



## DISTRIBUTION INFRASTRUCTURE AND END USE

### **2011 Platform Review Report**

An Independent Evaluation of Platform  
Activities for FY 2010 and FY 2011

**Review Date**

February 3, 2011







## Department of Energy

Washington, D.C. 20585

Dear Colleague:

This document summarizes the recommendations and evaluations provided by an independent external panel of experts at the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Biomass Program's Infrastructure Platform Review meeting, held on February 3, 2011, in Washington, D.C.

All programs in the Department of Energy's Office of Energy Efficiency and Renewable Energy are required to conduct a formal peer review of their project portfolios as a means for enhancing the management, relevance, effectiveness, and productivity of the activities. This report documents the process utilized by the Biomass Program in conducting its fiscal year 2011 Peer Review, the resulting opinions and recommendation from the Review Panel who was tasked with evaluating the Infrastructure Platform, and the Program's response to the results and recommendations. Additional information on the 2011 Biomass Program Peer Review Process—including all presentations and a full compilation of reviewer comments for each of the individual platform review meetings and Program Review meeting—are available on the Program Review website at <http://obpreview2011.govtools.us>.

The Biomass Program peer review process involves a systematic review of the project portfolios of eight separate technology platforms managed by the Program and a separate meeting where the entire Program was comprehensively reviewed. The Biomass Platform Reviews were conducted from February through April 2011 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 June 2011, was conducted to evaluate the Program's overall strategic planning, management approach, priorities across research areas, and resource allocation.

The recommendations and evaluations provided by the expert Peer Review Panels 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 considered in combination with other critical project information to result in a complete systematic evaluation of the progress and accomplishments achieved by the individual projects, the platforms, and the Program toward programmatic milestones, project goals, and objectives.

I would like to express my sincere appreciation to the reviewers. They make this report possible, and we rely on their comments to help make project and programmatic decisions for the new fiscal year. Thank you for participating in the 2011 Infrastructure Platform Peer Review meeting.

Alicia Lindauer

Technology Manager

Office of Energy Efficiency and Renewable Energy

U.S. Department of Energy

## EXECUTIVE SUMMARY

### Summary from Review Panel

The Infrastructure Peer Review consisted of a review of 10 projects focused on the research, development, and deployment of biofuels infrastructure. Overall, the Review Panel found that the Platform is performing well—better in some areas than others—as described below.

The research on intermediate ethanol blends (I-blends) was rated highest by the Panel, as these projects exhibited greater technical design and execution performance and were more focused on the goals than some of the other projects. Most of the research presented at the review was devoted to ethanol and ethanol-gasoline blends. This is appropriate as some of the most pressing data needs concern ethanol compatibility issues. The Program has done a lot of good work in a short time generating data needed for consideration of the E15 waiver request.

The Platform has achieved a number of important technical goals. It has developed important information about the compatibility of I-blends in vehicles and dispensing equipment. This information will allow the relevant agencies to decide on the suitability of these blends and under what conditions they may be used. The Platform has also developed the BioEnergy Atlas, an important tool to help plan for infrastructure investments that will make efficient use of federal and private capital. The U.S. Department of Energy (DOE) should provide support to keep this tool and its associated database up to date.

University and/or fundamental research has a useful place in the Biomass Program. However, the projects funded this year don't seem to fit into the overall Program goals and roadmap. Close coordination with other parts of the overall Biomass Program is important to ensure that the important issues are being addressed.

Key Recommendations include:

#### *Platform Approach*

- The Infrastructure Platform should support efforts to enable decisions on widespread approvals for higher concentrations of ethanol; carry out timely research on the use of non-ethanol biofuels in current end-use equipment; develop technology and procedures necessary to meet the goals of increasing biofuels use.
- The Program should adopt some clear programmatic performance measures. This was done well for the intermediate ethanol blends (I-blends) projects, but should be incorporated into other projects. These should include the tech transfer and dissemination activities that seem to be missing from some of the other projects.
- Fuels with the largest volumetric potential and the most serious technical end-use issues should receive the most attention and funding.
- The project portfolio has been heavily weighted toward ethanol and needs to move toward other biofuels.
- The major goals of the Program's Multi-Year Program Plan (MYPP) should be addressed more directly. Additional work is needed to lower distribution costs—a key goal identified in the MYPP. DOE should make budget funds available to address key goals and other issues.

### *Platform Management*

- DOE should consider smaller grants to more laboratories, rather than large grants to a few institutions.
- DOE management should work with the principal investigators to maximize return from the congressionally directed programs.
- DOE should define responsibility for solving key infrastructure-related problems and address appropriate barriers with stakeholders.

### *Current Projects*

- The portion of the Program that co-funds construction of E85 service stations/dispensers should be augmented. Projects should have volume targets and facilities built where these targets can be met.
- DOE should provide additional support to keep the BioEnergy Atlas and its associated database up to date.
- For many of the projects, there is no clear connection between the work being done and how the results will further the goals of the Program. Each project should have a clear roadmap for how the efforts will lead to the widespread use of biofuels.

### *Future Work*

- DOE should work with other stakeholders to help investors write a business plan for E85 stations, including economic analyses, design and construction assistance, station siting tools, and promotion strategies (“best practices”).
- DOE should conduct additional detailed compositional studies of renewable hydrocarbon biofuels and assess their potential for product quality issues.
- DOE should conduct product quality and fit-for-use tests on cellulosic ethanol and high concentrations of biodiesel.
- If existing data is not adequate, a test program should be planned and carried out to evaluate the compatibility of higher molecular weight alcohols (butanol, mixed alcohols) with existing vehicles and infrastructure.
- Define the specific infrastructure changes and investments required to accommodate projected future volumes of biofuels.
- DOE should work with industry and the U.S. Environmental Protection Agency (EPA) to help streamline fuel additive registration and bring new green gasoline and diesel fuels into the infrastructure.

### Summary of Results: Platform

Criteria	Average	Range	Standard Deviation
1. Relevance	8.4	7-10	1.02
2. Approach	7.4	7-8	0.49
3. Progress	8.0	6-10	1.26

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

### Summary of Results: Project Portfolio

WBS Number	Project Title; Presenting Organization; PI Name	Final Average Score	Next Steps			Technology Manager Summary Comments
			Continue Project	Continue with Possible Adjustments to Scope	Other	
5.10.1.1/2 & 8.5.10.1/2	Intermediate Blends Testing – Overview and Vehicles Testing; Oak Ridge National Laboratory; Brian West	8.7	X	-	-	This is a joint project funded by the Biomass and Vehicle Technologies programs. The testing has been completed; however, the analysis and reports are pending. The final reports will be posted on the Biomass Program website no later than 9/30/12.
5.10.1.2	Intermediate Blends Testing – Performance Testing; National Renewable Energy Laboratory; Kristi Moriarty	8.7	-	-	X	This project is complete.
6.3.1.8	BioEnergy Atlas; National Renewable Energy Laboratory; Kristi Moriarty	8.7	X	-	-	This Web-based tool will continue to be made available to the public for analysis and planning purposes through FY 2012.

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WBS Number	Project Title; Presenting Organization; PI Name	Final Average Score	Next Steps			Technology Manager Summary Comments
			Continue Project	Continue with Possible Adjustments to Scope	Other	
5.10.1.10 /11/12	Protec Fuel E85 Infrastructure Projects; Protec Fuel; Steve Walk	8.3	X	-	-	This four-year <i>American Recovery and Reinvestment Act</i> of 2009 (ARRA) project will continue until its expected completion date of February 2014.
5.10.1.1	Intermediate Blends Testing - Infrastructure Components Testing; Oak Ridge National Laboratory; Timothy Theiss	8.2	-	X	-	This is a joint project funded by the Biomass and Vehicle Technologies programs. Testing of Fuel C and CE25a showed specimens were highly sensitive to aggressive ethanol. Therefore, tests will also be conducted on E10 (CE10a) in fiscal year (FY) 2012.
5.10.1.9	Missouri Ethanol Blends Infrastructure Project; Missouri Corn Merchandising Council; Bradley Schad	6.8	X	-	-	This four-year ARRA project will continue until its expected completion date of February 2014.
7.7.2.10	Center for Clean Fuels and Power Generation; University of Houston; Michael Harold	6.6	-	-	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.
5.10.1.5	Michigan E85 Infrastructure Project; Clean Energy Coalition; Matt Sandstrom	6.5	-	-	X	This four-year ARRA project will continue until its expected completion date of February 2014.

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## EXECUTIVE SUMMARY

WBS Number	Project Title; Presenting Organization; PI Name	Final Average Score	Next Steps			Technology Manager Summary Comments
			Continue Project	Continue with Possible Adjustments to Scope	Other	
6.2.1.4.H	Fungibility and Compatibility of Advanced Biofuels; Oak Ridge National Laboratory; Bruce Bunting	6.0	-	X	-	The project scope has been modified in response to the results of the Peer Review and is expected to be finalized by 9/30/12.
7.8.1.17	Kansas Biofuels Certification Laboratory; University of Kansas; Susan Stagg-Williams	5.4	-	-	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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## INTRODUCTION

On February 3, 2011, the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Biomass Program held a Peer Review of its Distribution Infrastructure and End Use (Infrastructure) Platform. The Platform Review was part of the overall 2011 Program Peer Review implemented by the Biomass Program. The peer review is a biennial requirement for all EERE programs to ensure the following:

*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, multi-year program plans, and potentially in the redirection of individual projects.

Alicia Lindauer was designated by the Biomass Program as the lead for the Infrastructure Platform. In this capacity, she was responsible for all aspects of planning and implementation, including coordinating the Review Panel, coordinating with principal investigators (PIs), and overall planning for the Platform Review. She was assisted in this effort with resources from a Peer Review implementation team comprised logistics and Peer Review implementation contractors and DOE staff from the Golden Office.

Approximately 25 people attended the Infrastructure Platform Review meeting. An agenda for the meeting is provided in Attachment 1. A list of attendees is provided in Attachment 2. Presentations given during each of the Platform Review meetings, as well as other background information, are posted on the Peer Review website: <http://obpreview2011.govtools.us>.

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

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 developed following the June Program Review meeting. The Program Review Report may also include additional comments related to this Platform.

## Biomass Program Peer Review Process

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 1.

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 comprising staff from the Biomass Program, DOE Golden Office, National Renewable Energy Laboratory Systems Integration, and contractor support. The planning team held weekly planning meetings beginning in September 2010 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. The planning activities included input from the following committees:

- 1. Biomass Program Internal Peer Review Committee** – To ensure the quality of the process, exchange information efficiently, and communicate meeting and activity specifics throughout the review process. All of the Platform Leads were invited to participate in weekly conference calls involving contractors and the DOE Program Review Lead.
- 2. Biomass Program Peer Review Steering Committee** – Following EERE Peer Review guidance, a Steering Committee was formed to help ensure an independent and transparent expert review of the Biomass Program’s research, development, and deployment (RDD&D) portfolio. They serve as a working partner with the Biomass Program and are involved throughout the planning and implementation of the review process, providing comments and direction to ensure the Program receives and publishes calibrated, independent, and transparent project portfolio feedback. The specific activities performed by the Steering Committee are to
  - Review and comment on evaluation forms and presentation templates
  - Review and comment on overall implementation process
  - Review and comment on candidate review panelists for each platform
  - Review the summary results of the Platform Reviews and reviewer comments
  - Be present at the overall Program Peer Review, participate as Program Peer Reviewer and complete required review forms for the Program Peer Review. This includes reviewing the Biomass Program structure, Program management decision-making processes, selection process and portfolio balance, and progress toward achieving Program mission and goals.

## INTRODUCTION

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Twenty individuals were nominated to be considered for the Steering Committee, with a target of selecting seven members. In the end, only six Steering Committee members were selected to be on the Committee. Decision criteria included the following:

- Absence of any conflict of interest (COI) as demonstrated by receipt of a signed COI form
- Balanced representation of the diversity of expertise required to support the review process, such as expertise in finance, conversion technology, environmental sciences, or integrated biorefineries
- Balanced representation by type of organization, including research institution, private sector, government, and non-governmental organization.

Final selection was made by the Biomass Peer Review Planning Team and Team Leader. A list of Steering Committee members is provided in Attachment 3. The Steering Committee met through biweekly conference calls that began in September/October 2010. Committee recommendations were provided to the Platform Review planning teams as they were made throughout the planning process.

## Exhibit 1 | Basic Steps in Implementing the Biomass Program Peer Review

1. The Program's research, development, and demonstration (RD&D) and analysis project portfolio was organized by the eight 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 PIs, and overall planning for the Platform Review. Each Platform Lead was assigned contract support resources to assist in the implementation of the associated activities.
3. Each platform identified specific projects for review from its portfolio. Target: Review at least 80% of the Platform's total budget.
4. An internal Peer Review committee (IPRC) comprised of leads of each of the eight platforms, the DOE Program Review Lead, and the Peer Review Implementation team was formed to enhance communications, discuss relevant issues and concerns, and ensure the quality of the process. Meetings of the IPRC were held weekly.
5. 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. Meetings with Steering Committee members were held every two weeks.
6. Draft Project-level, Platform-level, and Program-level evaluation forms were developed for the 2011 Platform Review meetings. Similarly, draft presentation and project abstract templates 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 Steering Committee reviewed and modified the forms before they were finalized.
7. 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. The Committee provided yes/no recommendations on candidates, and they recommended other candidates for the platforms to consider. Results were provided to Platform Leads for consideration in the final selection of Review Panels.
8. Upon confirmation, each Review Panel member was contacted by the Golden Office and registered as an individual contractor for the purpose of the Peer Review Process. The Golden Office also communicated important information on their responsibilities, reimbursement procedures, and issues regarding COIs to the reviewers. Each reviewer received COI forms prior to the review meeting; forms were also collected prior to the meeting. A minimum of two conference calls were held for each Platform Review Panel, as well as Peer Review organizers, Golden Office and reviewers to verbally discuss background information on the review, instructions, evaluation forms, presentation templates, and other information pertaining to the Platform Review process. Project lists, abstracts, and presentations were provided to each reviewer in advance of the review meeting via a secure meeting website. To the extent possible, representatives from the Steering Committee participated in those calls.
9. The Biomass Program performed outreach to encourage participation in each of its Platform Review meetings by sending announcements to more than 3,000 Program stakeholders, PIs, and attendees at previous Program events. The Program Reviews were also announced on the Biomass Program website.
10. Platforms invited PIs to present their project(s) at the Platform Review. PIs were provided with presentation templates and instructions, reviewer evaluation forms, and background information on the review process. Conference calls were held with PIs to address questions. PIs who chose not to present received requests to submit forms stating such.
11. Platform Review meetings were held according to guidelines developed by the Steering Committee, IPRC, and the Peer Review Implementation team. Members of the Steering Committee participated in each review to ensure consistency and adherence to guidelines.
12. Review Panel evaluations were collected during each Platform Review meeting using an automated Web-based tool. These evaluations were accessible via a password-protected website following each review, and review panelists had approximately 10 working days to edit and finalize their comments. PIs then had approximately 10 working days to access the review results using the same password-protected website. PIs were also given the opportunity to respond to Review Panel evaluations via the same tool, and all comments are made publically available with the issuing of the final Platform Report.
13. 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.

### Biomass Program Peer Review Meetings

The Biomass Program organizes its research and analysis activities into technology platform areas, and for the purposes of the Peer Review process, the individual Platform Review meetings are held separately, after which information is processed and Platform Review comments and scoring outputs are generated; this compiled information provides a foundation from which the entire Biomass Program is reviewed. The 2011 Biomass Program Peer Review process reviewed eight platforms in three distinct series of meetings held from February through April of 2011. The Peer Review schedule was as follows:

Series 1 Peer Review Meetings, held February 1–3, 2011:

- Integrated Biorefinery
- Infrastructure

Series 2 Peer Review Meetings, held February 14–18, 2011:

- Biochemical Conversion
- Thermochemical Conversion

Series 3 Peer Review Meetings, held April 4–8, 2011:

- Analysis
- Sustainability
- Feedstock
- Algae.

The eight Platform Review meetings focused on the technical project-level reviews of the research projects funded in each of the eight Biomass technology platform areas. The overall structure and direction of the Platform was also reviewed. A separate Review Panel and a designated lead reviewer were selected 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 June 27–28, 2011. This allowed sufficient time to complete and verify the gathering of reviewer comments and to process comments and scoring outputs for use by the Program reviewers. At 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 the Platform Leads and lead reviewers as input. The Biomass Program Review Panel comprised six members of the Steering Committee and the lead reviewer from each of the eight Platform Review Panels.

## 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 RD&D or analysis projects, as well as the overall structure and direction of the Platform. Alicia Lindauer, the Biomass Program lead for the Distribution Infrastructure and End Use Platform, designated Dr. Albert Hochhauser—an independent consultant with technical expertise on fuels and fuel use—as the Lead Reviewer for the Peer Review Panel. Dr. Hochhauser 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 June.

In forming its Review Panel, the Infrastructure Platform evaluated 12 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 absence of COI as represented by receipt of their COI forms. An outside, objective Steering Committee, established to help ensure the independence and transparency of the overall Peer Review process, provided 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 2 lists Review Panel members for the Infrastructure Platform.

### Exhibit 2 | Infrastructure Review Panel

Name	Affiliation/Title	Highest Degree	Expertise
Albert M. Hochhauser*	Retired, formerly Exxon Mobile	Ph.D.	Chemical Engineering
Todd Potas	Natural Resources Group, LLC	M.E.	Chemical Engineering
George Parks	Imago Energy Consultancy	Ph.D.	Physical Chemistry
Pam Serino	Department of Defense, Office for the Defense Logistics Agency Energy	Ph.D.	Logistics
Manoj Jha	ATRC, Inc.	Ph.D.	Civil Engineering
Jason Bittner	University of Wisconsin	M.S.	Infrastructure Deployment

\* Denotes Lead Reviewer



### Organization of this Report

The remainder of this document provides the results of the Infrastructure Platform Review meeting, including the following:

- Results of Review Panel comments on the overall Infrastructure Platform
- The Biomass Program Infrastructure Platform Technology Manager responses to Review Panel comments and discussion of next steps for each project
- General results information processed from Review Panel comments on projects evaluated during the Platform Review
- Additional information, including the full compilation of Review Panel comments on projects evaluated during the Platform Review and PI responses to reviewer evaluations for their projects can be found in a compendium document.

## PLATFORM OVERVIEW AND EVALUATION

### Platform Overview

The Infrastructure Platform's strategic goal is to create the conditions whereby all biofuels can safely, cost-effectively, and sustainably reach their market and be used by consumers as a replacement for petroleum fuels. The Infrastructure Platform was the most recent addition to the Biomass Program, with intermediate ethanol blends testing and other Infrastructure activities first initiated in August 2007. Infrastructure Platform activities are focused on the final stages of the bioenergy supply chain, transporting biofuels and other products from the point of production at the biorefinery to retail station infrastructure and vehicle end use. Infrastructure activities related to feedstock processing and handling are located within the Feedstock Platform.

More information on the Infrastructure Platform, including the Platform Lead and Lead Reviewer Presentations, and the most recent versions of the Biomass Multi-Year Program Plan (MYPP) can be found in the compendium to this report.

## RESULTS

Reviewers evaluated the Infrastructure Platform and scored projects on a scale of 1–10 for each applicable criterion, and they provided written comments on approved criteria. The Platform was reviewed on five criteria: Relevance (1–10), Approach (1–10), Progress (1–10), Overall Impressions (no score), and Additional Recommendations, Comments, and Observations (no score). The individual projects funded by the Platform were evaluated on seven criteria: Project Approach (1-10), Technical Progress and Accomplishments, Project Relevance (1-10), Critical Success Factors (1-10), Benefits and expected outcomes (1-10), Technology Transfer and Collaborations: (no score), Overall Impressions (no score). The two tables that follow present the Summary of Platform results and comment, as well as the detailed Project Scoring Summary information from the review of the individual projects.

The detailed scoring includes the work breakdown structure number (WBS); project reference information; recipient information; average scores and associated standard deviation information for each criterion; total average project score; and information on the projects percentile rank. Overall, total average project scores in the Infrastructure Platform ranged between 8.7 and 5.4, with a mean of 7.3. The presentation of the percentile rank shows the percentage of scores in the frequency distribution that are score exactly the same or less than the referenced project.

### Results of Platform Evaluation

Criteria	Average Score*	Range	Standard Deviation
1. Relevance	8.4	7-10	1.02
2. Approach	7.4	7-8	0.49
3. Progress	8.0	6-10	1.26
4. Overall Impressions	n/a	n/a	n/a
5. Additional Recommendations, Comments, and Observations	n/a	n/a	n/a

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

## RESULTS

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### Relevance

#### Reviewer Comments

The Platform goals, targets, and barriers are well defined and consistent with the overall MYPP.

The idea to move forward with biofuels technology is definitely relevant for environmental and national security reasons.

The presenter clearly showed the relevance of the proposed work to the Platform goals.

The suite of activities seems to help meet the goal of increasing the volumes of biofuels. Overall I believe that the Program has been served adequately by the projects presented. However, there is room for improvement.

The Program has been reactive versus proactive in the Infrastructure category. The proactive areas of E85 work and the Atlas application tool development are good to very good to exceptional. The intermediate blends work was needed to respond to the waiver request and seemed to dwell and get bogged down by details that are very minor compared to the overall goals and objectives of the Program, which is to contribute to more biofuels in the marketplace. Safety concerns are valid concerning dispensers. But if the same failures could occur with E10 in the existing national infrastructure on the existing equipment as would occur with E15, then safety concerns should drive immediate equipment upgrades rather than saying E15 can't be done because of problems with breakaways, swivels, and nozzles.

All flex cars, better optimization, and promoting fuel blends from E10 to E85 have potential to get the country to 36 billion gallons by 2022. E10 is here and supplied by corn ethanol. The Program needs to support projects that will lead to higher levels than achieved to date.

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### Platform Response:

The Technology Manager appreciates and generally agrees with the reviewer comments concerning Infrastructure Platform goals and relevance to The Energy and Independence and Security Act (EISA) of 2007 and the Renewable Fuel Standard (RFS2). The RFS2 increased the volumetric requirements to 36 billion gallons of renewable fuel in vehicles by 2022.

Given that ethanol is the most widely available renewable fuel in the market today, it was recognized that a significant portion of the RFS2 targets could be achieved by increasing the ethanol content in gasoline

## Approach

### Reviewer Comments

The project portfolio has been heavily weighted toward ethanol, and needs to move toward other biofuels.

It is not clear how the specific projects will help achieve the goal to “reduce the biofuels delivery cost to be competitive with the delivery costs of gasoline and diesel fuels.”

The approach to look at new biofuel technologies is great, but it seems that DOE is still very focused on ethanol. For all the reasons discussed at the meeting, other second and third generation biofuels should be investigated. Ethanol is not fungible, has to have special hardware, and the cellulosic approach has not yet been achieved. We should be looking at the “low-hanging fruit” for drop-in fuels that can use current equipment and distribution systems. That would put us out the gate more quickly.

Based on what I understood from the presentation and subsequent review of the presentation file, the approach seems reasonable.

The projects overall seem to be adequate, but there remains some question about whether the selected activities, especially focused on algae, are truly making inroads in the area.

Program is highly relevant in working towards goals, targets and reducing barriers to increased use of biofuels. The response to the E15 waiver request has been thorough, if not overly so. Planning the testing with more input or review of the testing could have prevented some of the relevance questions that occurred. The Program is somewhat reactionary of late, as the majority of work in 2010 would likely not have occurred if the waiver request for E15 had not been submitted. Resolving the issues that were studied while considering the waiver request is important to getting more ethanol into the marketplace in any case, especially if advanced and cellulose technologies become commercially ready to contribute fuel to the market-place. Right now the blend wall is upon us, and if it remains in place, the economics will not be there for the new technology projects being developed and built in the Integrated Biorefineries Platform.

All flex cars, better optimization, and promoting fuel blends from E10 to E85 has potential to get the country to 36 billion gallons by 2022. E10 is here and is supplied by corn ethanol. The Program needs to support projects that will lead to higher levels than achieved to date.

### Platform Response:

The Technology Manager appreciates the reviewer comments concerning the Infrastructure Platform’s approach to meeting the volumetric biofuels targets outlined in the RFS2. The main focus of the Platform to date has been addressing the challenges around the distribution and end use of ethanol, the only biofuel currently available in the market in large volumes. As we are approaching the final phase of E15 testing, this completes the last deployment R&D activity for ethanol since other levels such as E10 and E85 have been commercial for many years. In addition, the Program has invested in Web-based tools, such as the BioEnergy Atlas and the Bioenergy Knowledge Discovery Framework (KDF), and the Alternative Fuels and Advanced Vehicles Data Center (AFDC) that provide easily accessible information on all commercially available biofuels and infrastructure. Biomass Program activities are moving toward the inclusion of advanced biofuels

## RESULTS

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### Progress

#### Reviewer Comments

Goals are defined very clearly and quantitatively, and all projects have defined which goals and barriers they are addressing. However, there is no tracking of progress towards these numeric goals. For instance, there is no information on what the distribution cost is today, how much it has been reduced, and what progress can be made to get it down to \$0.16 per gallon by 2017.

Criteria for measuring progress with a market such as biofuels are not well defined. To determine the biofuels of interest, DOE should look at technologies, set a roadmap to include implementation of these fuels, determine a path for specification and approval for use, a timeline for demo facilities, and then full implementation.

90% progress seems satisfactory.

The Program is proceeding on schedule across the board.

Very impressive amount of work done in 2010 on the E15 waiver request and the Biofuels Atlas tool. Most other programs are at or behind schedule. For all the work done on the waiver request, the conditional approval for certain vehicles makes implementation difficult.

#### Platform Response:

The Technology Manager appreciates the reviewer comments concerning the Infrastructure Platform's progress to date. The platform's existing cost goal of \$0.16/gallon is derived from the EIA's most recent average petroleum transportation cost projections for 2017. Past work examining ethanol pipeline viability and multimodal analyses, as well as existing funding for the Bioenergy KDF and the BioEnergy Atlas have the potential to help reduce biofuel delivery costs. In the coming year, the Platform intends to integrate routing costs into the KDF to further address this goal.

## Overall Impressions

### Reviewer Comments

The projects dealing with intermediate ethanol blends were well conceived and fit together very well to achieve an advance in knowledge leading toward the stated goals.

Going forward, the remaining programs would benefit from more focus and direction. Some of the university research programs on algae seem to fit better in other platforms.

There is little effort on biofuels other than ethanol. This may be appropriate at this time, considering the state of development of these other fuels, but there should be an explicit review of this issue.

The Program is well structured, and the goals are on target with all the policies that the nation has in place. Achieving those goals will be easier with a more diversified group of biofuels.

I liked this presentation. The team seems to be on target. One comment I have is, why did they choose not to test additional non-automotive engines?

Overall, the projects seem to be on target. The scope on ethanol blends research will advance more consumer adoption. There seems to be a smaller amount of work advancing new biofuels than I would have expected.

The Program included some excellent project work and meaningful successes. Concerns can, for the most part, be easily reconciled related to dispenser component failures. However, there does not appear to be enough effort to create the infrastructure needed to achieve 36 billion gallons of renewable fuel by 2022 given the blend wall and the negative impact it is having on biofuel prices. Even if E15 becomes part of the fuel mix, there will need to be additional gallons from sources besides corn ethanol, which is nearing its 15-billion-gallon production cap. Many facilities are currently finding it more profitable to export the ethanol to the European Union or other countries than sell it in the United States.

### Platform Response:

The Technology Manager appreciates and generally agrees with the reviewer comments. Regarding the comment on testing intermediate blends on non-automotive engines, testing thus far has focused on automotive engines for a several reasons. Preliminary testing in non-automotive engines indicated some potential concerns with using higher ethanol blends in these engines. Presently, these engines are excluded from the EPA waiver on E15 fuel. Future testing will be considered should circumstances change.

The Program is cognizant of the Energy Independence and Security Act of 2007 requirements for advanced biofuels, and the Program is working closely with other agencies, including the USDA, EPA, DOT, and the Department of Defense, as well as industry associations, such as API, UL, and NACS, to define future infrastructure needs associated with the transportation and distribution of advanced biofuels. Existing forums for industry and interagency coordination include the Biomass Research and Development Board and Technical Advisory Committee. An Interagency Infrastructure Workshop outlining near-term and long-term infrastructure needs was held in June 2011.

(Note: Only about 300–400 million gallons of ethanol per year are exported to Europe, out of approximately 13 billion gallons produced each year. These exports may be curtailed further pending the initiation of World Trade Organization trade action against subsidized American ethanol exports. As gasoline prices in the United States increase, blenders can be expected to blend higher percentages of ethanol into the U.S. fuel supply.)

## RESULTS

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

#### Reviewer Comments

I would suggest working more closely with the Interagency Working Groups looking at biofuel development. Also, attend meetings with industry organizations—not just academia—to develop large-scale production facilities for these products. Many of the technologies have been proven on a very small scale, and the “show stopper” has been funding to build demonstration facilities to provide biofuels on a larger scale.

Please make plans to perform additional tests on non-automotive engines.

I would like to see more data on consumption and better performance measures for the Program.

If all new vehicles were flex-fuel vehicles and all pumps were blender pumps, the infrastructure would have the flexibility needed to significantly increase the biofuel consumption in the marketplace.

### *Platform Response:*

The Biomass Program regularly engages with Interagency Working Groups and industry organizations and this interaction will continue in future years. No additional testing is planned for non-automotive engines at this time. Regarding consumption data, the Program tracks ethanol production data, but is unable to track data on ethanol consumption, largely because there is no Universal Product Code identification numbers for ethanol blended gasoline.



## RESULTS

### Project Review

Project Scoring Summary (Table Projects are listed in the order of their appearance in the agenda)

Project Number	Project Title; Presenting Organization; PI Name	Relevance		Approach		Progress		Success Factors		Benefits & Expected Outcomes		Average Score
		Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD	
5.10.1.1/2 & 8.5.10.1/2	Intermediate Blends Testing - Overview and Vehicles Testing; Oak Ridge National Laboratory; Brian West	9.0	0.58	8.3	1.11	9.3	0.47	8.3	0.47	8.7	1.11	<b>8.7</b>
5.10.1.1	Intermediate Blends Testing - Infrastructure Components Testing; Oak Ridge National Laboratory; Timothy Theiss	8.0	0.82	8.2	0.69	9.0	0.82	7.7	0.75	8.3	1.25	<b>8.2</b>
5.10.1.2	Intermediate Blends Testing - Performance Testing; National Renewable Energy Laboratory; Kristis Moriarty	9.0	0.82	8.5	0.76	9.2	0.90	8.3	1.25	8.5	1.50	<b>8.7</b>
5.10.1.10/ 11/12	Protec Fuel E85 Infrastructure Projects; Protec Fuel; Steve Walk	8.5	1.26	8.7	0.94	8.0	0.82	8.3	1.25	8.2	1.07	<b>8.3</b>
5.10.1.5	Michigan E85 Infrastructure Project; Clean Energy Coalition; Matt Sandstrom	6.8	0.90	6.8	1.07	6.8	0.69	6.0	1.15	6.2	0.90	<b>6.5</b>
5.10.1.9	Missouri Ethanol Blends Infrastructure Project; Missouri Corn Merchandising Council; Bradley Schad	7.2	1.07	7.0	1.63	6.8	1.07	6.0	1.15	7.0	1.00	<b>6.8</b>

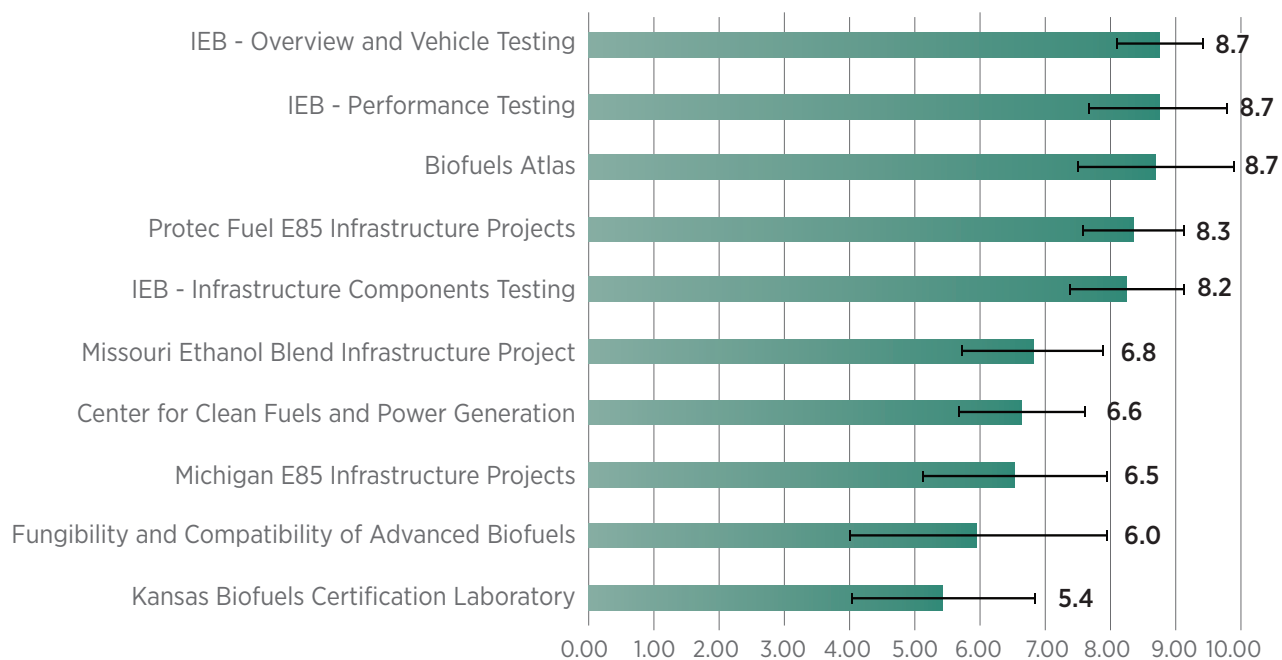
## RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Relevance		Approach		Progress		Success Factors		Benefits & Expected Outcomes		Average Score
		Avg	SD	Avg	SD	Avg	SD	Avg	SD	Avg	SD	
7.7.2.10	Center for Clean Fuels and Power Generation; University of Houston; Michael Harold	6.8	1.34	7.3	1.60	6.7	0.75	6.0	1.73	6.3	1.49	<b>6.6</b>
7.8.1.17	Kansas Biofuels Certification Laboratory; University of Kansas; Susan Staggs-Williams	5.2	1.34	5.5	1.71	5.8	1.21	5.5	1.50	5.2	1.21	<b>5.4</b>
6.2.1.4.H	Fungibility and Compatibility of Advanced Biofuels; Oak Ridge National Laboratory; Bruce Bunting	6.3	1.80	6.0	2.45	6.2	1.77	6.0	2.08	5.3	1.70	<b>6.0</b>
6.3.1.8	BioEnergy Atlas; National Renewable Energy Laboratory; Kristi Moriarty	8.7	.75	9.0	0.58	8.7	0.47	8.5	0.96	8.5	0.50	<b>8.7</b>

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

## Project Scoring Chart

### Peer Review Score Results (Average)



## COMPENDIUM INFORMATION

1. Biomass Program MYPP: [www.eere.energy.gov/biomass/pdfs/mypp\\_november\\_2011.pdf](http://www.eere.energy.gov/biomass/pdfs/mypp_november_2011.pdf)  
Infrastructure Platform: Page 105 (PDF)
2. Full Compilation of Reviewer Comments for the Infrastructure Platform  
Reviewer Comments are direct transcripts of commentary and material provided by the Platform's Review Panel. They have not been edited or altered by the Biomass Program.  
[www.eere.energy.gov/biomass/pdfs/2011\\_infrastructure\\_review\\_comments.pdf](http://www.eere.energy.gov/biomass/pdfs/2011_infrastructure_review_comments.pdf)
3. Peer Review Portal Website Peer Review Page: <http://obpreview2011.govtools.us>  
Infrastructure Page: <http://obpreview2011.govtools.us/infrastructure/>

## ATTACHMENTS

1. [Platform Review Meeting Agenda](#)
2. [List of Attendees](#)
3. [Biomass Program Review Steering Committee](#)
4. [Project Evaluation Form](#)
5. [Platform Evaluation Form](#)

## Infrastructure Platform Review Meeting Agenda

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
Date: 2/3/2011 (Location: 6E-069)				
8:30 a.m. – 8:40 a.m.	0.0.0.0	Platform Overview ( <a href="#">Presentation</a> )	Technology Manager	U.S. Department of Energy, Biomass Program
8:40 a.m. – 9:10 a.m.	5.10.1.1/2 & 8.5.10.1/2	Intermediate Blends Testing – Overview and Vehicles Testing ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Brian West	Oak Ridge National Laboratory
9:10 a.m. – 9:30 a.m.	5.10.1.1	Intermediate Blends Testing – Infrastructure Components Testing ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Timothy Theiss	Oak Ridge National Laboratory
9:30 a.m. – 9:50 a.m.	5.10.1.2	Intermediate Blends Testing – Performance Testing ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Kristi Moriarty	National Renewable Energy Laboratory
<b>BREAK</b>				
10:20 a.m. – 10:50 a.m.	5.10.1.10/11/12	Protec Fuel E85 Infrastructure Projects ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Steve Walk	Protec Fuel
10:50 a.m. – 11:10 a.m.	5.10.1.5	Michigan E85 Infrastructure Project ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Matt Sandstrom	Clean Energy Coalition
11:10 a.m. – 11:30 a.m.	5.10.1.9	Missouri Ethanol Blend Infrastructure Project ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Bradley Schad	Missouri Corn Merchandising Council
11:30 a.m. – 11:50 a.m.	7.7.2.10	Center for Clean Fuels and Power Generation ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Michael Harold	University of Houston
<b>LUNCH</b>				
1:00 p.m. – 1:20 p.m.	7.8.1.17	Kansas Biofuels Certification Laboratory ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Susan Stagg- Williams	University of Kansas

## COMPENDIUM INFORMATION

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
1:20 p.m. – 1:40 p.m.	6.2.1.4.H	Fungibility and Compatibility of Advanced Biofuels ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Bruce Bunting	Oak Ridge National Laboratory
1:40 p.m. – 2:00 p.m.	6.3.1.8	Bioenergy Atlas ( <a href="#">Abstract</a> , <a href="#">Presentation</a> )	Kristi Moriarty	National Renewable Energy Laboratory
CLOSING REMARKS				

## List of Attendees

First Name	Last Name	Organization
Jason	Bittner	University of Wisconsin, Center for Freight & Infrastructure
Ron	Brown	Agenda 2020 Technology Alliance AF&PA
Bruce	Bunting	Oak Ridge National Laboratory
Gary	Clark	Missouri Corn Merchandising Council
Shab	Fardanesh	U.S. Department of Energy, Biomass Program
Ed	Frank	Argonne National Laboratory
Robin	Graham	Oak Ridge National Laboratory
Andrew	Graves	BCS, Incorporated
Michael	Harold	University of Houston
Cornell	Harris	Deloitte
Albert	Hochhauser	Transportation Fuels Consultant
Manoj	Jha	Morgan State University
Mark	Jones	The Dow Chemical Company
Michael	Kass	Oak Ridge National Laboratory
Alicia	Lindauer	U.S. Department of Energy, Biomass Program
Kristi	Moriarty	National Renewable Energy Laboratory
George	Parks	FuelScience, LLC
Todd	Potas	DENCO, LLC
Sean	Reed	Clean Energy Coalition
Jeff	Rodgers	Deloitte
Matt	Sandstrom	Clean Energy Coalition
Bradley	Schad	Missouri Corn Merchandising Council
Pam	Serino	Defense Logistics Agency
Garry	Shanks	POET Ethanol Products
Susan	Stagg-Williams	University of Kansas
Timothy	Theiss	Oak Ridge National Laboratory
Robert	Tyler	City of Peoria
Anita	Vanek	BCS, Incorporated
Steve	Walk	Protec Fuel
Theodore	Wegner	U.S. Department of Agriculture, Forest Service, Forest Products Laboratory
Brian	West	Oak Ridge National Laboratory
Gary	Wheeler	Missouri Corn Merchandising Council
Cyril	Yee	Deloitte



## Biomass Program Review Steering Committee

Reviewer Name	Role	Professional Title and Affiliation
Neal Gutterson, Ph.D.	Co-lead	President & CEO, Mendel Biotechnology, Inc.
Mark E. Jones, Ph.D.	Co-lead	Research Fellow, Dow Chemical Company
Elizabeth Marshall, Ph.D.	-	Staff, Economic Research Service, U.S. Department of Agriculture
Janet Hawkes, Ph.D.	-	Consultant, Biobusiness, Environmental Services, and Academic Administration
Roger C. Prince, Ph.D.	-	Scientist, Biomedical Sciences Division, ExxonMobil
Robert Miller, Ph.D.	-	Consultant, Retired Air Products & Chemicals

## Infrastructure Project Evaluation

Using the following criteria, reviewers are asked to rate the project work presented in the context of the Program objectives, both numerically and with specific, concise comments to support each evaluation. **Please provide both strengths and weakness to support your score.**

Superior		Good		Satisfactory		Marginal		Unsatisfactory	
10	9	8	7	6	5	4	3	2	1
All aspects of the criteria are comprehensively addressed. There are significant strengths and no more than a few weaknesses that are easily correctable.		All aspects of the criteria are adequately addressed. There are significant strengths and some weaknesses. The significance of the strengths outweighs most aspects of the weaknesses.		Most aspects of the criteria are adequately addressed. There are strengths and weaknesses. The significance of the strengths slightly outweighs aspects of the weaknesses.		Some aspects of the criteria are <b>not</b> adequately addressed. There are strengths and significant weaknesses. The significance of the weaknesses outweighs most aspects of the strengths.		Most aspects of the criteria are <b>not</b> adequately addressed. There may be strengths, but there are significant weaknesses. The PI fails to demonstrate the project's capability to meet objectives.	

**1. Project Approach (1–10):**

Please evaluate the degree to which the project has

- a) Implemented technically sound research, development, and deployment approaches and demonstrated necessary results to meet their targets
- b) Identified a project management plan that includes well-defined milestones and adequate methods for addressing potential risks.

**2. Technical Progress and Accomplishments (1–10):**

Please evaluate the degree to which the project has

- a) Made progress in its objectives and stated project management plan
- b) Met its objectives in achieving milestones and overcoming technical barriers.

**3. Project Relevance (1–10):**

Please evaluate the degree to which the project has

- a) Identified with and contributed to meeting the Platform goals and objectives of the Biomass Program Multi-Year Program Plan
- b) Considered applications of the expected outputs

Please explain your score by commenting on the strengths and weakness evaluated.

**4. Critical Success Factors (1–10):**

Please evaluate the degree to which the project has

- a) Identified critical success factors (including technical, business, market, regulatory, and legal factors) that impact technical and commercial viability of the project
- b) Presented adequate plans to recognize, address, and overcome these factors.

**5. Benefits and expected outcomes (1–10):**

Please evaluate the degree to which the project has advanced the state of technology that impacts commercial viability, such as the following:

- a) Increasing the potential market for biofuels
- b) Increasing consumer access to biofuels
- c) Lowering the cost of distribution.

**6. Technology Transfer and Collaborations (no score):**

Please comment on the degree to which the project adequately interfaces and coordinates with other institutions and projects to provide additional benefits to the Biomass Program, such as publications, awards, or others.

## Platform Evaluation

### 1. Relevance (1–10):

Please evaluate the degree to which

- a) Platform goals, technical targets, and barriers are clearly articulated and logical
- b) Platform goals and planned activities support the goals and objectives outlined in the MYPP
- c) Achieving Platform goals will increase the commercial viability of biofuels.

How could the Platform change to better support the Biomass Program goals?

### 2. Approach (1–10):

Please evaluate the degree to which

- a) The Platform approaches are effective, as demonstrated by the extent to which Platform milestones and organization, project portfolio, and strategic directions facilitate reaching Program Performance Goals as outlined in the MYPP
- b) The Platform portfolio is focused and balanced to achieve Biomass Program and Platform goals, as demonstrated by Work Breakdown Structure; unit operations; and pathway prioritization.

Please explain your score by commenting on the strengths and weakness evaluated.

What changes would increase the effectiveness of the Platform?

### 3. Progress (1–10):

Please evaluate the degree to which the Platform is progressing toward achieving Biomass Program and Platform goals, specifically in reference to meeting performance targets and the likelihood of achieving the goals presented.

Please provide recommendations for improvements for tracking progress.

### 4. Overall Impressions (no score):

Please provide an overall evaluation of the Platform, including strengths, weaknesses, and any gaps in the Platform portfolio.

### 5. Additional Recommendations, Comments, and Observations (no score):

Please provide any additional recommendations, comments, and observations you have about the Platform or the Platform portfolio.

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