most important question is the suitability of intermediate ethanol blends in automotive and non-road equipment. A great deal of effort is appropriately dedicated to answering this question.</p>	<p>It is not clear whether the most important question can be adequately answered to the satisfaction of EPA and others.</p>
	<p>Stronger cooperation with the regions and states would hugely strengthen the approach. This is an essential step to deploy biofuels. OBP has hurt itself by breaking these connections</p>
<p>The RDD portfolio casts a pretty wide net. Future projects should all fit together to answer specific questions. There were several presentations today that did not seem to fit in this platform (Freedom prize, Entrepreneur Development, Appalachian State, Messiah College) and would not contribute significantly to the goals in the MYPP. Future projects should all be defined by the Biomass</p>	

<p>Program and should start to get at specific questions, e.g. if we have infrastructure issues at specific locations, why do they exist and what options are available to deal with them. Include commercial aspects and costs.</p>	
<p>Some of the RDD programs strongly support the goals. (Intermediate blends testing, National Biofuels Energy Lab, Pipeline feasibility study)</p>	<p>Other RDD programs do not or only weakly support the goals. Some look like earmarks only. Assumption that midlevel blends will provide a timely pathway to EISA attainment is not a strong one. There are numerous roadblocks beyond EPA waiver. This assumption is driving weakness into the midlevel blend work. Need a combined infrastructure, vehicle technology mandate.</p>
<p>The platform has gone a long way from where it was a year and a half ago compared to where it is today. It is now a defined platform for the near-term. The milestones, portfolio etc., will need to be modified on an annual basis to reflect achievements and refocus remaining priorities. Need more evaluation on areas that may generate substantial resistance.</p>	<p>There isn't any long term platform beyond 2022. Need to address a wider set of key issues such as vehicles and equipment as existing assets and more importantly, how to minimize the future cost to the consumer that owns existing assets. Dual infrastructure issues not addressed, particularly at the retail level.</p>

*Technology Manager Response*

The approval of intermediate ethanol blends is an important step in towards meeting the RFS. We have worked closely with EPA throughout the test program planning and execution in order to ensure that they will have the information they need to make an informed decision regarding the use of higher level ethanol blends in existing vehicles.

Platform goals will continue to be evaluated regularly to ensure that the infrastructure platform responds appropriately to changing fuel type and availability. While we cannot plan for certain at this time for what the platform will focus on beyond 2022, we believe that the 4 core areas that we have identified as our platform focus (biofuel distribution networks, biofuel end use and compatibility testing, analysis, crosscutting activities) will allow us to adapt to changing priorities and address future challenges. Additionally, the increased emphasis on analysis and biofuel distribution networks will allow us to better identify priority focus areas.

While we agree that expanded state outreach will go a long way in helping us meet our goals, we have worked with the States in several capacities in recent years. Over the past two years, we have:

- Co-funded a solicitation with the Department of Energy’s Clean Cities Program for biofuel outreach and education;
- Provided funding to the Governors’ Ethanol Coalition to hold a series of workshops to plan for targeted E85 expansion. (The first workshop was held in February 2009 in Des

Moines, Iowa in collaboration with the Iowa Office of Energy Independence to develop a joint plan to expand ethanol infrastructure in the region.); and

- Held quarterly calls with State Energy Offices and Clean Cities Coordinators.

**iii. Platform RD&D Portfolio**

*The degree to which the Platform RD&D is focused and balanced to achieve Biomass Program and Platform goals? (WBS, unit operations, pathway prioritization)*

**Exhibit 12 – Platform R&D Portfolio: Strengths and Weaknesses**

Strengths	Weaknesses
See answer to Question 2.	Effort devoted to diesel fuels may be appropriate considering the current state of knowledge.
Strong cellulosic ethanol focus is needed, but is way too exclusive in focus	Complement the cellulosic ethanol with co-products of biofuels including biodiesel to improve economics. The greater funding should allow broader thinking.
The platform RDD seems too broad to achieve the goals quickly. Questions and gaps should now be defined more narrowly. Work on fewer of them but give them more funding, management attention and oversight.	
See comments above concerning strongest projects.	With the exception of the work presented by the National Biofuels Laboratory (Next Energy) the understanding of the highly sophisticated linkage between biodiesel fuel quality, diesel vehicle technology, and biodiesel distribution infrastructure is VERY poor. This is rocket science meeting hammer and chisel.
The focus E15/E20 vehicles, emissions, durability, off-road equipment, material compatibility, and ethanol issues are near term issues. The program is currently scoped for the near term issues but may not be broad enough to address longer-term issues without adding or subtracting from the program, which is of course, possible.	There will be an enormous resistance to higher ethanol blends and enormous new investments by basic consumers particularly for E20. I suspect that fuel-engine modifications will be more important in the future than what occurred during the E0-E10 transition. A programmatic task area should be included here and a method for ranking modifications by equipment should also be added-- additive or other modifications may be included.

*Technology Manager Response*

As mentioned before, ethanol has been the main focus of the Infrastructure platform in recent years due to its dominant presence in the marketplace. While there are several congressionally directed projects addressing biodiesel RD&D, this has not been a focus of the program in recent

years. While we do not believe the projected quantities of biodiesel in the marketplace merit making it a major focus of the infrastructure platform in future years, we do recognize the importance of biodiesel as a fuel and plan to increase our activities in this area in the near future.

In future years, the Infrastructure platform will be focused on both near term and long term biofuel infrastructure concerns. Near term RD&D will focus on addressing distribution and end use concerns of biofuels that are currently in the marketplace (e.g. ethanol and biodiesel). Longer term RD&D projects will focus on analysis to identify focus areas, biofuel distribution networks to identify barriers to efficient distribution, and compatibility testing projects for new fuels.

**iv. Platform Progress**

*Based on the presentations given, how well is the platform progressing towards achieving Biomass Program and Platform goals? Are we meeting our performance targets? Is it on track to meet the goals presented? Please provide recommendations on improvements for tracking progress in the future.*

**Exhibit 13 – Platform Progress: Strengths and Weaknesses**

Strengths	Weaknesses
Programs are making good progress,	It is difficult to gauge progress towards the approval of intermediate ethanol blends, since the ground rules for approval are not fully defined.
Mid-level blends are a big win, so is the biodiesel work by NBB. Inclusion of the earmarks in their proper locations was a good step in giving a more integrated picture.	Program level metrics at the blending level (number of tanks blending of total) and other similar metrics would enhance the infrastructure view of progress in deployment and help identify barriers.
<p>The platform team should focus only on infrastructure and only on things you know are issues. For example it was not clear that the effect of moving biodiesel through a pipeline was a real issue and the project did not fully answer the question. Once it is determined that the products might need to move through a pipeline, then analyze the effect on the product. I had a hard time understanding where some of the projects - Freedom prize, Missouri study and the two college studies fit into this platform. The Missouri study funding and the Freedom prize funding seemed out of line with the goals and the results of the projects.</p>	
Pipeline work is a good start.	Fuel blend work is large in scope but has had flaws introduced thru political tampering. Educational work is weak. Retail distribution work is not sufficient.

The intermediate E15/E20 presentations with NREL and ORNL and Deloitte are right on target. The earmarks on biodiesel fit the program goals and objectives, even though the OBP is clearly based on ethanol.

The ORNL project on GIS database support is not clearly defined as an effort to address future infrastructure needs and is poorly defined as a tool to define current needs based on the presentation. The remaining earmarks fit the Platform in general, but did not generally provide substantial support to the program except for the Missouri study.

#### *Technology Manager Response*

With respect to the intermediate ethanol testing program, it is not our intention to approve them; rather, our intention is to provide sufficient data to EPA to allow a decision to be made regarding their use in existing vehicles.

Congressionally directed and management directed projects were reviewed at the platform review that best matched the focus of the individual projects. While we do not have direct control over funding for these types of projects, we recognize that some of the efforts do address relevant research questions. The increased emphasis on analysis will allow us to identify areas of concern in order to focus our efforts on issues of primary concern.

We plan to increase our efforts in biofuel distribution by focusing on regional distribution network concerns. The Bioenergy Knowledge Discovery Framework (KDF) will be instrumental in helping us to identify barriers to efficient distribution and targets for infrastructure development. The KDF is not simply an effort to address future infrastructure needs, nor is it a tool to define current needs. Rather, it is a framework to understand the linkages across the entire bioenergy supply infrastructure. It is still at the initial stages of development and the first phase of the project is focused on meeting the needs of the Biomass Feedstock and Infrastructure platforms. Despite this, several preliminary stakeholder meetings were held in order to gather initial feedback during the early developmental stage and a larger stakeholder meeting is planned for Fall 2009 to ensure that the needs of the larger stakeholder community will be met.

#### **v. Portfolio Gaps**

*Are there any gaps in the Platform RD&D Portfolio? Do you agree with the RD&D gaps presented by the Platform Manager?*

#### **Exhibit 14 – Platform Gaps: Reviewer Comments**

##### **Reviewer Comment**

Co-products are missing (this is key to fixing the economics), outreach functions are in need of a major strengthening. OBP was ill prepared for the huge assault on biofuels that has emerged this past year. The closure of the DOE regional offices has left a gap which the regional biomass partnerships with their strong state base could fill. This is especially true with the stimulus funds and all its challenges. Help is available. Use

it. No gaps were identified by the platform manager. Hmm. Why not?

The program seems tracked to answer the overall infrastructure question but not whether there will be issues in specific areas. More projects should be focused on areas that have been identified as potential issues.

Really need to increase sophistication of approach with regard to mid level blend assumptions, E85 assumptions, retail infrastructure. Where are the studies on blender pumps that will dispense E0 to E85. Where are the consumer behavior studies on blend cost vs. E0? Platform manager did not spend a lot of time on gaps.

### *Technology Manager Response*

While platform gaps were not addressed completely in the overview presentation, the Infrastructure Platform Team is aware that gaps do exist in the Platform RD&D and is committed to addressing these gaps. The following are responses to the specific gaps highlighted by the reviewers:

- While clearly an area of interest, research on co-products is largely outside of the appropriate focus of the Infrastructure platform.
- We agree that outreach efforts should be an important component of our work. Several outreach efforts were not presented at the Peer Review, including State outreach efforts described below.
- In order to fully address infrastructure concerns, both big-picture and specific infrastructure questions must be addressed. Analysis will be a major focus in future years. The increased focus on analysis in the next year will help us identify specific areas to focus our RD&D efforts.
- Funding for biofuel infrastructure development will be a component of our RD&D efforts in future years.
- As mentioned above, while we recognize that State outreach efforts could improve, we have worked with the States in several capacities in recent years. Activities have included: co-funding a solicitation with the Department of Energy's Clean Cities Program for biofuel outreach and education; providing funding to the Governors' Ethanol Coalition to hold a series of workshops to plan for targeted E85 expansion; and holding quarterly calls with State Energy Offices.

## **vi. Additional Recommendations, Comments, and Observations**

### **Exhibit 15 – Other Reviewer Comments**

#### **Reviewer Comment**

Recommend an invitation workshop with states and regional biomass partnerships - call it re-engagement after 6 years of minimal contact. Note: All biomass is local. Many smaller scale production facilities will gain more total production than a few mega scale plants with pre-processing and transportation costs limiting financial success.

More attention needs to be focused on economics in parallel with the technical questions. The dedicated ethanol pipeline feasibility study is a good example. Understand the economics because if they don't work the technical aspects don't matter. I would focus the effort more narrowly from this point on with fewer projects, more clearly defined goals and timelines, more oversight and more funding if necessary. The level of funding directed at some of these projects (Freedom Prize, Missouri Biodiesel Demonstration) seems out of line with the value they could or did produce.

Must figure out how to make better use of the 8 million E85 FFVs on the road today. This does not seem to be addressed. Need to tie vehicles and end-use distribution infrastructure together. They cannot be separate solutions.

Well run platform review this time. Software is lots better. Process was efficient.

### *Technology Manager Response*

We recognize that biofuel distribution concerns will vary by region. Moving forward, we plan to increase our efforts in biofuel distribution by focusing on regional distribution network concerns. The Bioenergy Knowledge Discovery Framework (KDF) will be an instrumental component to this work as a tool to identify barriers to efficient distribution and set for infrastructure development. This framework, combined with related analysis, will also help us answer the question of how to make better use of the existing FFVs on the road today.

Unfortunately, we do not have control over funding levels for congressionally directed or management directed projects. However, the feedback provided from the review panel will be used by the program and project principle investigators to redefine the scope of projects as necessary. Thank you to the review panel for helping ensure that everything ran smoothly.

### **C. Overall Technology Manager Response**

The Infrastructure platform thanks the Peer Reviewers for their valuable comments, time, and expertise. The concerns and opinions express to us throughout the platform and program review proceedings will be considered as the program reviews its strategic plan and planning activities, and assist in guiding the program and program accomplishments. Since each successive review looks at previous peer review platform and project results for improvements and adjusts, the platform manager hopes that the PIs take the Peer Reviewers comments seriously and work to incorporate this information to improve project performance and results.

### III. Project Review

The Infrastructure platform supports research and development projects with the National Labs, University and Industry partners, non-governmental organizations, and other entities. Projects funded through the Infrastructure platform align their activities with the Biomass program Multi-Year Program Plan (MYPP) goals. At the February 19, 2009 Review, 9 projects gave 20-30 minute presentations that focused presenting how project results would help achieve the Biomass program objectives. Projects were evaluated by a subset of the Feedstock Platform Review Panel, in accordance with the reviewers' areas of expertise.

#### A. Evaluation Criteria

Each project was evaluated systematically by set of criteria developed in conjunction with the Biomass program peer review steering committee. The evaluation criteria were provided to the project PIs ahead of time. The five criteria are provided below:

**Relevance** - *The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Market application of the expected project outputs has been considered.*

**Approach** - *The degree to which the project uses a sound, well-designed RD&D approach and clear project management plan, which incorporates well-defined milestones for monitoring the progress of the project and methods for addressing potential risks.*

**Technical Progress** - *The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.*

**Success Factors** - *The degree to which the project has identified critical success factors (technical, business, and market factors) which will impact technical and commercial viability of the project; and the degree to which the project has identified potential show stoppers (technical, market, regulatory, legal) which will impact technical and commercial viability.*

**Future Research** - *The degree to which the project has effectively planned its future, considered contingencies, understands resource or schedule requirements, built in optional paths or off ramps, or identified other opportunities to build upon current research to further meet OBP goals and objectives.*

**Rating System** – 5=Excellent; 4=Good; 3=Satisfactory; 2=Fair; 1=Poor

**B. Project Scoring**

**Exhibit 16 – Project Scoring Summary Table**

1.1.1.5	Bioenergy Knowledge Discovery Framework; Oak Ridge National Laboratory, Budhendra Bhaduri	2.67	2.67	2.33	2	2.67	2.47
5.8.3.1.	Freedom Prize, Public Health Foundation Enterprises, Inc., Karen Hanson	2.2	2	2.2	2.2	2.4	2.2
7.6.2.2.	New Uses Information and Entrepreneur Development, Growth Dimensions, Inc., Mark Williams	3	3	2.6	2.4	2.2	2.64
5.10.1.1. and 5.10.1.2.	Intermediate Ethanol Blends Testing, ORNL and NREL, Brian West and Steve Przesmitzki	4.8	4	3.8	3.6	3.6	3.96
7.8.1.7.	National Biofuel Energy Laboratory, Next Energy Center, Chuck Moeser	3.8	3.4	3.2	3.2	2.6	3.15
7.8.1.11.	Appalachian State University Biofuels and Biomass Research Initiative, Jeff Ramsdell, Appalachian State University	3	2.6	2.4	2	2.6	2.52
7.8.1.9.	Messiah College Biodiesel Fuel Generation Project, Messiah College, Michael Zummo	3	2.6	3	2.6	2.8	2.8

5.10.1.3.	Pipeline Feasibility Study – EISA Section 243, Deloitte Consulting, Rebecca Ranich	4.6	3.8	4.2	4	3.8	4.08
7.8.1.6	Missouri Biodiesel Demonstration Project, National Biodiesel Board, Jill Hamilton	3.8	3.2	3.4	3.2	3	3.32

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### **C. Infrastructure Platform Individual Project Reviews**

The following 9 projects were evaluated by three to five reviewers. The number of reviewers for each project is listed for each project. Each evaluation provides a summary table of the evaluation scores provided by the review panel followed by a verbatim reproduction of the full written comments provided by the review panel. The written comments do not in any way reflect an official opinion of the U.S. Department of Energy. Following the review, each project Principal Investigator was given an opportunity to review and respond to the written evaluation provided by the review panel. These responses are provided in full below. The Principal Investigator responses do not reflect an official opinion of the U.S. Department of Energy.

#### **Project Title: Bioenergy Knowledge Discovery Framework**

Performing Organization: Oak Ridge National Laboratory

Project Number: 1.1.1.5

Technology Area: Infrastructure

Number of Reviewers: 5

#### **1. Project Summary**

The Infrastructure Platform funding for the Bioenergy Knowledge Discovery Framework began in FY2009. The framework and user interface development was completed and was demonstrated. Infrastructure specific datasets, including transportation infrastructure, E85 refueling stations, and registered FFVs by zip code were integrated into framework and routing analysis is underway. Initial efforts to populate the framework were focused on the state of Iowa and presented at a workshop sponsored by the Iowa Office of Energy Independence. Additional stakeholder demonstrations were conducted to gather preliminary feedback on the project.

## 2. Summary of Project Scores

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	3.00	0.82
Approach	2.75	0.96
Technical Progress	2.75	0.96
Success Factors	2.25	0.50
Future Research	3.00	1.15

<b>Project Scoring Summary</b>						
<b>*</b>	<b>Criterion 1</b>	<b>Criterion 2</b>	<b>Criterion 3</b>	<b>Criterion 4</b>	<b>Criterion 5</b>	<b>Average</b>
Reviewer 1	3	4	3	2	4	<b>3.2</b>
Reviewer 2	4	3	4	3	4	<b>3.6</b>
Reviewer 3	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Reviewer 4	3	2	2	2	2	<b>2.2</b>
Reviewer 5	2	2	2	2	2	<b>2</b>

### **Overall Principal Investigator Response(s)**

No Overall PI Response

## 3. Compilation of Reviewer Comments and Principal Investigator Responses

1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
None identified.	Model is only as good as the underlying data. Need constant monitoring and evaluation of data. Unclear who the customer is, so hard to say that it meets overall program objectives.

**Response:** The data that will be made available in the KDF will be kept up to date in several ways. These include:

1. User maintained data. If a user chooses to make their data available through the KDF, the responsibility of maintaining the data currency will lie on them.
2. KDF maintained data. Certain datasets will be maintained by the KDF itself. These include data that will be manually updated, most likely versioned, by KDF administration as well as datasets that will be automatically updated based on scripting to acquire the data on a regular basis. The extent of need for and ability to fund this will be determined by OBP.
3. Data maintained outside of the KDF. The majority of the data made available through the KDF will be served from others. These data services will be referenced through the KDF but the responsibility for maintaining the actual data will be on the data provider. URLs will be automatically checked by the KDF to some extent, and broken URLs fixed manually, but the data itself will be maintained by the provider.

The KDF is designed to broadly serve the needs across the Public (Federal, State, and Local governments), Private (Industry), Research and Development (Academia, National Laboratories, NGOs, and other FFRDC), and Common Citizens. At the initial stages (this FY) we are addressing the requirements of two OBP platforms: Feedstocks and (Distribution) Infrastructure. They are the only paying –customers” with a follow up goal to provide

necessary support for research and decision making by their respective customers (for example, in FY09, they have been Governor's Ethanol Coalition; State of Iowa, Sun Grant Initiative institutes).

Very needed structure to integrate lots of analytical tools and databases.

Does not well identify biopower/CHP, pellet mill feedstock competition as being included. Need to advertise existence and ground rules to have data and analysis included by regions and states.

**Response:** There are many datasets that were not explicitly mentioned in the presentation. The KDF will likely serve or reference hundreds of datasets representing the entire spectrum of Bioenergy infrastructure. The datasets that will be included in the KDF will be defined by OBP and the user community. Users will upload their own data and request that specific datasets be uploaded or otherwise referenced from the KDF. If the data mentioned is needed by this community and is available for use, it will be available in the KDF. Biopower is not a current focus of the KDF; initial efforts have been on creating and developing an overall data structure and focusing on infrastructure components for biofuels. Once this has been completed and data more fully populated in the KDF, the framework will be able to address biopower/bioenergy more broadly.

None identified.

None identified.

**Response:** None identified.

Good vision of need for information. Good sense for complexity of identifying viable data sources and the need to integrate in visual tool.

Not clear how linked to market mechanisms and individual marketplace actors.

**Response:** We are in the initial phases of information and data gathering for infrastructure decision making. The basic data catalog structure has been created and base infrastructure components (transportation networks, pipelines, etc) have been identified and made operational. Gathering of market actor data across production, distribution and consumer delivery segments and their associated market responses/mechanisms is part of the current requirements collection effort. We anticipate that this will lead to an organized data and modeling services for the individual actors in the market place.

May be a precursor for a future planning model, such as a basic beginning, but not a forward focused tool. Focused on DOE and maybe the state energy offices.

No focus on future planning of future infrastructure needs, focus is currently on the past, historical databases. No real time information. The current plan to integrate in logistical packages competes with private industry. How do you plan to address that?

**Response:** Our initial interaction with two (very established) private sector consulting firms and the feedback from them have been extremely positive. Both have identified the KDF as a beneficial source (for data and information) for marketplace awareness. Moreover, they have also expressed strong interests in having the KDF serve as an advocacy/outreach platform for

their own services.

The focus of the KDF development is on the current needs of OBP which absolutely include the acquisition of current infrastructure data and the integration of that data into the KDF. There is no intention to compete with private industry in this effort. Any “integration” of a logistical model (which are primarily Government Off The Shelf or GOTS tools) will be through a funded effort of the OBP to solve a problem or provide a capability that serves their needs. The focus of the KDF is about making data, models, and tools available to OBP and efforts related to their work. If organizing information and data and making it available through a portal or interface, particularly information and data that are already freely available, is competing with industry then the KDF is the least of a multitude of concerns in this area.

As designed, the KDF is not a planning tool or a meta-model, but a framework for information access, data reposition and a multivalent query structure. The focus for infrastructure has been on historical and existing infrastructure data components, i.e., what infrastructure components are currently available, in order to provide a realistic base of data that will be available for research into future infrastructure needs. The purpose of the KDF is not to provide real-time data for infrastructure which either exists only as historical data (existing transport networks), or as components that are under construction; the reviewer would need to be more specific as to what “real-time” is in the context of capital-intensive, long-term infrastructure development. If the reviewer is referring to real-time production data, i.e. the outputs, that is being addressed under the production component of the KDF and not the infrastructure component. Also, any simulation of future scenario possibilities will rely upon actual existing/historical infrastructure information as data inputs. The data may be used by individual and industry in their planning processes, but more as a data provider and relevant research resource. There are no plans to integrate in logistical packages beyond what DOE has already funded and actively supports.

## 2) *Approach to performing the analysis*

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.

- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
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Good general description.

Would like to see more details. Was vague about how to make sure data is valid and up to date.

**Response:** We would like to have been able to provide more details. The timing of the presentation was obviously a constraint.

The data that will be made available in the KDF will be kept up to date in several ways. These include:

1. User maintained data. If a user wants to make their data available through the KDF, they will keep it up to date
2. KDF maintained data. Certain datasets will be maintained by the KDF itself. These include data that will be manually updated, most likely versioned, by KDF administration as well as datasets that will be automatically updated based on scripting to acquire the data on a regular basis. The extent of need for and ability to fund this will be determined by OBP. Data maintained outside of the KDF.
3. The majority of the data made available through the KDF will be served from others. These data services will be referenced through the KDF but the responsibility for maintaining the actual data will be on the data provider. URLs will be automatically checked by the KDF to some extent, and broken URLs fixed manually, but the data itself will be maintained by the provider.

Very good design emerging.

Framework needs further development for all of bioenergy not just biofuels

**Response:** The initial focus of the KDF is on the feedstock related portion of the bioenergy infrastructure. This is a clearly stated constraint within our SOW with OBP. The long term goal of the KDF, which is stated in the presentation and associated materials, is to serve the data needs for the entire Bioenergy infrastructure from seeds to filling stations.

None identified.

None identified.

**Response:** None identified

None identified.

Number of data sources not characterized.  
Growth plan for data sources not described.

**Response:** The number of data sources is not possible to list. There is a well defined strategy to define the datasets needed for modeling and analysis associated with the feedstock related aspects of the Bioenergy infrastructure; however, that data is not completely defined or

gathered. Additionally, that data will continuously change and grow so defining a ceiling or total is not only impossible but also counterproductive to the goal of having all of the up-to-date data needed to perform analysis. The growth plan for data sources is twofold. First, the users will contribute data. Second, the KDF will support the provision of data that is both requested by users and also deemed appropriate to serve through the KDF. The data that will be made available in the KDF will be kept up to date in several ways. These include:

1. User maintained data. If a user wants to make their data available through the KDF, they will keep it up to date
2. KDF maintained data. Certain datasets will be maintained by the KDF itself. These include data that will be manually updated, most likely versioned, by KDF administration as well as datasets that will be automatically updated based on scripting to acquire the data on a regular basis. The extent of need for and ability to fund this will be determined by OBP. Data maintained outside of the KDF.
3. The majority of the data made available through the KDF will be served from others. These data services will be referenced through the KDF but the responsibility for maintaining the actual data will be on the data provider. URLs will be automatically checked by the KDF to some extent, and broken URLs fixed manually, but the data itself will be maintained by the provider.

Concept is ok, but the presenter or the presentation was extremely general in discussion and couched in broad concepts and not specific goals, targets, or milestones. The "develop capabilities" was presented.

No milestones were defined. No specific, quantifiable targets were offered. There was no number of categories, no number of datasets. Need to define how you know when you have achieved your goals. Few barriers were defined and none of the challenges were discussed as to how they will be overcome.

**Response:** We would like to have been able to provide more details. The timing of the presentation was obviously a constraint and the presentation was intended to offer a conceptual description rather than a formal definition of progress to date. The presentation included three clear objectives and deliverables for this FY. The goals are very well defined in the SOW for the KDF which was collaboratively developed with and approved by OBP. This SOW outlines the needs of OBP and how the KDF will be developed in stages to fulfill those needs. All of this is set up in milestones with well defined goals and metrics.

In reference to the goals associated with data, the number of data sources is not possible to list. There is a well defined strategy to define the datasets needed for modeling and analysis associated with the feedstock related aspects of the Bioenergy infrastructure; however, that data is not completely defined or gathered. Additionally, that data will continuously change and grow so defining a ceiling or total is not only impossible but also counterproductive to the goal of having all of the up to date data needed to perform analysis. The growth plan for

data sources is twofold. First, the users will contribute data. Second, the KDF will support the provision of data that is both requested by users and also deemed appropriate to serve through the KDF. The data that will be made available in the KDF will be kept up to date in several ways. These include:

1. User maintained data. If a user chooses to make their data available through the KDF, they will keep it up to date.
2. KDF maintained data. Certain datasets will be maintained by the KDF itself. These include data that will be manually updated, most likely versioned, by KDF administration as well as datasets that will be automatically updated based on scripting to acquire the data on a regular basis. We will gather continuing updates to the databases by proactively monitoring the information sources (such as blending facilities, refineries) through direct or indirect contact. The extent of need for and ability to fund this will be determined by OBP. Data maintained outside of the KDF.
3. The majority of the data made available through the KDF will be served from others. These data services will be referenced through the KDF but the responsibility for maintaining the actual data will be on the data provider. URLs will be automatically checked by the KDF to some extent, and broken URLs fixed manually, but the data itself will be maintained by the provider.
4. Periodic refresh of the data through broad surveys and inspections. This is the existing approach but very time and cost intensive. The KDF could be used to implement modified survey strategies.

### *3) Progress and Results*

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or

OBP objectives and technical barriers.

Strengths	Weaknesses
	Hard to gauge progress based on the presentation.
<p><b>Response:</b> We would like to have been able to provide more details. The timing of the presentation was obviously a constraint and the presentation was intended to offer a conceptual description rather than a formal definition of progress to date.</p>	
Very early in the development.	None identified.
<p><b>Response:</b> None identified</p>	
None identified.	None identified.
<p><b>Response:</b> None identified.</p>	
	<p>Data inputs were not defined or summarized.            Functionality of actual tool not well defined.            Data set types were not well described in the presentation. Specific plans for improving categories of data not described.</p>
<p><b>Response:</b> We would like to have been able to provide more details. The timing of the presentation was obviously a constraint and the presentation was intended to offer a conceptual description rather than a formal definition of progress to date.            The dataset types that will be made available are both not limited and not completely defined. There will be several native types of data that will have significant capabilities within the functionality of the KDF. Other data, even very unique or difficult formats, will be made available by offering the data in its original form.            The specific data ontology, categories and connections between data are still in initial stages of development. Several data categories have been defined as data has become available. Future presentations/reviews will hopefully allow for more time to provide detailed discussion of data categorization efforts, ontological connections between data, and the basic data querying capabilities that have been developed.</p>	
Comments: None provided.	<p>Using existing datasets without putting them into a useful format or usable format is not efficient when everyone has to reformat the data every time it will be used. In my experience, none of the data sets are in a useful format, especially government datasets.</p> <p>The presentation did not define what has been done yet, what has yet to be done, or what the challenges are except that issues with shared data. Some datasets are proprietary; but there</p>

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was no discussion about how that will be addressed once customers emerge.

**Response:** Allowing data to be uploaded in one format and downloaded in several formats is a key feature of the KDF. Only a limited number of datasets will have this capability; however, the determination of this will be made by the data provider. If this person wants to go through a formal data import process, the data will be available in a variety of formats. If not, it will be available in the format it was uploaded in. KDF administration and OBP will also have the authority to determine which data are “integrated” into the KDF. These decisions will be made based on observed need and available funding.

Proprietary datasets will be dealt with on a dataset-by-dataset basis. Some datasets will be purchased for viewing or using within analysis enabled through the KDF. Some will be listed in the KDF but only available from the provider. Some will not be made available at all through the KDF.

One important feature of the KDF is to provide, to the greatest extent possible, the actual unaltered datasets used in various research and modeling efforts. The KDF will also provide links to the research papers or reports, so that the findings of the research, the data descriptions, any data manipulations, and research methodologies can be fully referenced. This allows for research methodologies and data sources to be reviewed, data inaccuracies/discrepancies to be revealed, results confirmed and conclusions validated. This will facilitate the progress of bioenergy science and potentially provide a sounder scientific basis upon which future research can rely.

#### 4) *Success Factors and Challenges*

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

**Strengths**

**Weaknesses**

Good high level understanding of factors.	Need better description of detailed data issues. Customers of tool not clear. Use of data "as is" may cause problems.
<p><b>Response:</b> The customer of the KDF is OBP as far as the existing funding and SOW are concerned. There is significant potential for that to grow, and it is the plan for the KDF to grow into a more open and accessible system, but it is currently limited to this user set. Most of the data that will be made available through the KDF will be provided by two groups. The first group is made up of other government agencies and purchased datasets. Their data will be used –as is”. The second group involves data that is created at the request of OBP. This data will be provided with documentation in the form or required reports or publications about the data. This data will also be used –as is”. Provision of data –as is” will allow for other researchers to confirm prior research and to do comparative analysis between studies and methodologies. While creating uniform data products is possible, there exists the possibility of data loss; maintaining the original data (what data and for how long is still to be determined) insures against potential data loss, while allowing for other researchers to access various datasets for their own purposes.</p>	
None identified.	Needs to test drive a wide variety of data sets and analytical tools and reports to ensure system works well and barriers are discovered.
<p><b>Response:</b> This is absolutely true and will definitely be part of the initial release of the system to OBP and others for testing and evaluation.</p>	
None identified.	None identified.
<p><b>Response:</b> None identified</p>	
Team seems to have good vision of need.	Description of effort is very generic. Connectivity to potential end users not clear. Need to know the plan to drive this data to those who need it - whether they know they need it or not.
<p><b>Response:</b> The customer of the KDF is OBP as far as the existing funding and SOW are concerned. There is significant potential for that to grow, and it is the plan for the KDF to grow into a more open and accessible system, but it is currently limited to this user set. The plan to make the system available, and to advertise that availability, will be part of the next phase of the KDF.</p>	
Comments: None provided.	Did not address the challenges of proprietary and confidential datasets or more specifically proprietary and confidential or commercial logistical programs. Seems like a key barrier and no comments on overcoming it. Lack of a consistent database is also a powerful barrier.
Clearly DOE wants this program but the author	

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was not able to define why or how it will be used specifically outside of the agency. No customer input or focus group

**Response:** The customer of the KDF is OBP as far as the existing funding and SOW are concerned. There is significant potential for that to grow, and it is the plan for the KDF to grow into a more open and accessible system, but it is currently limited to this user set. This being the case, the problem of proprietary data is concerned with a very limited subset of the total data and that issue is being handled via the internal security associated with the KDF. Most of the data that will be made available through the KDF will be provided by two groups. The first group is made up of other government agencies and purchased datasets. The second group involves data that is created at the request of OBP. This data will be provided with documentation in the form of required reports or publications about the data. The issue of a “consistent” database is a bit vague. There is no data model capable of housing the entirety of the data needed to support the analysis activities associated with understanding the bioenergy infrastructure as a whole. Our solution is to produce a database capable of organizing these disparate data in such a way that the right data in the right format can be found and accessed. Certain data will be stored in such a way as to make them available in a variety of formats and certain data will be stored in KDF enabled data models that will allow for additional capabilities in the system; however, the majority of the data will simply be made available in its native format. Just having this data available in one place is a significant benefit to this area of research. Regarding commercial logistics programs, DOE has funded and supported several different “internal” logistics programs which will be used in this effort. These same programs have also been used to provide logistical support for DOD and DOT. Public access to these systems is generally restricted, but is available to authorized personnel, including some private citizens, usually industry consultants working on EISs. The KDF will provide links to these systems, but access will be restricted to authorized users. Other infrastructure data products will be available for use in commercial logistics programs, but we do not anticipate providing specific data support for those systems.

##### 5) *Proposed Future Analysis*

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP

barriers or advancing the program.

Strengths	Weaknesses
None identified.	None identified.
<b>Response:</b> None identified.	
The vision/goals of this project are right on target.	None identified.
<b>Response:</b> None identified.	
None identified.	None identified.
<b>Response:</b> None identified.	
None identified.	Specific next steps not well described.
<b>Response:</b> There seems to have been a miscommunication of what was current work and what was future work as most of the questions and comments concerned aspects of the KDF that are best defined as future work.	
None identified.	No focus on future R&D needs.
None identified.	Very weak definition of future work, as it will be customer generated.
<b>Response:</b> There seems to have been a miscommunication of what was current work and what was future work as most of the questions and comments concerned aspects of the KDF that are best defined as future work.	

6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
Seems to have all the right players involved. Would like to see involvement of end-users in the process.	<b>Response:</b> The end users, OBP, are definitely involved in the planning and development of the KDF. As the system evolves and functionality is targeted to users outside of OBP, their involvement in the planning and development will absolutely be needed. OBP will actually have the say on who the

	end-users and user community will be. As structured, the KDF is “user-neutral”.
This project needs a lot of outreach and buy-in. Successful early experiences will be critical for buy-in of others.	<b>Response:</b> This is absolutely true and is a part of our planning and development strategy.
<b>Comment:</b> None provided.	<b>Response:</b> No response provided.
Adequacy of transfer / collaboration effort not established.	<b>Response:</b> No response provided.
There are no presentations or publications yet. Potential customer tool. Potentially large interface, but if limited to public info, then nothing was really of value. There is NO focus on future planning for future infrastructure needs.	<b>Response:</b> The KDF has been presented on several occasions. Although we anticipate the KDF providing much more, we do believe that the organization and provision of publicly available information is of great value. Also, the KDF is intended to be used in the process of infrastructure planning. If the data needed for analysis is in the KDF, and the results of analysis are provided through the KDF, then the KDF will be a great tool for use in gathering the information needed for infrastructure policy making in addition to the basic research and decision making associated with infrastructure development.

7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
Would have liked to have seen a more detailed description of the data being integrated, and an evaluation of the quality/validity of the data.	<b>Response:</b> Time and the state of the development process both worked against this occurring. The provision of this information will be a function of the system itself; however, so access to it will definitely be provided.
Need to complete the intake protocols and quality control sooner rather than later.	<b>Response:</b> This is absolutely true and is part of our design and development strategy. It is also true; however, that these protocols will change significantly as more data and types of data are designated for ingestion and service through the KDF. We are designing the system to be flexible rather than rushing to provide protocols

<p><b>Comment:</b> None provided.</p>	<p>before we are ready to ingest data. <b>Response:</b> No response provided.</p>
<p>Need better quantitative description of effort. Very qualitative. Data collection and data delivery projects must be described quantitatively.</p>	<p><b>Response:</b> Given the qualitative description of OBP requirement for “data support”, it is challenging to quantify how many data sets meet the requirements. Quantitative assessment of the KDF is problematic at this stage of development. New data sources are being identified on a regular basis, new models and research are being catalogued as well. Going forward, user-community contributions will be available on the KDF. Metrics can and will be available such as the number of queries, most-queried studies, datasets, etc., but are premature at this time.</p>
<p>Needs to put their own data into the system in their own format to reduce future costs. Need to better address key data or program categories. The current approach is too general. Need to resolve proprietary/commercial barriers and address competition with private consulting industry. Need to build consistent datasets.</p>	<p><b>Response:</b> Although the presentation was general, the strategy for the KDF is well defined and the development is based on known milestones. The issue of a “consistent” database is critical. There are two key goals in this regard. One is to develop “benchmark” data sets that can provide a unifying platform for modeling across the emerging infrastructure and across OBP platforms. Developing the “National Biofuel transportation network” is such a goal. The other objective is to provide a unifying approach for existing data sets that are in disparate format. Our solution is to produce a database capable of organizing these disparate data in such a way that the right data in the right format can be found and accessed. Certain data will be stored in such a way as to make them available in a variety of formats and certain data will be stored in KDF enabled data models that will allow for additional capabilities in the system; however, the majority of the data will simply be made available in its native format. Just having this data available in one place is a significant benefit to this area of research. There is no intention to compete with</p>

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private industry in this effort. The focus of the KDF is about making information and data available to OBP and efforts related to their work. If organizing information and data and making it available through a portal or interface, particularly information and data that are already freely available, is competing with industry then the KDF is the least of a multitude of concerns in this area.

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**Project Title: Freedom Prize**

Performing Organization: Public Health Foundation Enterprises, Inc.

Project Number: 5.8.3.1

Technology Area: Infrastructure

Number of Reviewers: 5

**1. Project Summary**

The Freedom Prize Foundation will develop prizes and award funds to reward and incentivize oil displacement through the deployment of existing technologies, process improvements, and other strategies. Freedom Prizes will target five verticals: Industry, Schools, Government, Military and Community. The prizes will be designed to spur reduction in oil consumption and educate the public at large about alternatives to oil.

**2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	2.20	1.10
Approach	2.00	0.71
Technical Progress	2.20	0.45
Success Factors	2.20	0.45
Future Research	2.40	0.55

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	4	3	3	3	3	3.2
Reviewer 2	2	2	2	2	2	2
Reviewer 3	2	1	2	2	3	2
Reviewer 4	1	2	2	2	2	1.8
Reviewer 5	2	2	2	2	2	2

Overall Principal Investigator Response(s)
No Overall PI Response

### 3. Compilation of Reviewer Comments and Principal Investigator Responses

#### 1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.



Strengths	Weaknesses
Addresses key issues in adoption of efficiency of fuel use.	Overall impact on public acceptance is not clear.
<b>Response:</b> None identified	
Uses the prestige to spur action.	Need to sharpen and re-think project targeting.
<b>Response:</b> None identified	
None identified.	Not clear where this fits into the biomass program. Reduction of fossil fuel use is a good general goal but shouldn't this program be part of some other program?
<b>Response:</b> In our opinion, the relevance to the biomass program is in the area of reducing barriers to adoption through education and awareness of alternatives. The placement of this project in the Infrastructure Review section was not ideal, given our mission.	
Important focus on reducing oil consumption and educating on alternative fuels.	Does not seem to capitalize on market mechanisms. Prize value unlikely to be seen as relevant.
<b>Response:</b> None identified	
Recognizes their weak focus on R&D. School district (and other future categories) focus is designed to reduce oil consumption, but how it will be defined nationwide or how the education will have a lasting effect after the competition was over, was not defined.	The concept is poorly designed to move the Biomass Program forward. Is the program being adopted by others? Will it be permanent? Focus on fuel efficiency is a broader DOE goal but not specific to OBP. Clearly an earmark.
<b>Response:</b> Our mission is not focused on R&D, and by design, is focused on deployment of technologies.	

2) *Approach to performing the analysis*

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides

- useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
  - 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.
  - 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
Well thought out metric for reducing fuel consumption per pupil mile. Allows other prize awards as well for innovation.	Should allow use of other measures of efficiency. Should also include assessment of economic efficiency, and applicability of adopted programs in evaluating programs for the prizes. Other valid metrics are possible, e.g. gallons saved/\$ invested. Some programs may require other metrics. Need to be flexible.
<b>Response:</b> We plan to capture additional data points in order to demonstrate the return on investment by school districts, and other measurements of efficiency as suggested by the reviewer. However, in order to ensure fairness, we had to create one common metric which would apply to all contestants.	
None identified.	Need to re-think approach. Why start with school districts when we have the EPA Clean Diesel and school bus swap out programs well advanced?
<b>Response:</b> We have been in contact with those programs and plan to leverage their networks.	
Highlighting/publicizing techniques that produced success are good.	Not clear why school districts were chosen as the first priority for the prizes. Wouldn't municipal transit agencies have the potential for higher fuel savings? Saving money through fuel use reduction or in other areas is already an incentive. Wouldn't it be more effective to modify the approach to publicizing best practices instead of awarding prizes?
<b>Response:</b> The decision to begin with school districts was made jointly with DOE.	
None identified.	As an individual effort, needs partnering.
<b>Response:</b> We are developing partnerships with educational organizations and other networks which will assist us with marketing.	
The project is reaching out to a number of very	Exactly what is the milestone? How will

high level organizations but how it trickles down to schools or school districts is not clear. Why not work with existing DOE school programs?

petroleum reduction be defined? Will it be a lasting effect? The project is not focused on infrastructure development nor does it try to integrate into OBP's plans. Why schools and military goals, why not better enzymes, more coproducts, reduce commercial barriers, etc.?

**Response:** The mission of the Freedom Prize is, by design, to focus on deployment of existing technologies as opposed to R&D. We do intend to work with existing DOE school programs and have been in contact with the program manager, who has agreed to help us with outreach through her program.

### 3) Progress and Results

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
Good start on schools.	No detailed plan presented to expand to other areas as well.
<b>Response:</b> None identified	
None identified.	Need Clean Cities and Clean Diesel expertise Milestones are missing.
<b>Response:</b> None identified	
Seem to be making progress on their goals but the whole concept seems very weak.	None identified.
<b>Response:</b> None identified	

None identified.	Technical details are not well described.
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<b>Response:</b> None identified	
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The project developed a school program, such as it is. But where is the government, military, private industry, etc.? They worked with Clean Cities and EPA.	A better approach might have been 5 prizes per category so that it could be more competitive. Will the approach be cost effective? Not working on all five categories at once is too linear in effect to be time costly and also loses the synergies of multiple stakeholders at the same time.
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<b>Response:</b> We are in the process of accelerating the development of prizes and are awaiting approval to proceed forward.	
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4) *Success Factors and Challenges*

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
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Good ideas for evaluating success and understanding challenges.	Need to ensure that districts don't game the system. Success criteria should be defined more broadly. One example is the adoption of the technology or technique by other school districts.
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<b>Response:</b> Agreed -- the school districts will need to provide evidence of their fuel consumption. And one of the criteria for the subjective awards will be the potential (or actual) "replication" of the idea by other school districts.	
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None identified.	Barriers are not well considered at depth and fit
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	to other programs.
<b>Response:</b> None identified	
None identified.	They don't appear to have well thought out definitions of success.
<b>Response:</b> None identified	
None identified.	May be overwhelmed by stimulus funds.
<b>Response:</b> None identified	
Not a long term project. Project not well defined in advance for some reason.	A lot to do in one year, when their approach is linear.
<b>Response:</b> None identified.	

### 5) Proposed Future Plans

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
	Further application details are undefined at this time.
<b>Response:</b> None identified.	
	The fit to other programs on the playing field needs a stronger focus.
<b>Response:</b> None identified.	
Sharing success techniques is good idea.	
<b>Response:</b> None identified.	
	Future evolution of other prizes (beyond school district funding) not well defined.

**Response:** None identified

No real integration into various industries that could continue the project once DOE funding is complete.

How do they keep it alive? This is a one shot wonder of no lasting value.

**Response:** None identified.

#### 6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
Reached out to Clean Cities, EPA.	<b>Response:</b> No response provided.
More collaboration with strategic thinking would help. Suggest air quality authorities of states	<b>Response:</b> No response provided.
<b>Comment:</b> None provided.	<b>Response:</b> No response provided.
Need to attach efforts to other DOE programs such as Clean Cities.	<b>Response:</b> We have been in contact with Clean Cities and intend to work together to develop and implement prizes.
Interface appears to be present but not fully defined. The project did not provide key stakeholder lists for each project area.	<b>Response:</b> No response provided.

#### 7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
Project should define criteria for success of the project beyond just awarding the prizes in a fair and open competition. Is it adoption of technologies by other districts?	<b>Response:</b> No response provided.
Limited additional funding recommended.	<b>Response:</b> No response provided.
Possibly modify measurement to include capital investment or other costs involved with	<b>Response:</b> The mission is to create and implement prizes. However a key element of our strategy is indeed to gather and then

<p>achieving the fuel reduction, i.e. what was the ROI of the fuel reduction. It may be more effective to replace the prize/contest with an initiative to assemble best practices from all types of school districts (rural, city, suburban) and publicize those nationwide. You could also hold seminars/provide updates with new techniques, newsletters, etc.</p>	<p>publicize the examples/best practices. We will do that through a variety of communications and social marketing methods.</p>
<p>Overall value of this spending is questionable given the magnitude of the task and competing initiatives. Overall progress seems behind given duration of program.</p>	<p><b>Response:</b> No response provided.</p>
<p>Spent an inordinate amount of time on one category--schools, and have not left a lot of time for the other four categories. Need to hire some people to speed thing up, may want to hire people from each industry so they know the key stakeholders already, since they are going to need to be efficient.</p>	<p><b>Response:</b> No response provided.</p>

## **Project Title: New Uses Information and Entrepreneur Development**

Performing Organization: Growth Dimensions, Inc.

Project Number: 7.6.2.2

Technology Area: Infrastructure

Number of Reviewers: 5

### **1. Project Summary**

The New Uses Information and Entrepreneur Development includes Capital Access for fixed assets or working capital in which the City of Belvidere may elect to grant a portion of the DOE grant funds to qualified clients for needed capital to commercialize agriculture new uses material into new alternative industrial products. In most instances funds would be granted to projects that have a strong commitment to increasing employment in the Belvidere / Boone County area. Product Manufacturing and Commercialization Support Services include a portion of the DOE grant funds will be used to provide consultation services for multi-tenants of the New Uses Product Development Center NUPDC. Provision of Physical Space means a portion of the DOE grant funds will be used to construct a 20,000 square foot building that will house the New Uses Product Development Center (NUPDC). The building will provide physical space for prototype manufacturing, testing and engineering manufacturing processes. The building will also provide lab/research space, general office space, and small business administrative support services.

### **2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	3.00	0.71
Approach	3.00	1.00
Technical Progress	2.60	1.14
Success Factors	2.40	1.14
Future Research	2.20	0.84

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	4	2	3	2	2	2.6
Reviewer 2	3	3	2	3	3	2.8
Reviewer 3	3	4	4	4	3	3.6
Reviewer 4	3	4	3	2	2	2.8
Reviewer 5	2	2	1	1	1	1.4

**Overall Principal Investigator Response(s)**

No Overall PI Response

**3. Compilation of Reviewer Comments and Principal Investigator Responses**

*1) Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

**Strengths**

**Weaknesses**

Very relevant as defined.	Goals should be more detailed and quantified, especially Task 1. Need to show how this develops "cost competitive infrastructure" as stated in MYPP goals.
<b>Response:</b> None identified	
Within geographic area, relevant need for commercialization The nitrogen project is very strategic. The biofuels industry runs on the need for cheap nitrogen.	Narrow geographic area limits reach of this effort.
<b>Response:</b> None identified	
Seems to have been successful at generating new ideas for biofuel development ideas.	None identified.
<b>Response:</b> None identified	
Good appreciation of issues around transitioning resources during economic dislocations.	None identified.
<b>Response:</b> None identified	
Focus on biofuels and biobased production, commercialization, and distribution.	No real strategy, a hit or miss type of solicitation. No real integration into Biomass Program goals and objectives.
<b>Response:</b> None identified.	

## 2) Approach to performing the analysis

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant

weaknesses.

- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
None identified.	Didn't define what is meant by "new uses". Some uses don't seem "new". Need to measure the success of the organizations who receive the awards in carrying out the studies and commercialization.
<b>Response:</b> None identified	
Competitive awards uses with guidance to winners.	Need deeper technical review strength to cover the broad range of potential products.
<b>Response:</b> None identified.	
Great that they are focused outward on a network and other constituents/partners. Capital project screening committee seems capable.	Could use better metrics. Milestone reviews. When do they decide whether a project is worth further investment or effort?
<b>Response:</b> None identified.	
Good focus on what is important. Focused on program deliverables, not brick and mortar.	None identified.
<b>Response:</b> None identified	
New management. More solicitations. Good review team.	What is being done is poorly defined. They have been working on this for well over 2 years but they are still not well organized. No milestones other than a number of successful grants.
<b>Response:</b> None identified.	

### 3) Progress and Results

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
None identified.	Should show more summary quantitative measures of accomplishments for Task 1, e.g. how many customers. Presentation did not make clear what the contribution of the contractor is.
<b>Response:</b> None identified	
Good progress for dollars spent.	Slow EF-1 sign-offs (DOE issue?) Need metrics on products to market and sales volumes.
<b>Response:</b> None identified	
Project seems to have demonstrated a fair amount of momentum. There are many different opportunities, outside funding and involvement of Cargill, Deere and other private sector parties.	None identified.
<b>Response:</b> None identified	
Project seems to have very specific examples of business / economic activity that the program has nurtured / enhanced. This type of project is hard to measure without specific results, which the project is able to cite.	None identified.

**Response:** None identified

University on bioplastics expanded their interest and has successfully sought DOE/EPA funding. BioVantage and a variety of other biobased (Chemtool) product firms have been involved.

Solicitations are too frequent. No real benefits to OBP defined. How do you define success or how to you eliminate poor projects from a technical or economic approach--the review team? How do you define how much petroleum is reduced?

**Response:** None identified.

*4) Success Factors and Challenges*

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

**Strengths**

**Weaknesses**

None identified.

Poorly defined. Need to define measures of success versus targets.

**Response:** None identified.

None identified.

Faster NEPA reviews are needed.

**Response:** None identified

They seemed to have great success in developing involvement/ideas from many parties.

Objective measures of project successes. Not clear where you go from here. How close are some of these projects to commercial viability? How do you help them get to the next step and able to move forward on their own?

**Response:** None identified.

None identified.	Project seems to be struggling in obtaining matching funds.
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**Response:** None identified.

Avoids most show stoppers by pushing those risks and costs off to the commercial developers or university researchers.	No environmental or standards review. No commercial success milestones.
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**Response:** None identified.

5) *Proposed Future Analysis*

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
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None identified.	None identified.
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**Response:** None identified

The state of the state inventory of bioenergy strengths is an important step.	None identified.
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**Response:** None identified.

None identified.	Could use better metrics on how to define commercial success of the ventures started by this program. They weren't very clear on what happens next except more of essentially the same thing. Is there another program to turn some of these projects over to when they are ready for commercial investment?
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**Response:** None identified.

None identified.	The future of this effort depends upon the ability to secure solid, stable co-funding. This is a networking / information sharing / connectivity effort.
<b>Response:</b> None identified.	
Needs to define how they are going to continue their work once the DOE funding expires.	Clearly an earmark that is not a real fit to OBP nor does it provide a real need for OBP.
<b>Response:</b> None identified.	

6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
Not clear how success in this project will be used to further goals of the MYPP. If the projects are successful, will the learnings be published or publicized in some other way?	<b>Response:</b> No response provided.
Stronger state outreach earlier in the project would have helped.	<b>Response:</b> No response provided.
Synergy between biodiesel plant and glycerin potential seems like a great idea.	<b>Response:</b> No response provided.
Each case the project works on is unique. Each unique project has its own technical value. The team running the project seems to understand how to do incubation of these businesses / economic entities. This is slow work.	<b>Response:</b> No response provided.
Integration has improved, outreach to good quality proposals have improved. Technical review time has improved. \$1.6 private for every \$1 DOE spends. Focus is on biofuels and biobased commercialization and has some real success.	<b>Response:</b> No response provided.

7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
<p>The project needs quantitative metrics and goals aligned with the metrics.</p>	<p><b>Response:</b> No response provided.</p>
<p>Develop a champion in state government. A key early missed opportunity.</p>	<p><b>Response:</b> No response provided.</p>
<p>They appear to have accomplished a great deal on selling the program and generating interest among entrepreneurs and existing businesses as potential customers. Maybe focus the program on just generating ideas rather than providing support services. Since the ability to acquire outside funding is an issue, maybe focus the project on particular technologies or end products (biodiesel, etc.).</p>	<p><b>Response:</b> No response provided.</p>
<p>MUST figure out the co-funding issue. Keep working with the State of Illinois. The long-term viability of project is at risk without a breakthrough in this area.</p>	<p><b>Response:</b> No response provided.</p>
<p>Their grant focus is not directed to firms/organizations that might benefit from OBP's program. There is no focus on enzyme development or testing, organism development or testing, no lignocellulosic siting, no biobased product development for coproducts in lignocellulosic ethanol production, etc. Worse, the focus is not on infrastructure-- ethanol UL permitting, ethanol logistics, ethanol or biodiesel storage.</p>	<p><b>Response:</b> No response provided.</p>

## **Project Title: Intermediate Ethanol Blends Testing**

Performing Organization: Oak Ridge National Laboratory and National Renewable Energy Laboratory

Project Number: 5.10.1.1, 5.10.1.2

Technology Area: Infrastructure

Number of Reviewers: 5

### **1. Project Summary**

Two paths to increased ethanol utilization in the U.S. are 1) use of E85 in Flex-Fuel Vehicles (FFVs), and 2) increasing ethanol content of gasoline used across the entire fleet. The use of E85 for displacing large volumes of petroleum is currently precluded by the fact that there are only 6-7 million FFVs on the road in the U.S. (about 3% of the fleet), and only 1% of fueling stations carry E85. Blending ethanol with gasoline for use in conventional vehicles is a more attractive option from a logistics view, however, only E10 is a legal fuel in the U.S., considered “substantially similar” to gasoline. Moving the “blend wall” from E10 to E15 or E20 requires an extensive test program to examine the effects of these intermediate blends on the legacy fleet of gasoline vehicles, small non-road engines, and other equipment.

### **2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	4.80	0.45
Approach	4.00	1.73
Technical Progress	3.80	1.64
Success Factors	3.60	1.52
Future Research	3.60	1.14

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	5	5	5	4	3	4.4
Reviewer 2	5	5	4	4	5	4.6
Reviewer 3	5	4	4	5	4	4.4
Reviewer 4	4	1	1	1	2	1.8
Reviewer 5	5	5	5	4	4	4.6

Overall Principal Investigator Response(s)
No Overall PI Response

### 3. Compilation of Reviewer Comments and Principal Investigator Responses

#### 1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
Good collection of data that is all relevant to goals.	There is never enough data, and EPA will not or cannot define the data needs to make a decision.
<b>Response:</b> None identified	
Getting past the current blend wall is critical. This is strategic work. Cannot hit OBP goal without this project.	None identified.
<b>Response:</b> None identified	
Project goes directly to the usefulness and impacts of E15 and E20.	None identified.
<b>Response:</b> None identified	
None identified.	The assumptions about mid-level blends being a viable means for dealing with EISA ethanol production levels is weak. The project does not involve collaboration with NHTSA for safety implications in older vehicles. Not clear that literature review included Australian mid-level blend studies.
<b>Response:</b> Literature review did include the Orbital/Australian studies. Engaging NHTSA was noted at the review meeting and reviewers commented that this is an excellent idea and will endeavor to do that.	
The project is tightly focused on Program goals and Federal fuel use targets. Customers are well defined and represent the key stakeholders in the industry. The project is aligned with OBP objectives to reach E20 and to expand biofuels in the transportation sector.	The project needs Health Effects if technical feasibility is successful or even partially successful.
<b>Response:</b> None identified.	

2) *Approach to performing the analysis*

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project

is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.
- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
Projects are all well designed with clear objectives. Each project has a good management structure and implementation plan.	Scope is very broad and necessarily involves difficult decisions about how available funds are spent.
<b>Response:</b> None identified	
All fuel end uses are being analyzed for broad buy-in. Literature review was done. EPA is partner with needs teased out to the degree possible.	Need more legacy vehicles and equipment review.
<b>Response:</b> None identified	
Appears very pragmatic and objective in looking for a solution to reduce gasoline consumption. The project has a clear approach—short term and longer term effects. Could use a better explanation of the reasons for the test methodology. Was the type of vehicles dictated by EPA or others? How was the approach defined?	None identified.
<b>Response:</b> None identified	
Categories of testing are largely correct and	V2 usage of all model year 2008 vehicles is not an acceptable evaluation population. This does

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thorough.

not represent the performance of the car parc. CRC protocols are not employed on many test sub-elements. V4 (long term durability) uses only 2006-2008 model year vehicles. This is not an acceptable population of vehicles to assess the car parc. TRC & ETC use 2009 only. The selection of vehicles will skew the results and findings of these sub-elements of the study.

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**Response:** Older Tier 2 vehicles, and possibly Tier 1, are planned for next phase of V4 (full life aging).

V2 is focused on discerning small changes in emissions with multiple fuel chemistry variables. This dual-use project was started by EPA under EPA Act and DOE is leveraging to add increased ethanol levels to gather detailed HC speciation data in parallel.

Several high emitting used vehicles are planned for the last phase of V2 so it is not entirely focused on 2008 MY.

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Very complicated group of tasks and participants. The entire project is very well defined and will provide a large amount of public information that is key to the success of the program. Very well defined plans, although the details were left to the imagination due to lack of time.

Why a Saab, why not a U.S. firm or at least a car that is commonly used in the U.S. and meets more than a 1% market share. Needs more durability analysis.

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**Response:** There was no mention of Saab in the March 2009 OBP merit review. This comment is not understood.

In 2007, ORNL benchmarked a Saab BioPower vehicle (SAE 2007-01-3994). But again, this work was not relevant to the Mid Level Ethanol Blends merit review presentation of 3/2009).

### 3) *Progress and Results*

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP

objectives and may contribute to overcoming technical barriers.

- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
All projects are technically well designed and have good analysis, results are all published.	Fuels are not randomized in project V2. There should be a central repository of all the data, or at least a central bibliography.
<b>Response:</b> None identified	
Solid progress is being made.	None identified.
<b>Response:</b> None identified	
The project produced a short term report on emissions pretty quickly. Seems to be moving forward quickly on long term tasks.	None identified.
<b>Response:</b> None identified	
None identified.	Contribution to OBP goals seriously jeopardized by vehicle population selection noted above. Populations selected seem designed with the objective of a specific outcome.
<b>Response:</b> As noted above, older vehicles will be added to test matrix in next phase.	
The project is producing high quality, public documents that will be critical for the future debates about E20. Project is mostly on time, although solicitation and contracting has been slow. Some of the partners--EPA and CRC-- are moving faster than DOE/NREL/ORNL. Technical objectives are well defined and meet decision criteria.	EPA needs to be more proactive in developing this new industry if EISA will be successful.
<p><b>Response:</b> ORNL and NREL are moving as fast as the funding will allow. As noted by a Reviewer: "Scope is very broad and necessarily involves difficult decisions about how available funds are spent."</p> <p>Presenter disagrees that other organizations are outpacing us. ORNL/NREL produced a peer-reviewed report on the first vehicle and SNRE work about 1 year after start. DOE Team is working with CRC and providing &gt;50% of overall funding. CRC involvement has been critical in helping identify key issues and help with development of test plans.</p>	

Some test plans may be "shovel ready" but lack of funds (from government and/or industry) preclude start.

#### 4) Success Factors and Challenges

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
Identified potential showstoppers.	None identified.
<b>Response:</b> None identified	
The blend wall time window must be met on-time. Very good progress.	None identified.
<b>Response:</b> None identified	
Appear to have accomplished or launched all the tests. Some are completed and some are still in progress.	None identified.
<b>Response:</b> None identified	
None identified.	Team seems to have totally missed the impact of vehicle population selection. Long term safety impacts in vehicles and small engine devices are not sufficiently taken into account.
<b>Response:</b> Duly noted above. Older vehicles will be included in next phase of testing.	
The group has been very thorough in developing key challenges and defining the project to address those challenges.	The group has been very thorough in developing key challenges and defining the project to address those challenges, but there is a little bit of identifying the show stopper and

not really addressing the show stoppers.

May tend to override the showstoppers, particularly if the project is premature or if future testing (e.g., testing 2012 or 2015) that has to be redone using improved vehicles and no budget is available for it. Lots of vehicle are too new and do not address the entire population, particularly on the aging and durability studies. There is a high likelihood that slightly older vehicles (1990-2005 vehicles) will age more rapidly because of the fuel, but that is not being addressed.

**Response:** None identified

### 5) Proposed Future Analysis

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
Future work is to complete current projects. Other work will depend on results of current efforts.	Should consider options and have a plan defined that depends on potential results.
<b>Response:</b> Presenters plan to continuously evaluate data as it comes in and will want to be flexible to focus future projects on high interest areas.	
Very comprehensive and well designed map of future work.	None identified.
<b>Response:</b> None identified.	

Appear to have solid plans to complete the further testing under tight time restrictions.	Maybe provide some recommendations to EPA/others.
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<b>Response:</b> None identified.	
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None identified.	Allowing the test plan to morph into support for a partial automotive waiver is not responsible because it does not allow EISA biofuel volume growth due to marketplace distribution issue of low / mid blends. This seems to be an underlying assumption.
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<b>Response:</b> As noted above, older vehicles are planned for the next phase of V4. Additional nonroad testing is also planned.	
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The number of tasks and their timing is fine, although there isn't a full presentation of what needs to be done if the future--at the end of this particular phase.	Need health effects in next phase. Need LCA impact in next phase.
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<b>Response</b> Excellent comments. Some health impacts due to vehicle emissions are included in the next phase of V2. LCA analysis is already part of other work on ethanol not specific to mid-level blends.	
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6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
Good coordination with other groups in government, industry.	<b>Response:</b> No response provided.
Good set of partners and collaborators and partners. Stronger EPA research needs identification was key.	<b>Response:</b> No response provided.
There appears to be a great collaboration between NREL and ORNL and the involvement of other parties.	<b>Response:</b> No response provided.
No discussion of the diagnostic (OBD) aspect of the test plan. Extent of CRC collaboration on some test elements was poor, good in	<b>Response:</b> No response provided.

others.	
Excellent TT with publications and presentations.	<b>Response:</b> No response provided.

7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
The project may want to include more older vehicle and technology in overall program. Data collection in non-road equipment seems light. Even though they are small in terms of volume consumed, it's still an important segment.	<b>Response:</b> Excellent comments and we are planning for additional older vehicle and non-road testing.
Need all the information public and in one spot and available for the long term. Expand legacy vehicle and equipment testing.	<b>Response:</b> We are looking into establishing a central repository for information and links to data/reports.
The information is very technical. I think it would be helpful if they were also charged with providing recommendations to EPA and other policy makers rather than just providing data and a summary of the results.	<b>Response:</b> No response provided.
Must correct population selection issues. Need collaboration with industry groups in all test elements. Must address change in certification fuels to follow in use blend levels.	<b>Response:</b> Older vehicles planned for the next phase of V4. We plan to continue working with industry groups such as CRC, NMMA, AMA, and ISMA.
Need more focus on butanol, fuel economy long term LCA impact. Why Saabs, why not vehicles with more market share? DOE (Task V2) is much slower than EPA. DOE needs to speed up solicitation and contracting. Need older vehicle-durability studies. What happens in the aviation gasoline industry? Boat industry? Need to begin to address the public debate--shape it and organize its discussion with the public and the broader stakeholder	<b>Response:</b> No response provided.

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communities.

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## **Project Title: National Biofuel Energy Laboratory**

Performing Organization: Next Energy

Project Number: 7.8.1.7

Technology Area: Infrastructure

Number of Reviewers: 5

### **1. Project Summary**

Little is known about the impact of the unavoidable compositional variability of biodiesel (and even conventional diesel) on diesel emissions. The alkyl ester makeup of biodiesel varies very widely world-wide, as does the hydrocarbon makeup of petroleum diesel. Not enough is known about the impact of these variations on fuel characteristics (e.g., cetane number, stability and cold weather performance) and engine performance (e.g., emissions, power output, cold-weather drivability, wear of fuel system and engine parts). In particular, very little is known of the impact of biodiesel on the production of certain emissions, such as formaldehyde, that are currently not regulated but are expected to be regulated in the future. It is the purpose of this program to resolve these issues.

### **2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	3.80	0.45
Approach	3.40	0.55
Technical Progress	3.20	0.84
Success Factors	3.20	0.84
Future Research	2.60	0.55

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	4	3	2	2	2	<b>2.6</b>
Reviewer 2	4	3	4	3	3	<b>3.4</b>
Reviewer 3	4	4	3	4	3	<b>3.6</b>
Reviewer 4	4	4	4	4	2	<b>3.6</b>
Reviewer 5	3	3	3	3	3	<b>3</b>

**Overall Principal Investigator Response(s)**

No Overall PI Response

**3. Compilation of Reviewer Comments and Principal Investigator Responses**

*1) Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
Goals stated are matched to overall objectives.	None identified.
<b>Response:</b> None identified	
1/3rd of a barrel of oil is middle distillates. DOE needs this focus to reach the biofuel goals.	None identified.
<b>Response:</b> None identified	
Seems connected with the program.	None identified.
<b>Response:</b> None identified	
Precipitate work is very relevant and well performed.	None identified.
<b>Response:</b> None identified	
Had a well rounded very technical research program well connected with partners and customers and provides a solid basis of good quality information on biodiesel fuel characteristics and engine performance. Fits well into commercial validation.	The work validates key issues but does not bring the R&D to the next level. The work avoids addressing cost effective solutions. What are the relative costs for antioxidants, or epoxydation or fixed catalysts?
<b>Response:</b> See below.	

## 2) Approach to performing the analysis

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.

- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
None identified.	It is not clear how the research is aimed to meet the program objectives.
<b>Response:</b> The research was aimed at developing the data to support the OEM's and the acceptance of a B20 ASTM standard with the NBB. Further items spawned from that effort.	
None identified.	There is limited range of feedstock analysis. Northern climate oilseed feedstocks missing in analysis.
<b>Response:</b> Soybean, Cottonseed even poultry fat are northern climate feedstock. We have analyzed Soy, Cotton seed, Palm, Poultry Fat, Yellow grease, RKA B100 (commercial)	
Seems well designed to answer the questions.	None identified.
<b>Response:</b> None identified.	
Methodology seems very thorough and results are valuable (Fuel chemistry)	None identified.
<b>Response:</b> None identified	
There is good quality data developed.	There is good quality data developed, but it does not address how the risks are going to be resolved. There is no proactive R&D, no solutions R&D.  The approach validates other research in the industry but does not take the R&D to the next plateau, e.g., if glucosterol are a problem, how do you get it out or how to you test for that?
<b>Response:</b> From the R&D solutions aspect, the program participants have filed for several patent applications to move the R&D forward. Identification of glucosterol was addressed. (under nature of biodiesel precipitates –slide #8). Removal of glucosterol is also being addressed.	

### 3) Progress and Results

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
None identified.	The project did not present good technical evaluation of results. There is no evidence of statistical analysis.
<b>Response:</b> As was recognized by other reviewers, we thought a good set of technical data was developed and discussed. With only 20 minutes, the explanation of all data was limited.	
Solid set of technical data has been developed.	Data needs to be integrated with work of other researchers beyond NBEL.
<b>Response:</b> Data was shared with NBB and many publications were completed and were shown in the data back-up. Need to meet with other groups and share more info. Good idea.	
The group appears to have answered the questions. They also did appear to find some solutions to improve oxidation and make a better biofuel with different additives.	None identified.
<b>Response:</b> None identified	
The ASTM biodiesel standard is an important step forward. The efforts described all seem meaningful and focused.	None identified.
<b>Response:</b> None identified	
Achieved all work they started with, high quality R&D results, lots of publications, good technology transfer into ASTM and technical diesel industry. Used a variety of biodiesel fuels, expanding on soy biodiesel. Most of the technical tasks have been completed.	No real focus on overcoming barriers rather than characterizing the data in more detail.
<b>Response:</b> This statement is not true. The program identified barriers and had some suggestions to overcome those. They are:	

1. Precipitate formation above Cloud point- Removal of sterols, unreacted glycerides
  2. Poor oxidative stability- Antioxidant work, Modification of FAME
  3. Poor cold flow properties- Removal of sterols, unreacted glycerides, FAME modification
  4. Higher cost of getting high quality feedstock with very low FFA-Heterogeneous catalysis
  5. High sodium ion levels in biodiesel when homogeneous catalyst is used- Heterogeneous catalysis
- We also worked on survey data of B20 manufacturers for station data.

4) *Success Factors and Challenges*

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
None identified.	The project did not address this question in a way that allows understanding of the critical issues.
<b>Response:</b> None identified	
Kudos on support for ASTM B20 standard.	Variability in feedstocks yield and variability in biodiesel technical characteristics was not well explored.
<b>Response:</b> Soybean, Cottonseed even poultry fat are northern climate feedstock. We have analyzed Soy, Cotton seed, Palm, Poultry Fat, Yellow grease, RKA B100 (commercial) What are missing: Canola, Rapeseed. Could be done with further research.	
The project appeared to achieve some solutions by mixing antioxidants. The project kept drilling down to improve results.	None identified.

<b>Response:</b> None identified	
The work is focused on meaningful issues that are real industry challenges.	None identified.

<b>Response:</b> None identified	
None identified.	There is no discussion on economic limits, particularly on the antioxidants, the epoxydation, fixed catalyst conversion, etc., to determine if, while technically feasible, these recommended approaches are economically feasible.

<b>Response:</b> We believe the antioxidants mentioned are economically feasible. More research could be done in this area and more data made available. The prime focus was on a sustainable ASTM B20 standard that OEM's could use toward warranty concerns.	
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5) *Proposed Future Analysis*

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
None identified.	It is not clear how future directions mesh with the past and build on previous data.
<b>Response:</b> Future direction is to build on the relationship of the lab to dyno to vehicle analysis. Much of the data today does not encompass all three areas. We hope to wrap this up in 2009.	
None identified.	None identified.
<b>Response:</b> None identified	
None identified.	It was not well understand where they intend to

go next.

**Response:** This grant program is almost complete. See above for some future direction.

None identified.

None identified.

**Response:** None identified

Project is nearly completed.

Future funding is not warranted. The data was good, but there are other organizations doing the same type of work. They have not lined up funding from other organizations.

**Response:** We did secure substantial cost share funding exceeding the original intent approved by DOE. As far as future funding is concerned, we are currently reviewing this with NREL, DOE, Michigan Department of Economic Development and Wayne State University for future program decisions.

#### 6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
Many publications and presentations.	<b>Response:</b> No response provided
Broad range of collaborations. However, where are NBB and the University of Idaho (both are part of the National Biodiesel Education Program of USDA)? Both have a wealth of technical expertise and studies.	<b>Response:</b> NBB was involved when we had discussions on the B20 standard and when we were reviewing the survey data from various stations. We also reviewed some school bus information colder northern states such as Minnesota and northern Michigan. We have not worked with the University of Idaho but are willing to share what ever information they would like to see. Any contacts would be appreciated.
They had some outside partners and they said they have published results, but this wasn't very clear in the presentation.	<b>Response:</b> Many publications were listed in the back-up data given which it appeared some of the reviewers had not looked at prior to the meeting. Three pages of publications were given and were noted during the presentation. The publications are linked to the WSU web site and also will be available for DOE linking and NextEnergy Linkage.

<b>Comment:</b> None provided.	<b>Response:</b> No response provided
Lots of good TT provided, good interaction with diesel OEM providers and ASTM and other groups.	<b>Response:</b> No response provided

7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
<b>Comment:</b> None provided.	<b>Response:</b> No response provided.
Need a public website in a single spot for all the information to be available on a long term basis. Presentations and publications in a scattered way do not cut it.	<b>Response:</b> The information is all linked in a web site on Wayne State University server at: <a href="http://www.eng.wayne.edu/page.php?id=4778">http://www.eng.wayne.edu/page.php?id=4778</a> for publications. For general information at WSU about the program: <a href="http://www.eng.wayne.edu/page.php?id=4765">http://www.eng.wayne.edu/page.php?id=4765</a>
The scope seems ok but would like to have seen some recommendations based on the results generated so far.	<b>Response:</b> Recommendations: Improve the quality of biodiesel? Such as oxidation stability and cold flow properties. Efficient methods of making biodiesel. Proper blending techniques (most of the B20 tested in the survey were not B20)
<b>Comment:</b> None provided.	<b>Response:</b> No response provided

## **Project Title: Appalachian State University Biofuels and Biomass Research Initiative**

Performing Organization: Appalachian State University

Project Number: 7.8.1.11

Technology Area: Infrastructure

Number of Reviewers: 5

### **1. Project Summary**

The Appalachian State University Biofuels and Biomass Initiative includes fundamental research, applied design, process engineering, agricultural studies, community outreach, industry relations, economic development, and public policy endeavors. To date, there is very little experience with the consequences on fuel properties and combustion emissions due to variable biodiesel feedstocks, especially mixed feedstocks. Appalachian seeks to address this void through expansion of our current feedstock and fuel quality applied research initiative.

### **2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	3.00	1.22
Approach	2.60	0.89
Technical Progress	2.40	0.89
Success Factors	2.00	0.71
Future Research	2.60	0.89

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	4	2	3	2	3	<b>2.8</b>
Reviewer 2	4	4	3	2	3	<b>3.2</b>
Reviewer 3	3	3	3	3	3	<b>3</b>
Reviewer 4	3	2	2	2	3	<b>2.4</b>
Reviewer 5	1	2	1	1	1	<b>1.2</b>

Overall Principal Investigator Response(s)
No Overall PI Response

### 3. Compilation of Reviewer Comments and Principal Investigator Responses

#### 1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
Good match-up against the DOE objectives.	Would be nice to show that existing data

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(mostly HD) exhibit relationships between fuel compositions and emissions.

**Response:** We are in the beginning phases of data collection for this project, but have found a statistically significant difference in pollutants from combustion of biodiesel manufactured from different alternative feedstocks. Our next report will be specific to show relationship of pollutant quantity to fuel type.

Middle distillates are 1/3 of a barrel of oil. None identified.  
Needed for DOE biofuel goals.

**Response:** None identified

Seems loosely connected to the program. Why test emissions only from small sedans vs. trucks?

**Response:** Our initial funding would only allow for the purchase of one test vehicle. We chose a sedan because there is less biodiesel emissions data in the literature as compared to trucks.

Important issues for study. None identified.

**Response:** None identified

Local facility with potential local benefits with respect to consumer biodiesel validation. DOE does not need any new engine and emission facilities and if added, they need to be integrated into NREL, ORNL, Argonne, C-CERT, Texas, CARB, etc. This group does not have a unique focus. The group does not have the technical expertise to improve biodiesel processing technology either. There is no real infrastructure or personnel

**Response:** Our emissions study is connected to our larger work to improve the economic viability of the biodiesel industry in North Carolina. As with many regions, NC producers depend on locally available non-traditional feedstocks in order to remain financially stable. Sufficient emissions data for fuel manufactured from these feedstocks is not in the literature. Our contribution to and collaboration with other emissions facilities will improve the overall understanding of biodiesel emissions. We have contributed to several improvements in biodiesel processing technology for small and mid-scale producers in our region. More personnel and infrastructure are coming with future funding

## 2) Approach to performing the analysis

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project

is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.
- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
None identified.	The current experimental setup does not measure PM measurements, which is a critical component of diesel emissions. Data have limited use if PM not measured.
<p><b>Response:</b> We are collaborating with air quality scientists to add PM measurements within the next few months, but will be somewhat limited until further funding is obtained. We will have PM measurement in place for testing on the dynamometer.</p>	
Did literature review before focus on non-soy feedstocks, hence the poultry fat focus. For biodiesel, a regional approach is the correct approach.	None identified.
<p><b>Response:</b> We are studying several regionally viable feedstocks, including poultry fat.</p>	
None identified.	Much of the DOE money seems to be spent on building and equipment (dynamometer). Don't these facilities exist in other places already? Why spend capital dollars to build these facilities in NC?
<p><b>Response:</b> DOE funding is only \$295,200. These funds are being spent on the test vehicle and the dynamometer. The emissions analysis equipment was funded by the UNC general administration Research Competitiveness Fund. The building for our research and testing facility is being funded and constructed by Catawba County. The biodiesel process equipment is funded by the Golden LEAF Foundation. Total funding of all of these items is approximately \$3.3 million, with DOE funding only representing 9%. The purpose of the facility is to serve regional producers with issues related to regionally available, viable</p>	

feedstocks. Results will contribute to the overall body of knowledge related to combustions emissions from biodiesel manufactured from various feedstocks.

None identified.

On road data collection leads to variation in results. Use of dynamometer within vehicle equipment is critically important.

**Response:** Use of dynamometer will begin as soon as installation is complete. Typical load schemes will be utilized, as well as a load scheme that mimics our on-road course. All fuels will be tested on the dynamometer and results compared to those taken on-road.

None identified.

No real plans focused on the true consumer issues with vehicles, which is new engine technology not suitable for more than B5 (lube issues, trap regeneration issues). There is no focus on how to improve processing, what exactly are they going to improve with their testing? No on site fuel testing, so how are they going to help the local biodiesel producers?

**Response:** The DOE project is just equipment for emissions analysis. DOE funded the test vehicle and the dynamometer. Our research and testing facility is a separate project funded by other sources. It will include extensive fuel testing, as well as the ability to test the efficiency of various process techniques for small and mid-scale producers.

### 3) Progress and Results

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

**Strengths**

**Weaknesses**

None identified	Milestones not defined. Still too early to evaluate data.
<b>Response:</b> Milestones were defined in report to the DOE. They are related to the purchase, installation, and proper operation of the equipment.	
Work in progress. Milestones are being met.	Only one vehicle being tested.
<b>Response:</b> We plan to add more vehicles as further funding is obtained.	
None identified.	Project is 9 months old, still taking data.
<b>Response:</b> The DOE project and funding was just for the purchase of some of the equipment necessary for completion of emissions analysis. All of the equipment has been purchased. The dynamometer will be installed as our facility (funded by other sources) reaches completion.	
None identified.	Only initial data reviewed.
<b>Response:</b> None identified	
None identified.	No real focus on OBP goals and milestones. They haven't yet shown that they can be an integral part of the solution.
<b>Response:</b> None identified	

#### 4) Success Factors and Challenges

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
None identified.	Undefined.
<b>Response:</b> None identified	

None identified.	The project needs public results and publically documented impacts which are not yet available.
<b>Response:</b> None identified	
Great that they talked at least a little about preliminary results	Not much to show so far except to develop the test tools, subject and processes.
<b>Response:</b> None identified	
None identified.	Effort is very preliminary.
<b>Response:</b> None identified	
None identified.	There are numerous issues. If they build it, will they come? Are they offering any unique services?
<b>Response:</b> Unique critical data is combustion emissions for biodiesel manufactured from alternative feedstocks, especially those economically viable for our region. DOE project funding was for a small portion of equipment necessary to complete this work.	

### 5) *Proposed Future Analysis*

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
None identified.	The project needs to include petro-diesel in comparison and also needs to get good chemical characterization of the different fuels being tested. Plans for dynamometer do not include standard emissions test equipment - to make FTP bag measurements. It will be

	difficult to compare results to previous literature if FTP bag measurements are not conducted.
<b>Response:</b> Petro-diesel tests are included in our study for comparison. We are in the process of completing chemical characterization of each of the fuels we test. This analysis will be more extensive once our facility is completed. We will work to include FTP bag measurements.	
None identified.	What is standard test regime?
<b>Response:</b> Once dynamometer is installed we will use standard test regimes utilized by other studies in the literature. We will also develop a test regime that mimics our on-road course for comparison.	
Next steps seem logical.	None identified.
<b>Response:</b> None identified	
None identified.	Need to significantly improve testing methodology.
<b>Response:</b> None identified	
None identified.	No unique relevance.
<b>Response:</b> None identified	

#### 6) Technology Transfer & Collaborations

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
No current plans to publish the data.	<b>Response:</b> We plan to publish data in peer reviewed journals. We will also distribute data via a database available to biodiesel producers and others in the industry.
Need greater peer review and collaborations	<b>Response:</b> We will be meeting with Oak Ridge scientists and others in the emissions field within the next few months in order to validate our methods and collaborate where possible.
Small project. Only local collaborators (Catawba).	<b>Response:</b> We will be meeting with Oak Ridge scientists and others in the emissions field within the next few months in order to validate our methods and collaborate where possible.

Will have to get standardized testing in place in order to enable meaningful collaboration.	<b>Response:</b> We will be meeting with Oak Ridge scientists and others in the emissions field within the next few months in order to validate our methods and collaborate where possible.
<b>Comment:</b> None provided.	<b>Response:</b> No response provided

7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
Should include PM measurements.	<b>Response:</b> We will be adding PM measurements within the next few months.
Should add capability to measure emissions according to FTP.	We will work to add bag measurements as well.
Need public information and dissemination. Encourage state/university funding to continue work.	<b>Response:</b> No response provided.
Why not test trucks, large and small vs. just small sedans? Is there a reason to think the emissions results from one feedstock to another would be different?	<b>Response:</b> Will add trucks if future funding allows, however literature is most lacking when it comes to biodiesel emissions from small sedans. Emissions from biodiesel fuels manufactured from different feedstocks are different due to the difference in chemical composition of feedstock oils and finished fuels.
The preliminary work does not meet vehicle test methodology expectations. It is good for comparative results from this project only. Work will only be of long term value if test standardization is addressed.	<b>Response:</b> We will work in the next few months to make sure our methods meet standards such that valid comparisons and future collaborations can be made. We will be meeting with Oak Ridge scientists and others in the emissions field within the next few months in order to validate our methods and collaborate where possible.
They should sit down with DOE and some key reviewers and re-scope the entire project in order to generate some value. The project is still preliminary and would benefit from re-scoping.	<b>Response:</b> We would be glad to sit down with DOE and reviewer representatives. We are interested in producing relevant work that will have significant impact.

## **Project Title: Messiah College Biodiesel Fuel Generation Project**

Performing Organization: Messiah College

Project Number: 7.8.1.9

Technology Area: Infrastructure

Number of Reviewers: 5

### **1. Project Summary**

Processor and process research and development has not yet been accomplished to support ASTM D 6751 certifiable biodiesel production by entrepreneurs and institutions seeking to leverage the opportunities afforded by biodiesel for recycling and other small-scale applications. This project will meet these needs by establishing a laboratory facility and a research and development program that will advance biodiesel processor and process design in support of small scale producers. Our work will include researching the ability to produce ASTM certified fuel using various feedstocks, possibly including recycled or unconventional materials, and production ingredients. The project will also develop scalable processor and process designs suitable for ASTM D 6751 certifiable small-scale biodiesel production.

### **2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	3.00	0.71
Approach	2.60	0.55
Technical Progress	3.00	1.00
Success Factors	2.60	0.55
Future Research	2.80	0.84

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	4	3	4	3	3	3.4
Reviewer 2	3	3	4	3	4	3.4
Reviewer 3	3	3	3	3	3	3
Reviewer 4	3	2	2	2	2	2.2
Reviewer 5	2	2	2	2	2	2

Overall Principal Investigator Response(s)
No Overall PI Response

### 3. Compilation of Reviewer Comments and Principal Investigator Responses

#### 1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
Good set of objectives that has the potential to	There is question as to whether the basis for

impact biodiesel.	this project is relevant. Assuming success, has a contractor or DOE shown that this will have an impact? Objectives should have an economic component, and this should be an explicit part of the program.
<b>Response:</b> This raises a good point and we are working to develop an economic element to the project currently.	
Fits a niche that is not well recognized.	None identified.
<b>Response:</b> I agree.	
None identified.	There should be some economic analysis to at least estimate whether the small biorefinery can ever make sense and under what circumstances would it or wouldn't it make sense. Then move on to determining how it would work.
<b>Response:</b> I agree and we are working to incorporate this analysis into our work.	
The issue of improving quality from small batch producers is critically important.	None identified.
<b>Response:</b> None identified	
Small community scale biodiesel plants (5 million gallons/year and lower) are economically viable but technically challenged. They cannot afford fuel quality testing and do not have easy access to high quality technical information--either on the fuel quality side or conversion processing side.	It appears they may be working to keep a non-competitive industry alive. The objectives are only generally defined and needs to be fine-tuned--e.g., maybe they can focus on fuel quality testing and process improvements but not try to do it all. They need economic targets.
<b>Response:</b> The main focus will be quality testing and improving the process with a hope of producing at least a design for a processor. As other have suggested, we will work to develop an economic element for the project.	

## 2) *Approach to performing the analysis*

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.
- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
All steps are defined.	Need more details about key piece - building the reactor and defining design parameters. Qualifications of PI are a critical factor but were not presented.
<b>Response:</b> We are in the process of defining these key pieces.	
Applied research for smaller scale production.	Where are milestones?
<b>Response:</b> None identified.	
Seems logical.	Requires some capital investment. Don't the equivalent facilities to do this exist somewhere else? Why at this college?
<b>Response:</b> None identified	
None identified.	Looks like this team is early in maturity. Still trying to feel their way forward.
<b>Response:</b> We are still in developing the laboratory to really begin the research and design elements of this project.	
Focus on bridging the gap between backyard producers and very small producers.	Working to help firms that are possibly too small to ever be commercial. The lab does not appear to be a high quality laboratory, no full suite of tests (which tests, which sent outside) and there is no focus on BQ-9000. What kind of equipment for processing is going to be available? Which is missing? How will they try to address the missing elements, how are they going to figure out what type of process technologies is needed compared to what the

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industry has already tried?

**Response:** Currently we populating the laboratory with the necessary equipment to perform ASTM D 93 (Flash Point), ASTM D 2709 (Water and Sediment), ASTM D 2500 (Cloud Point), ASTM D 664 (Acid Number, and ASTM D 6584 (Total and Free Glycerin). Necessary equipment to perform these tests has been researched and is currently being ordered.

### 3) Progress and Results

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
Good progress in short time since inception.	None identified.
<b>Response:</b> Thank you.	
Good progress for early stages of project. Literature review in progress.	None identified.
<b>Response:</b> None identified	
None identified.	No real results to date except to get some things set up for the project.
<b>Response:</b> None identified.	
None identified.	They are just getting started. There are no substantial results reviewed, but good intentions.
<b>Response:</b> None identified	

None identified.

Their accomplishments are not really accomplishments but rather a list of appearances and learning opportunities for them. They are not focused on OBP goals and objectives, but rather on local community needs. They need more technical staff and if necessary bring in expertise.

**Response:** Thank you for these suggestions. We will work to ensure that our work aligns with OBP goals.

#### 4) *Success Factors and Challenges*

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
Good list of success factors and showstoppers.	Need to include costs as part of factors.
<b>Response:</b> None identified	
Focus on the waste glycerin.	None identified.
<b>Response:</b> None identified	
New project.	None identified.
<b>Response:</b> None identified	
None identified.	They are developing and understanding of critical roadblocks. Understanding of how to approach problem and task is still developing.
<b>Response:</b> None identified	
They are collecting information about their	They haven't learned what their success factors

chosen industry but they have a long way to go or show stoppers are yet in becoming an expert in that industry, at least well enough to be a technology transfer organization.

**Response:** None identified.

5) *Proposed Future Analysis*

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
Good outline of major future goals, but will need a more detailed plan.	None identified.
<b>Response:</b> None identified	
The small scale focus needs an on-going effort. Encourage further fund seeking.	None identified.
<b>Response:</b> None identified	
Future plans seem reasonable.	None identified.
<b>Response:</b> None identified	
None identified.	None identified.
<b>Response:</b> None identified	
Their focus is on improving fuel quality, particularly for economically viable biodiesel produced from technically challenging feedstocks.	If the local biodiesel producers can't afford product testing or better technology, how are they going to support a future organization on campus once the DOE grant is finished?
<b>Response:</b> This is a very good point. I am working with both the college and local biodiesel	

producers to determine what the future of this program will look like at the completion of the DOE grant period.

### 6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
Limited information was presented. Suggest that relationships be developed with other researchers.	<b>Response:</b> This is very helpful and will be pursued.
Broader collaboration with other regions with small scale producers is encouraged.	<b>Response:</b> Thank you. Collaboration will be key to the success of "small scale" biodiesel work.
Positive that found some industry partners, Kestone Biofuels and Piedmont Biofuels.	<b>Response:</b> No response provided.
Not yet applicable.	<b>Response:</b> No response provided.
Plans to provide public technology transfer. I'm not sure the PI has the expertise to provide high quality TT.	<b>Response:</b> No response provided.

### 7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
Project name should be changed to reflect that it is focusing on used oil.	<b>Response:</b> No response provided.
Reach out to other small scale production states. Many states have this situation running live.	<b>Response:</b> No response provided.
Work with other projects on recycling of waste glycerin and methanol. Add economic analysis. Do these small scale biorefineries make sense vs. shipping the waste oil and buying biodiesel	<b>Response:</b> Projects and collaborations are currently underway to work with recycling glycerin and methanol. The addition of an economic analysis to determine viability of small scale refineries will be pursued.

from larger refineries?	
Need to find opportunities for collaboration.	<b>Response:</b> No response provided.
Need to refocus on some of the issues special to Yellow grease and small producers, such as how to solve cold soak issues. Need to better train personnel, send them out for laboratory testing (see Magellan Laboratories for previous teaching) and also needs to go out for BQ-9000 testing in order to support commercial biodiesel producers.	<b>Response:</b> Thank you for the suggestion. These matters will be addressed.

## **Project Title: Pipeline Feasibility Study - EISA Section 243**

Performing Organization: Deloitte Consulting

Project Number: 5.10.1.3

Technology Area: Infrastructure

Number of Reviewers: 5

### **1. Project Summary**

The purpose of this study is to fulfill requirements under Section 243 of the U.S. Energy Independence and Security Act of 2007 (EISA) for the Secretary of Energy. Section 243 of EISA requires DOE to analyze:

- Quantity of ethanol production;
- Existing or potential barriers to construction;
- Market risk (including throughput risk) and means of mitigating the risk;
- Regulatory, financing, and siting options that would mitigate the risk;
- Financial incentives, including the return on equity;
- Technical factors that may compromise the safe transportation of ethanol;
- Such other factors as the Secretary considers to be appropriate.

### **2. Summary of Project Scores**

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	4.60	0.55
Approach	3.80	0.45
Technical Progress	4.20	0.45
Success Factors	4.00	0.71
Future Research	3.80	1.10

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	5	3	4	5	4	4.2
Reviewer 2	4	4	5	4	2	3.8
Reviewer 3	5	4	4	4	4	4.2
Reviewer 4	4	4	4	3	4	3.8
Reviewer 5	5	4	4	4	5	4.4

Overall Principal Investigator Response(s)
No Overall PI Response

### 3. Compilation of Reviewer Comments and Principal Investigator Responses

#### 1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
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The project addresses a key question in the DOE plan in a preliminary analysis.	None identified.
<b>Response:</b> None identified	
Quick study required by EISA.	A gap analysis shows other analysis needs.
<b>Response:</b> None identified	
This is key to the potential delivered cost of ethanol in the eastern market.	None identified.
<b>Response:</b> None identified	
Ethanol pipeline study from northern Iowa to east coast by Deloitte Consulting. Make use of existing right-of-way.	None identified.
<b>Response:</b> None identified	
Need to estimate the costs of building future ethanol infrastructure where the population is concentrated and this project is integral to this discussion and future incentives. Analyzed dedicated ethanol pipeline that expands ethanol distribution.	None identified.
<b>Response:</b> None identified.	

2) *Approach to performing the analysis*

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.
- 1-Poor. The analysis approach is not well-defined and not effectively executed, and

unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
<p>Good analysis. Deloitte is eminently qualified to carry out this analysis.</p>	<p>By necessity, the analysis is preliminary and does not consider all alternatives. Did not consider General Interest economics. That is, does the investment make sense for the economy? This gives a different answer since we already have a distribution system. Does the added investment pay for itself in terms of reduced cost to the producers/consumers?</p> <p>The analysis should also discuss possible justifications for the government subsidies that were assumed in one of the cases.</p> <p>By using average economics, the analysis probably overestimates how much business the pipeline could take from the current rail system.</p>
<p><b>Response:</b> None identified</p>	
<p>Very good look at a mid-west to east coast option for ethanol-only pipeline.</p>	<p>Public ownership such as a BPA or TVA was not analyzed.</p>
<p><b>Response:</b> None identified</p>	
<p>Sensible to use the Colonial/Buckeye route and east markets which would have the best potential. Assumptions seem logical.</p>	<p>None identified.</p>
<p><b>Response:</b> None identified</p>	
<p>Assumptions well documented.</p>	<p>Fairly situationally dependent.</p>
<p><b>Response:</b> None identified</p>	
<p>The project was sound, well designed, and implemented according to its goals.</p>	<p>There are always various sensitivities on assumptions, and more sensitivity analysis should have been provided.</p>
<p><b>Response:</b> None identified.</p>	

3) *Progress and Results*

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
Good and complete analysis, considering it is described as a preliminary investigation.	Should the analysis consider alternatives, such as maintaining the current modes of distribution, and use them to evaluate economics?
<b>Response:</b> None identified	
Identification and discussion of risks is helpful.	None identified.
<b>Response:</b> None identified	
None identified.	None identified.
<b>Response:</b> None identified	
This project is almost complete. All milestones and objectives have nearly been completed.	Needed to compare and contrast between pipeline costs versus railroad costs. Based on the tariffs estimate provided, the rail would be almost as cost effective as the pipeline. The project did not address any other savings or losses that might have occurred by avoiding trucking or rail.
<b>Response:</b> None identified.	

#### 4) Success Factors and Challenges

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
Good discussion of risks and mitigation options. Seems complete.	At some point they should try to quantify the economic impacts of some of these risks. Should consider as a potential showstopper the rail industry will cut prices to compete.
<b>Response:</b> None identified.	
Results gave a good analysis of a single system option.	None identified.
<b>Response:</b> None identified.	
Clear, concise results. Clearly identified the key issue of the financing, federal money/guaranty required and risk both financial and market demand. Great summary of the conclusions and results. Modeling vs. market demand was a good approach vs. just the mandate.	None identified.
<b>Response:</b> None identified	
None identified.	Key assumption concerning large part of right-of-way already owned.
<b>Response:</b> None identified	
The group did a very good job identifying the key risks associated with construction costs, demand, and another of key variables, but	Needed more sensitivity analysis. Needed more of a feel on how much of the support from DOE or other Federal support will be needed

eventually they had to abstract from those risks. for the pipeline versus private investment.

**Response:** None identified

5) *Proposed Future Analysis*

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
Not really relevant since it's almost done.	None identified.
<b>Response:</b> None identified.	
None identified.	No future work or gap analysis performed. Examples: a) Compare to the west coast unit train with dairy/feedlot co-location for wet distillers grains; b) Impact of mid-level blends on need for the pipelines; and c) Impact of east coast cellulosic.
<b>Response:</b> None identified.	
Project is completed.	None identified
<b>Response:</b> None identified.	
Very relevant.	None identified.
<b>Response:</b> None identified.	
Very timely project.	None identified.
<b>Response:</b> None identified.	

6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
<b>Comments:</b> None provided.	<b>Response:</b> No response provided.
Reached out to the pipeline industry.	<b>Response:</b> No response provided.
They got good input from Magellan and Buckeye.	<b>Response:</b> No response provided.
There was outreach to industry knowledge but collaboration was not a key element of project.	<b>Response:</b> No response provided.
It is a report to Congress and thus unavailable to the general public and thus, the OBP should make a concerted effort to get this report published.	<b>Response:</b> No response provided.

*7) Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
See comments above regarding general interest economics.	<b>Response:</b> No response provided.
A public ownership option should be examined.	<b>Response:</b> No response provided.
Project is completed. For the future they might try to more precisely model the competitive impact of ethanol from sources not on the pipeline.	<b>Response:</b> No response provided.
Results coached in mandate assumption in EISA. Need to follow-on with study that is more market demand based with variables such as retail fuel price, price differential of E85 to gasoline. This is a good start. Need to go further.	<b>Response:</b> No response provided.

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More sensitivity analysis.

**Response:** No response provided.

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Project Title: Missouri Biodiesel Demonstration Project

Performing Organization: National Biodiesel Board

Project Number: 7.8.1.6

Technology Area: Infrastructure

Number of Reviewers: 5

### 1. Project Summary

The National Biodiesel Board will partner with petroleum products merchant wholesalers to perform pipeline run(s) with an expected result of understanding how biodiesel behaves in the pipeline, particularly if it is fungible, and why or why not. Limited testing has been done to date by other organizations on biodiesel movements through pipelines. None of it is publicly available information. This project will be the first demonstration of soydiesel in a pipeline. This demonstration will raise awareness and dispel speculation about the concerns of moving low-level blends of biodiesel on the pipe. This project will have an outreach and education component directed at petroleum marketers on the proper procedure to blend, ship, and store ASTM D6751 quality biodiesel. This project will also establish an emergency implementation plan should fuel quality situations occur in the future, as did in Minnesota last winter. Further, this grant will result in the installation of a biodiesel meter-blending terminals at each of two existing petroleum terminals.

### 2. Summary of Project Scores

<b>Evaluation Criteria</b>	<b>Average Score</b>	<b>Standard Deviation</b>
Relevance	3.80	0.45
Approach	3.20	0.84
Technical Progress	3.40	1.14
Success Factors	3.20	0.84
Future Research	3.00	1.00

Project Scoring Summary						
*	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Average
Reviewer 1	4	4	2	4	4	3.6
Reviewer 2	4	4	5	4	4	4.2
Reviewer 3	3	2	3	2	2	2.4
Reviewer 4	4	3	3	3	3	3.2
Reviewer 5	4	3	4	3	2	3.2

Overall Principal Investigator Response(s)
No Overall PI Response

### 3. Compilation of Reviewer Comments and Principal Investigator Responses

#### 1) *Relevance to overall objectives*

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Analysis adds value to the program portfolio.

- 5-Excellent. The project is critical to and fully supports Multi-Year Program Plan objectives. Analysis results are identified and critical.
- 4-Good. Most aspects of the project align with the plan objectives. Use of analysis results is identified and important.
- 3-Satisfactory. Many aspects of the project align with plan objectives.
- 2-Fair. The project partially supports the plan objectives. The project partially supports analytical needs of the program.
- 1-Poor. The project provides little support to the plan objectives. The project does not meet the analytical needs of the program.

Strengths	Weaknesses
Project correctly identifies and addresses a number of issues that are directly associated with the overall DOE objectives.	The question is what is the economic need for shipping B5 through product pipelines. They should define the economic model to show why pipeline transport is important.
<p><b>Response:</b> Based on information found in "How Pipelines Make the Oil Market Work -Their Networks, Operation and Regulations" you can find the economic basis NBB referred to in its presentation. To move product on the pipeline costs only a 2-3 cents between Texas and Chicago or New Jersey. However, moving the same gallon through trucks or rails can cost 20-30 cents. This report further notes that after World War II, moving fuel by traditional methods had strategic limitations (tankers) to supply the East Coast. Over 600 billion gallons of fuel or 68% of the fuel nation-wide were moved on pipelines in 2001 at only 2% of the overall transport cost. Trucks and rail accounted for 5% of the fuel movement.</p>	
Fits core public research for key biodiesel needs.	None identified.
<p><b>Response:</b> None identified</p>	
None identified.	Why did we do the tests? How much uncertainty is there that the fuel quality couldn't be maintained? Will B5 really move much via pipeline given its production locations?
<p><b>Response:</b> In various discussions with pipeline industry companies, these companies did not have the experience with biodiesel blends that allowed them to feel certain that fuel quality would be maintained. Pipeline companies are very conservative, and have had previous negative experience when transporting supposedly 'harmless' substances in the pipelines—especially those lines that also carry jet fuel. Unexpected problems in jet engines with red dye and fuel water separators at airports with lubricity additives have significantly reduced the willingness of pipeline companies—and airlines—to support new and different fuels or additives in multi-product pipelines. While B5 has been pipelined in Europe for some time, the European system is much smaller in both length and diameter than US pipelines and the European experience does not directly transfer to the US. It was necessary to work cooperatively with these companies to provide the information with which they can feel confident telling their customers that transporting biodiesel blends on pipelines will not cause issues.</p> <p>In addition, the new Renewable Fuel Standard will require 1 billion gallons of renewable diesel fuel, most of which will be biodiesel, which at the B5 level will put B5 in about 30% of the US diesel fuel. This is a level at which stakeholders (i.e. large petroleum refiners) are likely to want to ship B5 on the pipeline as there is a 18 to 25 cent savings vs. truck and rail. Kinder Morgan recently announced they will start carrying B5 on their non-jet fuel pipelines this summer, and with success of this project transport on lines carrying jet fuel will also be possible.</p> <p>Biodiesel production locations are very different than those of ethanol. There is substantial</p>	

capacity in the Houston ship channel for both production and imports of biodiesel which—if this effort is successful—may be ideally located for pipeline transport to the Northeast, especially for use in home heating oil. Massachusetts already has a B2 mandate. Pennsylvania is in the process of gearing up for its B2 mandate next year. New York legislature is expected to pass a B2 mandate further creating a demand for biodiesel in the Northeast. Texas is the leading biodiesel producing state. Many of the producers, including those in Texas, are strategically located near pipelines with the intent of moving product economically and efficiently on the pipe or at terminals in close proximity.

Four main objectives are very relevant to EISA objectives. None identified.

**Response:** None identified

Moving biodiesel as B5 reduces fuel costs, eliminates duplicate infrastructure, and may offer some cost savings in the pipeline. Increases the infrastructure goals. Ancillary support on BQ-9000 fuel quality workshops. Lubricity testing in ULSD in pipeline runs. Increased storage infrastructure.

Will we ever need to transport B5 through the pipeline? How much of the pipeline industry supports this concept? What barriers still exist?

**Response:** Based on the answer above and the recent passage at ASTM of up to 5% biodiesel as a fungible component in both on/off road diesel fuel (D975) and in home heating oil (D396), yes, it is likely biodiesel blends will be transported via pipeline. In the summer of 2008, the five major pipeline companies have joined forces with the National Biodiesel Board (NBB) as part of the Pipeliner Biodiesel Steering Committee (PBSC) and have identified over 30 technical questions and issues to be resolved for large scale commercial shipment of B5 on US multi-product pipelines. Their commitment to work with NBB and go public with the list of concerns is an indication of their support. The issues associated with non-jet pipelines are substantially less than those with pipelines that also carry jet fuel, and are clearly outlined in the PBSC white paper. It is very likely this would not have happened without the funding provided through this project.

2) *Approach to performing the analysis*

The degree to which (a) appropriate and consistent models, tools, and calculation methods have been defined and implemented; (b) data sources, assumptions and results have been clearly documented; and (c) an internal review process has been defined and implemented. The project is well-designed and provides consistent, credible results that support and guide OBP research portfolio and plans.

- 5-Excellent. The analysis approach is well-defined and executed, and provides clearly documented, relevant results to support OBP decision-making. Difficult for the approach to be improved significantly.
- 4-Good. The analysis approach is generally well thought out and effective, and provides

- useful results to support OBP decision-making but could be improved in a few areas.
- 3-Satisfactory. The analysis approach is satisfactory, providing some results that could support OBP decision-making. Improvements in approach would improve project quality.
- 2-Fair. The analysis approach includes some elements that could potentially provide results to support OBP decision-making, but overall, the approach has significant weaknesses.
- 1-Poor. The analysis approach is not well-defined and not effectively executed, and unlikely to provide results to support OBP decision-making.

Strengths	Weaknesses
Description was straightforward and easily matched to objectives.	None identified.
<b>Response:</b> None identified	
Solid targeting of industry development needs adjustments made as the situation changed.	None identified.
<b>Response:</b> None identified	
Approach is not well defined.	<p>Why wasn't a test run done in cold weather? There seemed to be a lot of pieces, pipeline, storage, terminal, USPS. Wouldn't they all have been better as separate projects that could focus on them in more detail? They only got data that the biodiesel went in the pipeline within spec and out within spec. There is no data on any degradation of the project. Not sure this was worth \$1.2 million.</p>
<p><b>Response:</b> In 2006 prior to the beginning of this project, the biodiesel industry was facing a severe fuel quality problem in the country's first biodiesel mandated state, Minnesota. NREL's fuel quality survey was released showing that over 60% of the biodiesel samples taken did not meet the ASTM specification. Diesel engine manufacturers were concerned that the industry could not produce and maintain quality fuel through the distribution channels.</p> <p>Through this grant, the NBB put together a comprehensive distribution program to address the economic and fuel quality barriers at the time. This project was initially designed with only three major tasks, not just the pipeline research: 1) Pipeline Movements and Lubricity Testing, 2) Missouri Infrastructure Development, 3) Fuel Quality Outreach and Education. These tasks were centered on increasing and achieving quality fuel distribution throughout the supply chain. The pipeline run was designed to demonstrate that biodiesel could be successfully transported in a pipeline to build confidence among the pipeline industries. Additionally, refueling terminals were, and still are, considered to be a barrier to wide-spread biodiesel use. Only 70 of 1500 terminals currently offer biodiesel blends. Since this initial program funding was earmarked from Senator Bond, NBB focused it infrastructure efforts at</p>	

terminal locations that served Missouri fleets.

Consumer confidence in biodiesel fuel quality was a show-stopper at the time this project was initiated. Minnesota has just introduced its B2 mandate state-wide and was experiencing severe fuel quality issues. This was also the same time frame ULSD was being introduced and Hurricane Katrina hit. Some of the quality issues were not related to biodiesel but poor diesel fuel. Regardless, fuel quality education, both upstream and downstream, became critical to the long-term success of biodiesel. If the industry failed in Minnesota, it might not have recovered at all. Through the course of this project, fuel quality in the field improved to 90% compliance, indicating NBB was successful in increasing fuel quality awareness through the BQ9000 workshops funded by this grant and preparing guidance documents on the BQ9000 program for both producers and marketers.

The three tasks of this initial project complement one another. For example, without the education task, a successful pipeline run and lubricity additive testing would be insignificant if fuel quality damaged consumer confidence beyond repair. Pipeline movements are also limited if the fuel can't be stored in terminals at the end of the line.

The fourth task, USPS Oil Analysis, could have been done as a separate project and was added under a re-scope. The funds for this task were originally designated to evaluate whether producers were achieving fuel quality in the field through sampling. Later, this was determined to be a conflict of interest to NBB. NBB and DOE determined that this task would be better served if moved to NREL, which they agreed to do. However, NREL funds needed to be released from an existing project to do that. To resolve this, NBB agreed to pay for the oil analysis to make both projects move forward. The second fuel quality testing done by NREL, as stated above, did prove the industry responded to the need to improve by achieving 90% compliance. NBB is committed to closing this gap on improved fuel quality. Federal resources help make that effort possible.

None identified.

None identified.

**Response:** None identified

The Pipeliner's Group is an excellent approach that generated lots of interest and brought the key stakeholders together. Improving fuel quality via BQ-9000 is also a public benefit. Good management and oversight and responsive to DOE. Provided engine oil analysis using ULSD using the USPS fleet testing.

No winter testing of B5 in winter, where biodiesel creates a risk. This testing did not occur in this project even though it was addressed over a year and a half ago; although it may be in the NBB future R&D lists.

**Response:** This project is multi-phase with the first and largest phase being directed funding and the second smaller phase (still in the process) was competitively funded. The specifications for the first runs did not include a cold weather requirement. There are no specific notes regarding this omission. But as the PI, the partners' primary goal was to successfully complete the run maintaining fuel quality over a long haul to build the pipeline industry's confidence in biodiesel. Adding another element, such as cold weather, may have been seen as adding another risk factor which was not desired for the first run.

For the second phase, it was determined that a specific set of approved test data acquisition

protocols that would maximize the information and data to address the questions raised by the pipeline members of the Pipeliner Biodiesel Steering Committee (PBSC) was needed prior to the execution of future runs. These data acquisition protocols are being developed jointly between the PBSC and the large refiners that produce jet fuel (BP, Shell, Chevron, ExxonMobil, and Total—called the Joint Inspection Group) for two runs that will be executed in the spring/summer of 2009. While additional runs in cold weather are desired—and may be the subject of future work—the JIG members have expressed a need to get the data on the desired level of biodiesel cross contamination likely in jet fuel as input to jet aircraft testing and potential specification changes to the jet fuel specification which will specify the maximum allowable biodiesel content allowed in jet fuel.

### 3) Progress and Results

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

- 5-Excellent. The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.
- 4-Good. The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.
- 3-Satisfactory. The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.
- 2-Fair. The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.
- 1-Poor. The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.

Strengths	Weaknesses
None identified	Presentation did not show any data. Would like to see response from pipeline industry and whether they requested additional information, and why.
<p><b>Response:</b> The initial test run did collect samples. But due to the proprietary nature of this work, the results agreed to by the partners (Colonial, Northville and NBB) did not include public release of the raw data, rather a pass-fail scenario. However, in the two future runs, NBB will negotiate test data as can be seen in the PBSC white paper which clearly shows the latest thinking and needs of the pipeline industry. In addition to pipeline testing, the lubricity study does provide data and is now available on NBB’s website. The Minnesota Biodiesel Council’s fuel quality sampling data is also posted on their website.</p>	
Major progress has been made, especially fuel quality, lubricity, cold weather, and pipeline	None identified.

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use. Questions resolved and no longer an issue or question.

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**Response:** None identified

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Accomplished all of the stated goals.

The stated goals don't seem worth \$1.2 million.

**Response:** As stated above, the biodiesel industry believes this project was highly successful and delivered a great deal within the \$1.2 budget. It is important to note that the project is not yet complete with two pipeline runs pending – waiting for test protocols from the PBSC. Highlighted below are the major achievements largely due to the efforts under this grant:

First successful pipeline run of B5 from Houston, Texas to Linden, New Jersey. Although no public data is available, NBB did announce the overall success of this effort through a press release and member communications. NBB will also add an executive summary to its website.

Commercializing a fuel with the pipeline industry is not a small task. This project has attracted the attention and industry of the private industry. Based on the positive results with the first biodiesel pipeline run and the planning for the second and third runs promoted the formation of the Pipeliner Biodiesel Steering Committee, made up of private pipeline industry members and the NBB. The committee was formed to address technical barriers of moving biodiesel on the pipeline. These members are using this project to establish protocols and collect data to further their knowledge on how to best move biodiesel on the pipeline.

The committee identified 30 issues that needed to be addressed in a report that is now in the public domain and will be reported to DOE in NBB's next quarterly report. How can this be seen as anything less than valuable?

Taking the biodiesel industry from 40% fuel quality compliant to 90% within an 18 month period is an undeniable success. The biodiesel industry did not have the resources needed to address this alone. NBB attributes this progress to the rapid implementation of the BQ9000 program largely promoted and funded out of this project. After the first 18 months of this project, 90% of the biodiesel was produced by BQ-9000 certified producers. The fuel quality field samples were also reported in NREL's recent fuel quality survey. Minnesota Biodiesel Council also provides its fuel quality data, collected under this program, on its website.

The project produced two guidance documents on the BQ-9000 program: BQ9000 Producer Program Guidebook and the BQ9000 Marketer Guidebook.

This project proved that biodiesel at a 1% blend is a strong lubricity additive and is reported in NBB's Effects of Additives and Biodiesel from Various Feedstock on Lubricity and Ultra Low Sulfur Diesel (ULSD)

Through the proceeds from the BQ-9000 workshops, this project produced a first responder training course prepared by the International Association of Fire Chiefs. The curriculum was made available to DOE.

The Underwriters' Laboratory approved B5 in standard diesel equipment. This approval may not have progressed as quickly without the support of NBB funded out of this grant.

The USPS fleet evaluation managed by NREL was also supported by this grant. The grant paid for oil analysis to evaluate biodiesel's wear on diesel engines. This work is nearly complete. NREL is waiting for the engine tear-down results.

This project provided critical resources to respond to the lack of consumer confidence in

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Minnesota. The state was the first to mandate B2. Everyone was looking at Minnesota as it began its initial mandated. It was also the first winter of the B2 mandate in Minnesota. Biodiesel was receiving the blame for the technical difficulties. However, there were several factors in play – Hurricane Katrina, ULSD implementation. This project gave NBB the funds to educate biodiesel users or potential distributors on how to source and handle quality biodiesel. It also helped provide resources needed to respond quickly to problems in the field to accurately determine whether or not biodiesel was at fault. All these factors helped build consumer confidence in MN. The state was faced with eliminating the B2 mandate. After this project and successful implementation in the state for several years, the state is now expanding its program to a B5 mandate, beginning this summer. If the state didn't successfully address its consumer confidence issues, it would not have continued or grown to a B5 mandate, beginning this summer. Furthermore, if there was not enough confidence in biodiesel quality the US Congress would not have create a role for biodiesel under the expand RFS.

Another indicator of success is the growing state mandates for biodiesel. In 2006, only one state, Minnesota, had a mandate. Since the inception of this project five more states have initiated mandates: WA, OR, MN, PA, MA. Through this project NBB has helped bolster confidence in biodiesel. Now twenty-seven states are now considering some type of biodiesel mandates.

None identified.

None identified.

**Response:** None identified

80% of the project is already completed. Pipeline study is the most valuable. Most of the projects were done on time and meeting goals.

Some parts of the project are yet to be completed. Need more information on remaining barriers and issues associated with pipeline industry.

**Response:** The 30 remaining pipeline technical barriers are in the PBSC white paper and many do not currently have funding. The largest potential barrier is jet aircraft testing to determine the maximum allowable content of biodiesel in jet fuel. Biodiesel availability continues to be barrier. This project has helped improve the situation and make it more available.

Although this project has increased consumer confidence and possible access of biodiesel through pipelines and two terminals, we still need to have a place to put it off the pipe at terminals. NBB's goal is to:

- Double terminals to 150 (10%) throughout US in just a few years;
- Maintain fuel quality (Fuel quality constantly needs to be monitored and addressed to keep OEM support. NBB is dedicated to achieving fuel quality. As the nation moves toward implementation of the expanded Renewable Fuel Standard (RFS), a high fuel quality standard will be needed to be achieved to minimize risk to fleets and OEMs.); and
- Improve biodiesel's economic competitiveness. (Biodiesel continues to be economically disadvantage compared to diesel fuel. One solution to this is distribution on the pipeline. As stated previously can curb cost by as much as \$0.25 per gallon.);
- Continue work with UL and other standards organizations.

#### 4) Success Factors and Challenges

The degree to which the project has identified the key contributions the analysis has the potential to make towards program goals or biomass/biofuels development, and the degree to which the project has identified key challenges.

- 5-Excellent. A comprehensive list of benefits and contributions are identified and strong approaches to address challenges are identified.
- 4-Good. Key success benefits and contributions are identified and there are methods to address challenges.
- 3-Satisfactory. Many contributions of the analysis are identified and methods to overcome challenges have been proposed.
- 2-Fair. Some contributions are identified. Methods to address challenges are not well developed.
- 1-Poor. Little to no identification of contributions or challenges. Little to no recognition of relative importance or prioritization of activities.

Strengths	Weaknesses
Identified a number of critical factors.	Did not identify factors associated with jet fuel industry.
<p><b>Response:</b> The work with the JIG was a result of efforts under this project. Discussions have only recently begun. It is clear considerable engine testing will be needed to convince the jet engine manufacturers and airlines that moving biodiesel on the pipelines is safe. The actual test requirements have not yet determined. NBB will share these results with DOE as soon as possible.</p>	
Very good work.	Need cold weather pipeline test.
<p><b>Response:</b> Cold weather testing has been addressed above. Although this is one issue identified by the Pipeliner Committee, it was not determined not to be a sufficient enough to delay the remaining two pipeline test runs planned under this project. If funds are available, a B5 and B20 pipeline run in cold weather with at least two types of biodiesel common in the US (one low freezing biodiesel and one high freezing biodiesel) would provide significant new data.</p>	
Project demonstrated that it was possible to move biodiesel successfully through the pipeline under the testing conditions.	Was this really worth \$1.2 million? The ultimate results seem almost meaningless.
<p><b>Response:</b> See response to a similar statement under Technical Progress.</p>	
None identified.	None identified.
<p><b>Response:</b> None identified.</p>	
Some good showstoppers were identified, but they are general to the industry and did not address this project specifically.	They have not addressed the remaining issues in B5 in pipeline industry, or identified them.
<p><b>Response:</b> None identified.</p>	

### 5) Proposed Future Analysis

The degree to which the analysis activity has highlighted areas of future analysis or research or further developments that can facilitate the growth of the biofuels industry.

- 5-Excellent. The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.
- 4-Good. Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.
- 3-Satisfactory. Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.
- 2-Fair. The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.
- 1-Poor. Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.

Strengths	Weaknesses
Well-defined approach to future work.	Would like to see a definition of what's needed to convince the jet fuel industry to accept pipeline shipments.
<b>Response:</b> In addition to the needs in the PSBC white paper, the PBSC is in the process of working with the jet fuel industry and the jet engine companies through the Joint Inspection Group (JIG) to determine the information and data needs to approve a small level of biodiesel in jet fuel (10 to 100 ppm range) as part of this project.	
Work almost done. Good list of next steps	None identified.
<b>Response:</b> This project provides partial funding for the Florida USPS study, prepared by NREL. According to NREL, they are waiting for the final engine tear-down, expected last year. This last information is important in understanding the overall impact of the engine-oil analysis. When NREL completes its work, it is NBB's intention to release the findings publically.	
Important to publish results from what they learned from USPS.	None identified.
<b>Response:</b> Agreed. NBB is waiting for NREL to publish the results. NREL has submitted a draft to SAE for fall distribution is approved.	
None identified.	None identified.
<b>Response:</b> None identified	
While the project is nearly completed, the group did not address what is needed to be done in the future, outside of this project.	Not addressed next steps.
<b>Response:</b> As stated in our slide presentation under future work, NBB has two more pipeline	

runs to complete under this grant and the promotion of the USPS engine and oil analysis results. On slide 18, NBB encourages DOE to continue to fund terminal and infrastructure development. There are now 70 terminals distributing biodiesel out of 1500 nationwide. In order to significantly improve biodiesel distribution, there needs to be several hundred terminals strategically placed across the nation. Also, these terminals and their distributors need to be trained in how to maintain fuel quality. Although this education was part of this grant, the need to continue to reach out to new distributors or terminal operators is still needed as this industry anticipates rapid growth over the next two year.

NBB also mentioned the need to support biodiesel UL approval, as it has done with E85 standards. This work could require several hundred thousand dollars to establish the test protocols. This work has been done through DOE labs (NREL and ORNL). California through a waiver now allows biodiesel to be stored under ground so long as the storage and dispensing equipment undergoes UL certification. This further emphasizes the need for UL and other certification protocols and test procedures.

As stated above, NBB needs to work with JIG to continue testing trace amounts of biodiesel in jet fuel to gain acceptance on the pipeline. Engine testing is costly and expected to require several million dollars to complete this effort. The industry is looking to DOE and FAA, as partners, to help shoulder these costs. The details of the future work will be reported in NBB's quarterly reports to DOE and its final report in greater detail as this research is still under development.

#### 6) *Technology Transfer & Collaborations*

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

Comments	Responses
<p>Good interactions with pipeline companies. Would like to understand what steps need to be taken to allow pipeline approval of shipments.</p>	<p><b>Response:</b> This was explained above. In brief, the Pipeliner Group and NBB have developed a list of 30 research questions that need to be answers. This list will be provided to DOE in the next quarterly report. NBB can also share it with the reviewers if given an option to attach documents. The PBSC research questions will be used to develop the "next steps" and guide NBB on how it will work with the industry to answers them before biodiesel will be accepted by this industry for wide-scale use.</p>
<p>Need to scan all the reports and workshop contents to ensure all the information is on the public side of the website.</p>	<p><b>Response:</b> NBB is will place an executive summary about the first pipeline run on its website. Currently only a press release is available. In addition, the lubricity report</p>

	<p>is complete and available. The BQ-9000 Guidance documents were on the BQ-9000 website. However, they have undergone a revision since DOE's involvement. NREL has submitted a paper to SAE on its USPS Oil Analysis. This paper, if approved, will be released in the fall. The Pipeliner Biodiesel Steering Committee report outlining their questions is available to DOE. It has not ready for the public domain at this time. The UL announcement about accepting B5 in any diesel equipment is a result of efforts from this project. That announcement is on NBB's website. NBB will add a few BQ-9000 fuel quality presentations to the public side of its website. Also the fuel quality sampling data from Minnesota is available on the MN Biodiesel Council's website. And finally, the International Association of Fire Chiefs completed a first responder training curriculum with profits from the BQ-9000 workshops. This curriculum has been sent to DOE. NBB will ask that it be added to IAFC's website and linked to NBB's site. And future papers as a result of the pending pipeline runs will also be sent to DOE and added to NBB's website.</p>
<p>Great that they got Colonial and Buckeye pipeline to participate. If any technical issues are overcome, does the pipeline capacity and infrastructure exist to move large quantities of biodiesel?</p>	<p><b>Response:</b> There are holding tanks that can load it on to the pipelines. However, there is still a greater need for dedicated tanks at terminals to store the delivered biodiesel. This will require substantial investments by the petroleum industry. Industry grants from DOE would certainly move the industry forward more quickly.</p>
<p><b>Comments:</b> None provided.</p>	<p><b>Response:</b> No response provided</p>
<p>The Pipeliner association was a great success in bringing key stakeholders together and creating a technical and economic debate in the industry. The BQ-9000 workshop was well received and brought important information to hundreds of key stakeholders. The fuel quality testing was necessary and well received. The</p>	<p><b>Response:</b> No response provided</p>

USPS report will also be very important information on the future success of the industry.

7) *Recommendations for Additions and Deletions to Project Scope*

Comments	Responses
<b>Comments:</b> None provided.	<b>Response:</b> No response provided.
The aviation industry biodiesel acceptance needs a focused effort with DOD cooperation. This is an item for a new project.	<b>Response:</b> Agreed.
The project is already substantially completed. Not sure it is worth pursuing further. If there are continuing pipeline issues those should be the focus of individual projects. USPS study could be more focused on results from fleet trucks which seem like a separate issue.	<b>Response:</b> As stated under approach, the USPS oil analysis was not part of the initial project. Nevertheless, it is valuable piece of information.
<b>Comments:</b> None provided	<b>Response:</b> No response provided.
Publically available ASTM workshop presentations, blending terminal report-- technical and economic; public pipeliner report, lubricity report, fuel quality report; USPS report, finish pipeline B5 testing.	<b>Response:</b> Responded to this in section above.

**Attachment One: Project Review Form**

# Project Evaluation Form

Session:

Reviewer Name:

\_\_\_\_\_

Title of Project:

\_\_\_\_\_

Presenter Name:

\_\_\_\_\_

Reviewer Self Assessment of Subject Knowledge (Circle One): **None** **Novice** **Intermediate** **Expert**

1. Project Stage of Development as Identified by PI \_\_\_\_\_

2. Project Stage of Development as Recommended by Reviewer \_\_\_\_\_

**3. Relevance** to overall Program objectives and market need.

The degree to which the project continues to be relevant to the goals and objectives of the Biomass Program Multi-Year Program Plan. Market application of the expected project outputs have been considered.

Project Relevance to OBP Objectives and Market		
<p><b>5-Excellent.</b> The project is critical to and fully supports Multi-Year Program Plan objectives. The project is critical to and fully supports the needs of target customer(s) and market(s); customers and markets are fully identified.</p>		<p>Specific Comments:</p>
<p><b>4-Good.</b> Most aspects of the project align with the plan objectives. Most aspects of the project align with the needs of customers and markets; customers/markets are identified and important.</p>		
<p><b>3- Satisfactory.</b> Many aspects of the project align with plan objectives. Many aspects of the project align with the needs of customers and markets; customers/markets are identified.</p>		

<p><b>2-Fair.</b> The project partially supports the plan objectives. The project partially supports the needs of customers and markets identified.</p>		
<p><b>1-Poor.</b> The project provides little support to the plan objectives. The project does not meet the needs of customers and markets; customers/markets not identified.</p>		

**4. Approach** to performing the Research, Development and Demonstration (RD&D).

The degree to which the project uses a sound, well-designed RD&D approach and clear project management plan, which incorporates well-defined milestones for monitoring the progress of the project and methods for addressing potential risks.

<p><b>5-Excellent.</b> The project has a sound, well-designed approach and has developed and implemented effective project management practices. Difficult for the approach to be improved significantly.</p>		<p>Specific Comments:</p>
<p><b>4-Good.</b> The approach is generally well thought out and effective but could be improved in a few areas. The project has developed adequate milestones and potential risks have been identified but management approaches may not be fully developed.</p>		
<p><b>3-Satisfactory.</b> The approach is satisfactory to meet project objectives and some milestones are developed. Improvements in approach would improve project quality.</p>		
<p><b>2-Fair.</b> Some aspects of the project may lead to progress, but the approach has significant weaknesses.</p>		
<p><b>1-Poor.</b> The approach is not responsive to project objectives and unlikely to make significant contributions progress.</p>		

**5. Technical Progress and Accomplishments**

The degree to which the project has made progress in its stated objectives, achieving milestones as planned and contributing to OBP goals and objectives as outlined in the OBP MYPP and overcoming technical barriers outlined in the MYPP.

<p><b>5-Excellent.</b> The project has made excellent progress towards project objectives, OBP goals and objectives and overcoming one or more key technical barriers. Progress to date suggests that the barrier(s) will be overcome.</p>		<p>Specific Comments:</p>
<p><b>4-Good.</b> The project has shown significant progress toward project objectives, OBP goals and objectives and to overcoming one or more technical barriers.</p>		
<p><b>3-Satisfactory.</b> The project has shown satisfactory progress toward project objectives, OBP goals and objectives and contributes to overcoming technical barriers.</p>		
<p><b>2-Fair.</b> The project has shown modest progress towards stated project goals and OBP objectives and may contribute to overcoming technical barriers.</p>		
<p><b>1-Poor.</b> The project has demonstrated little or no progress towards stated project goals, or OBP objectives and technical barriers.</p>		

**6. Critical Success Factors and Showstoppers**

The degree to which the project has identified critical success factors (technical, business, and market factors) which will impact technical and commercial viability of the project; and the degree to which the project has identified potential show stoppers (technical, market, regulatory, legal) which will impact technical and commercial viability.

<p><b>5-Excellent.</b> A comprehensive list of critical success factors and showstoppers are identified and strong strategies to overcome possible showstoppers are identified.</p>		<p>Specific Comments:</p>
<p><b>4-Good.</b> Key critical success factors and showstoppers are identified and there are clear strategies developed to overcome showstoppers.</p>		
<p><b>3-Satisfactory.</b> Many critical success factors and showstoppers are identified and strategies to overcome showstoppers have been proposed.</p>		
<p><b>2-Fair.</b> Some critical success factors and showstoppers are identified. Strategies to overcome showstoppers are not well developed.</p>		
<p><b>1-Poor.</b> Little to no identification of critical success factors or showstoppers. Little to no recognition of relative importance or prioritization of activities.</p>		

**7. Proposed Future Research** approach and relevance (as defined in the project).

The degree to which the project has effectively planned its future, considered contingencies, understands resource or schedule requirements, built in optional paths or off ramps, or identified other opportunities to build upon current research to further meet OBP goals and objectives.

<p><b>5-Excellent.</b> The future work plan clearly builds on past progress and is sharply focused to address one or more key technical barriers in the OBP MYPP in a timely manner.</p>		<p>Specific Comments:</p>
<p><b>4-Good.</b> Future work plans build on past progress and generally address removing or diminishing OBP MYPP barriers in a reasonable period.</p>		
<p><b>3-Satisfactory.</b> Future work plans are loosely built on past progress and could address OBP MYPP barriers in a reasonable period.</p>		
<p><b>2-Fair.</b> The future work plan may lead to improvements, but should be better focused on removing/diminishing key OBP MYPP barriers in a reasonable timeframe.</p>		
<p><b>1-Poor.</b> Future work plans have little relevance or benefit toward eliminating OBP MYPP barriers or advancing the program.</p>		

**8. Technology Transfer/Collaborations**

Does the project adequately interact, interface, or coordinate with other institutions and projects, providing additional benefits to the Program? Have Project Performers Presented or Published on the Progress or Results of the Project?

**9. Recommendations for Additions/Deletions to Project Scope**

**Attachment Two: Platform Review Form**

## Platform Review Form

**Reviewer Name:** \_\_\_\_\_

**Platform:** \_\_\_\_\_

**Reviewer Self Assessment of Subject Knowledge (Circle One):** None   Novice   Intermediate   Expert

1) Are platform goals, technical targets and barriers clearly articulated? Are platform goals realistic and logical? Do the platform goals and planned activities support the goals and objectives of the Biomass Program as outlined in the MYPP? How could the platform change to better support the Biomass Program's goals?

Platform Goals		
<b>5-Excellent.</b> The platform goals are critical and fully support achieving OBP goals. The platform goals are clear, realistic and logical.		Specific Comments:
<b>4-Good.</b> The platform goals are important and support achieving almost all OBP goals. The platform goals are clear and logical.		
<b>3-Satisfactory.</b> The platform goals support achieving the majority of OBP goals. The platform goals are defined, but could be improved.		
<b>2-Fair.</b> The platform goals support achieving some OBP goals. The platform goals need better definition.		
<b>1-Poor.</b> The platform goals support achieving few OBP goals. The platform goals are not well defined.		

2) How well does the platform approach (platform milestones and organization, RD&D portfolio, strategic direction) facilitate reaching the Program Performance Goals for each platform as outlined in the MYPP? What changes would increase the effectiveness of the Platform?

Platform Approach		
<b>5-Excellent.</b> The quality of this platform approach is exceptional and fully supports achieving Program Performance Goals.		Specific Comments:
<b>4-Good.</b> The quality of this platform approach is above average and supports achieving almost all Program Performance Goals		
<b>3-Satisfactory.</b> The quality of this platform approach is sufficient to support achieving the majority of Program Performance Goals		
<b>2-Fair.</b> The quality of this platform approach supports achieving some Program Performance Goals		
<b>1-Poor.</b> The quality of this platform approach supports achieving few Program Performance Goals		

3) The degree to which the Platform RD&D is focused and balanced to achieve Biomass Program and Platform goals? (WBS, unit operations, pathway prioritization)

Platform R&D Portfolio		
<b>5-Excellent.</b> The platform R&D is focused and balanced and fully supports achieving OBP and Platform goals.		Specific Comments:
<b>4-Good.</b> The platform R&D is focused and balanced and supports achieving almost all OBP and Platform goals.		
<b>3-Satisfactory.</b> The platform R&D is balanced and supports achieving the majority of OBP and Platform goals.		
<b>2-Fair.</b> The platform R&D supports achieving some OBP and Platform goals.		
<b>1-Poor.</b> The platform R&D supports achieving few OBP and Platform goals.		

4) Based on the presentations given, how well is the platform progressing towards achieving Biomass Program and Platform goals? Are we meeting our performance targets? Is it on track to meet the goals presented? Please provide recommendations on improvements for tracking progress in the future.

Platform Progress		
<b>5-Excellent.</b> The platform is making exceptional progress towards achieving OBP and Platform goals.		Specific Comments:
<b>4-Good.</b> The platform is making above average progress towards achieving almost all OBP and platform goals.		
<b>3-Satisfactory.</b> The platform is making sufficient progress towards achieving the majority of OBP and platform goals.		
<b>2-Fair.</b> The platform is making progress towards achieving some OBP and platform goals.		
<b>1-Poor.</b> The platform is making little progress towards achieving OBP and platform goals.		

5) Please note any specific platform strengths.

6) Please note any specific platform weaknesses.

7) Are there any gaps in the Platform RD&D Portfolio? Do you agree with the RD&D gaps presented by the Platform Manager?

8) Additional Recommendations, Comments and Observations

# Attachment Three: Infrastructure Platform Review Agenda

**Office of the Biomass Program  
Infrastructure Platform Peer Review  
March 19, 2009**

7:15 - 8:15 AM Continental Breakfast					
8:15 - 8:45 AM			Welcome and Platform Overview	Office of the Biomass Program	Alicia Lindauer-Thompson
8:45 - 8:55 AM			Process Overview	Office of the Biomass Program	Leslie Pezzullo
	Presentation /Q&A	WBS #	Project Title	Performing Organization	Presenter/Recipient
Education, Outreach and Planning					
8:55 - 9:00 AM			Session Overview	Golden Field Office	Roxanne Dempsey
9:00 - 9:30 AM	20/10	1.1.1.5	Bioenergy Knowledge Discovery Framework	Oak Ridge National Laboratory	Budhendra Bhaduri
9:30 - 10:00 AM	20/10	5.8.3.1	Freedom Prize	Public Health Foundation Enterprises, Inc	Karen Hanson
10:00 - 10:30 AM	20/10	7.6.2.2	New Uses Information and Entrepreneur Development	Growth Dimensions, Inc.	Mark Williams
30 Minute Break					
Biofuel End Use					
11:00 - 11:05 AM			Session Overview	Golden Field Office	Roxanne Dempsey
11:05 - 12:20 PM	60/15		Intermediate Ethanol Blends Testing	Oak Ridge National Laboratory	Brian West
				National Renewable Energy Laboratory	Steve Przesmitzki
Lunch *					

<i>1:20 – 1:50 PM</i>	<i>20/10</i>	7.8.1.7	National Biofuels Energy Laboratory	Next Energy	Chuck Moeser
<i>1:50 – 2:20 PM</i>	<i>20/10</i>	7.8.1.11	Appalachian State University Biofuels and Biomass Research Initiative	Appalachian State University	Jeff Ramsdell
<i>2:20 – 2:50 PM</i>	<i>20/10</i>	7.8.1.9	Messiah College Biodiesel Fuel Generation Project	Messiah College	Michael Zummo
<b>25 Minute Break</b>					
<b>Biofuel Distribution</b>					
3:15 – 3:20 PM			Session Overview	Golden Field Office	Roxanne Dempsey
3:20 – 3:50 PM	<i>20/10</i>	5.10.1.3	Pipeline Feasibility Study – EISA Section 243	Deloitte Consulting	Rebecca Ranich
3:50 – 4:20 PM	<i>20/10</i>	7.8.1.6	Missouri Biodiesel Demonstration Project	National Biodiesel Board	Jill Hamilton
4:20– 4:30 PM	Conclude and Adjourn				Alicia Lindauer-Thompson, Office of the Biomass Program
<b>4:30 – 6:30 PM</b>	<b>Reviewer Collaboration/Report Out Session</b>				<b>Closed Session</b>

\* Lunch will not be provided for this meeting. A list of local eateries will be included in your registration materials.

**Attachment Four: Infrastructure Platform Review Attendees**

## Infrastructure Platform Review Attendees

First Name	Last Name	Organization
Budhendra	Bhaduri	Oak Ridge National Laboratory
Peter	Bluford	Consultant to the Life Science Industry
Christopher	Bordeaux	Bordeaux International Energy Consulting, LLC.
Thomas	Burns	U.S. Department of State
Chris	Cassidy	USDA
Eric	Connor	TRI
John	Cowie	Agenda 2020 Technology Alliance - AF&PA
Anthony	Crooks	USDA Rural Development
Donal F.	Day	LSU AgCenter, Audubon Sugar Institute
Roxanne	Dempsey	U.S. DOE
Jill	Fisher	BCS, Incorporated
Thomas	Foust	National Renewable Energy Laboratory
Nicholas	Frasier	Navarro Engineering and Research Inc.
Diane	Graziano	Argonne National Laboratory
Molly	Hames	Navarro Research and Engineering
Jill	Hamilton	National Biodiesel Board
Karen	Hanson	Freedom Prize Foundation
Albert	Hochhauser	Consultant
John	Houghton	U.S. DOE, Office of Science
Alexander	Kasuya	Deloitte Consulting
Jay	Keller	Sandia National Laboratories
Ellyn	Kerr	Industrial Biotechnology / Mary Ann Liebert
George	Kervitsky	BCS, Incorporated
Courtney	Kirk	BCS, Incorporated
Michael	Knotek	Knotek Scientific Consulting
David	Lax	API
Alicia	Lindauer-Thompson	U.S. DOE
Mark	Maher	General Motors
Michael	Manella	Archer Daniels Midland Company
Liz	Marshall	World Resource Institute
Babu	Metgud	Innovation Technology Enterprise Development Center
Jeffrey	Miano	Syngenta
Amy	Miranda	BioEnergy International LLC
Chuck	Moser	Next Energy
Steven	Peterson	Oak Ridge National Laboratory
Leslie	Pezzullo	U.S. DOE, Office of the Biomass Program
Jeff	Ramsdell	

Rebecca	Ranich	Deloitte Consulting
Neil	Rossmeyssl	U.S. DOE, Office of the Biomass Program
Debbie	Sandor	National Renewable Energy Laboratory
Dr. Moinuddin	Sarker	Natural State Research, Inc.
Bhima	Sastri	U.S. DOE
John	Schmitter	KEP LLC
Susan	Schoenung	Longitude 122 West, Inc.
Amy	Schwab	National Renewable Energy Laboratory
David	Sjoding	WSU Extension Energy Program
Glenn	Sonntag	U.S. DOE, Office of the Biomass Program
Jake	Stewart	Austin Energy/ City of Austin
Melati	Tessier	LSU AgCenter, Audubon Sugar Institute
K. Shaine	Tyson	Rocky Mountain Biodiesel Consulting, LLC
Brian	West	Oak Ridge National Laboratory
Candace	Wheeler	General Motors
Mark	Williams	
Robert	Wimmer	Toyota
Carl	Wolf	BCS, Incorporated
May	Wu	Argonne National Laboratory
Joyce	Yang	U.S. DOE, Office of the Biomass Program
Norb	Ziemer	Northern Illinois University
Michael	Zummo	Messiah College

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U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

DECEMBER 2009

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