



ANALYSIS

2011 Platform Review Report

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

Review Date

April 4, 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 Analysis Platform Review meeting, held on April 4, 2011, at the Doubletree Hotel in Annapolis, Maryland.

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 were tasked with evaluating the Analysis 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 accomplishment achieved by the individual projects, the Platform, and the Program, toward programmatic milestones, project goals, and objectives.

I would like to express my sincere appreciation for 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 Analysis Platform Peer Review meeting.

Zia Haq
Analysis Platform Technology Manager
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

EXECUTIVE SUMMARY

Summary from Review Panel

Introduction

The Panel appreciates the opportunity to participate in the review process. Overall, the Panel felt that the Analysis Platform is addressing a variety of important issues with the current slate of projects, and the range of scores reflected this. To further improve its value to the Program, the Platform should seek to be proactive in its approach, with the objective of leading the discussion of the issues with integrated, considered analysis.

The Platform has a large amount of land-use change (LUC) projects. While the Panel agrees that this is an important issue, some of the projects addressing LUC seemed to overlap each other, and others appeared unrelated to the rest. The Platform has a good start on addressing LUC and should make it a priority to focus the modeling efforts to address the specific needs of the U.S. Department of Energy (DOE). The Panel strongly supports the Technology Manager’s plan to develop a roadmap to show how each LUC modeling project is unique, uses data consistently, is complementary to others, and overlaps with others. This effort will also address some of the gaps identified in the modeling portfolio, which are discussed next in the report.

Finally, some projects were clearly aligned with Biomass Program objectives, while others appeared less so.

General Recommendations

The reviewed projects fell into two broad areas: modeling (i.e., LUC and sector) and knowledgebase generation.

Modeling

Because the Analysis Platform provides a critical decision-making function, the modeling projects within the Platform must provide results that can be used by the Program to chart direction and show progress toward goals. There are many good modeling efforts underway; however, the overall impression is that they are focused too heavily on reacting to a variety of “moving-target” issues in the biofuels arena rather than leading the discussion around these important topics. As mentioned above, the Analysis Platform is encouraged to take a more proactive role, and two examples were provided by the Panel:

1. To expand and improve the modeling efforts, the Panel suggests planning and conducting a “learning curve study” by charting information about a known technology and its associated land use and then applying this information to an emerging technology, like algal biofuels. This type of approach would expand the current modeling and help DOE develop an informed program for new technologies. Questions to answer from past learning could be the following:
 - a. How long should the development take?
 - b. Where is the technology now on the developmental curve?
 - c. How much money might be needed to complete the technology deployment?

2. The scenario models, like the Biomass Scenario Model (BSM), could be used to model virtual integrated biorefineries (IBR), building from the work already done. The objective would be to proactively show biorefineries' possibilities. This biorefinery effort would also help develop more micro or regional analyses to offset the macro or global analyses currently dominating the LUC models. Overall, the Panel felt there was a real need to drive modeling with these types of efforts—rather than letting short-term, “hot issues” drive the outcomes. The Panel also suggested convening a small group of visionaries that can help plan and develop the scenarios.

Gaps in the modeling efforts were identified as (1) continued use of “aged” petroleum values in biofuels comparisons, (2) quality and sources of technical data available for the modeling efforts, and (3) the need for more robust model testing.

1) Comparison to Petroleum Values

The Panel felt an important way to improve most of the modeling projects would be the comparison of cellulosic fuels with current petroleum fuels; that is, the gas references need to be updated to make the comparisons more sensible for the current refining scenarios (e.g., tar sands are not the same as Saudi sweet crude). This effort could include the DOE Fossil Energy Program in discussions about what the benchmarks should be.

2) Technical Data in the Models

The Panel concluded that continuing to build the data conduit from the various commercialization projects (e.g., the IBR and Loan Guarantee projects) is important to improve on the data quality in the scenario (BSM, CIM-EARTH) models. The commercialization projects could provide invaluable information to the modeling in the areas of pioneer costs, yields, and industry growth curves. To help move the discussions forward, the Panel suggested providing the IBR project partners ranges of values for them to “approve.” This would prevent partners from having to provide sensitive data. Obtaining and using this information would help to accelerate the transition in a sustainable way. The need to coordinate with the U.S. Department of Agriculture (USDA) was noted by the Panel, with the suggestion to use the USDA/DOE solicitations to fund regional analyses on feedstock/technology mixes.

For the LUC models, while sophisticated land-use data is available in the United States, it is not available globally, and use of global data reduces the granularity of the model results. The Panel agrees with the Technology Manager that getting better data from a few key countries (e.g., Brazil for sugarcane) could improve the global results significantly, and the Panel suggests joint data gathering with USDA.

Understanding and articulating data accuracy is an issue in all modeling. The Panel felt that more sensitivity analyses need to be included in all the modeling projects to address uncertainty in data and assumptions, as well as to identify where more data or support is needed.

3) Model Credibility/Testability/Consistency

Along with data robustness, models should be challenged regularly for credibility. Consistency in the assumptions, data utilization, and outputs among the different models can be improved via improved and regulated communication between the modeling teams. For example, the Consortium for Research on Renewable Industrial Materials (CORRIM) model data should be compared with the woody feedstock inputs in the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Model. All the modeling projects should aim to validate their models in some way—even if historical data is not available. Backcasting and forecasting limitations should be made transparent to the users of the outputs.

Knowledgebase Generation

The Panel felt that the historical data archiving portion of the Biomass Energy Data Book and the overall data mining aspects of both the Data Book and the Bioenergy Knowledge Discovery Framework (KDF) projects are important and should be maintained in some format, although it appeared that the actual Data Book website could be rolled into the KDF website. Funding for any website/knowledgebase is a long-term commitment, and for that reason, the Program should drive the development with a specification document. It was agreed that there is a need for a robust knowledgebase of biomass research data, but the two projects presented were not particularly robust or compelling solutions.

Summary of Results: Platform

Evaluation Criteria	Average*	Range	Standard Deviation
1. Relevance	8.0	6-9	1.22
2. Approach	7.5	6-9	1.50
3. Progress	7.3	6-9	1.30

* 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	
6.2.1.5.b	GREET Development; Argonne National Laboratory; Michael Wang	8.5	X	-	-	The GREET model will continue providing a well-recognized and accepted framework for assessing greenhouse gas (GHG) emissions for alternative fuel pathways.
6.2.1.2.d	Algae Resource Assessment; Pacific Northwest National Laboratory; Mark Wigmosta	7.7	X	-	-	This project will continue developing the geographic information systems (GIS) information and analysis as a necessary step in the evaluation of open-system algal feedstock production systems.
6.2.1.1.b	Biomass Scenario Model Development; National Renewable Energy Laboratory; Brian Bush	7.4	X	-	-	This project will continue development and use of a dynamic modeling tool to investigate and gather information on various scenarios relevant to Program goals and policies.
6.2.1.5.a	GTAP: ILUC for Corn Ethanol; Purdue University; Wally Tyner	7.4	X	-	-	This project will continue to estimate land-use changes and calculate GHG emissions associated with U.S. corn ethanol production.
6.2.1.2.b	JGCRI and Global Land-Use Change Model Development; Pacific Northwest National Laboratory; Marshall Wise	7.1	X	-	-	This project will continue to upgrade the modeling of biomass energy supply and use the Global Change Assessment Model (GCAM) to provide an analytical platform for biomass in support of Program goals.

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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	
11.2.3.4.b	LUC Framework; Oak Ridge National Laboratory; Budhendra Bhaduri	7.1	-	-	X	This project concluded at the end of FY 2011.
1.7.1.4	Technical, Economic, Environmental, and Social Impacts of Woody Biomass to Biofuels; Consortium for Research on Renewable Industrial Materials; Steve Kelley	6.6	-	X	-	This project will have a no cost extension through 2013, but until then, it will continue to combine biomass growth and yield models, engineering process models, and life-cycle assessment for collection of specific woody biomass feedstocks and biofuel processing alternatives.
11.2.5.2	CIM-EARTH; Argonne National Laboratory; Todd Munson	6.2	X	-	-	This project will continue developing modeling components necessary to analyze the national economic and environmental impacts of current and future biofuel production pathways for a range of policies and technology scenarios.

CONTINUES ON NEXT PAGE

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.a	Bioenergy Knowledge Discovery Framework (KDF) ; Oak Ridge National Laboratory; Budhendra Bhaduri	6.1	X	-	-	This project will continue development of a geospatial-temporal knowledge discovery framework for collection, integration, management, modeling, visualization, and dissemination of data, models, and tools for the bioenergy infrastructure. FY12 will be the final year of the major development phase of the KDF. FY13 and beyond will focus on growth of the user community.
6.2.1.4.b	GTAP Modification to Quantify ILUC to Date LCFS; Oak Ridge National Laboratory; Gbadebo Oladosu	6.1	X	-	-	This project will continue developing representations of potential global indirect effects, particularly indirect land-use change, under different biofuel use, production, and policy scenarios.
11.2.3.4.a	Bioenergy Databook; Oak Ridge National Laboratory; Stacy Davis	6.1	-	-	X	This project concluded at the end of FY 2011.

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INTRODUCTION

On April 4, 2011, the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Biomass Program held a Peer Review of its Analysis 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.

Zia Haq was designated by the Biomass Program as the lead for the Analysis Platform. In this capacity, he 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. He assisted in this effort with resources from a Peer Review implementation team comprised of logistics and Peer Review implementation contractors, as well as DOE staff from the Golden Office.

Approximately 100 people attended the Analysis 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 Analysis Review Panel, and describes the role of the Steering Committee.

This report represents the results of the Analysis Platform Review, as well as the 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 the Analysis 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 processes is provided in Exhibit 1.

Neil Rossmeyssl of the Biomass Program was assigned by the Biomass Program Manager as the Peer Review Leader. Mr. Rossmeyssl 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 Systems Integration, and contractor support. The planning team held weekly planning meetings beginning 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 contractor and 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 (RD&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 comment 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 the following:
 - 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 processes, portfolio balance, and progress in achieving Program mission and goals.

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 forms were reviewed and modified by the Steering Committee before being 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. Committee provided Yes/No recommendations on candidates and recommended other candidates for the Platform to consider. Results were provided to Platform Leads for consideration in 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 to the reviewers on their responsibilities, reimbursement procedures, and issues regarding COI. COI forms were provided to each reviewer in advance of the review meeting and collected. A minimum of two conference calls were held for each Platform Review Panel and collectively 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. If PIs chose not to present, they received a request to submit a form stating such.
11. Platform Review meetings were held according to guidelines developed by the Steering Committee, IPRC, and 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. Following each Review, Review Panelists were provided approximately 10 working days to edit and finalize their comments and evaluations, which were accessible via a password-protected website. PIs were then provided 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 publicly 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, 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 Program technology platform areas. The overall structure and direction of each 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 was comprised of the six members of the Steering Committee, formed to provide overall oversight of the Program Peer Review process, and the Lead Reviewer from each of the eight Platform Review Panels.

Analysis 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. Zia Haq, the Biomass Program lead for the Analysis Platform, designated Ms. Kelly Ibsen of Lynx Engineering, LLC., as the Lead Reviewer for the Analysis Peer Review Panel. Ms. Ibsen 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 Analysis Platform evaluated 10 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 lack of 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 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 Analysis Platform.

Exhibit 2 | Analysis Review Panel

Name	Affiliation	Expertise
Kelly Ibsen*	Lynx Engineering LLC	Process Development and Analysis
Janaki Alavalapati	Virginia Tech	Forest Resources, Economics, & Policy and Environmental Conservation
Bruce Dale	Michigan State University	Sustainability Analysis and Biomass Conversion
Andras Marton	Independent Project Analysis, Inc.	New Technology and Process Development Projects

* Denotes Lead Reviewer

Organization of this Report

The remainder of this document provides the results of the Analysis Platform Review meeting, including

- Results of Review Panel comments on the overall Analysis Platform
- The Biomass Program, Analysis Platform, Technology Manager response 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, as well as PI responses to reviewer evaluations for their projects—these can be found in a compendium document.

PLATFORM OVERVIEW AND EVALUATION

Platform Overview

The Analysis Platform helps determine overall Program goals and priorities and covers issues that cut across all Program elements. Analysis specific to technology area helps identify and understand questions around particular technology elements, contributes to engineering designs, and sets performance targets, as well as enables monitoring of progress toward Program goals. Benefits analysis tracks progress toward DOE and EERE goals, while technical analysis directs research, development, demonstration, and deployment projects.

The Analysis Platform plays four main roles in the Biomass Program decision-making process:

1. Providing the analytical basis for Program planning and assessment of progress
2. Defining and validating performance targets for biomass technologies and systems
3. Reviewing and evaluating external analyses and studies
4. Contributing engineering analysis.

Maintaining these capabilities at the cutting edge is essential to ensure that the analyses provide the most efficient and complete answers to technology developers and Program management. Continued public-private partnerships with the biomass scientific community and multi-lab coordination efforts will help ensure that the analyses results from the Program are peer reviewed, transferable, and comparable.

The Analysis Platform's strategic goal is to provide context and justification for decisions at all levels by establishing the basis of quantitative metrics, tracking progress toward goals, and informing portfolio planning and management.

Strategic analysis activities support accomplishment of Program goals by

- Ensuring high-quality, consistent, reproducible, peer-reviewed analysis
- Developing analytical tools, models, methods, and datasets to advance understanding of bioenergy and its related impacts
- Conveying the results of analytical activities to a wide audience, including DOE management, Congress, the White House, and the general public.

Strategic analysis activities are ongoing; however, the following defines a key milestone in support of Program goals:

- By 2012, understand the impacts of competition for biomass resources on feedstock cost, greenhouse gas emissions, and meeting the Energy Independence and Security Act of 2007 biofuels goals.

Additional information about the Analysis Platform is in the Biomass Program Multi-Year Program Plan (MYPP) and on the 2011 Biomass Program Review Portal.

RESULTS

Reviewers evaluated the Analysis 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 six criteria: Project Approach (1-10), Technical Progress and Accomplishments (1–10), Project Relevance (1–10), Benefits and Expected Outcomes (1–10), Technology Transfer and Collaborations: (no score), and 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 Analysis Platform ranged between 8.5 and 6.1, with a mean of 7.5. The presentation of the percentile rank shows the percentage of scores

Results of Platform Evaluation

Criteria	Average Score*	Range	Standard Deviation
1. Relevance	8.0	6-9	1.22
2. Approach	7.5	6-9	1.50
3. Progress	7.3	6-9	1.30

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

Relevance

Reviewer Comments

The goals of Analysis Platform are clearly articulated and the planned activities directly support the goals and objectives outlined in the MYPP. Activities pursued through this Platform support biofuels industry development and provide valuable input to other federal agencies on bioenergy.

Significant Strengths:

The State of Technologies (SOT) work has helped to develop the MYPP goals and targets quantitatively. The Platform goals and barriers are clear and logical.

The work being done under the Analysis Platform will definitely help in commercialization of biofuels.

Minor Strengths:

Link to R&D shown by the SOT presentation.

The majority of the projects appear to support the MYPP goals and objectives in some way.

Minor Weaknesses:

Did not identify the stakeholders for the SOT work—doing so would add to the relevance argument greatly. No examples of industry involvement—this goes to showing that the work will increase the commercial viability of biofuels.

There are some aspects of some projects that appear to greatly overlap with each other primarily in the area of estimating LUC.

Suggestion: A more defined Platform approach, showing how each project aligns with the goals and with each other is the key to keeping the small amount of funding moving the important modeling efforts forward. Some streamlining of projects and even ending of projects is probably necessary once the overall approach is better defined. Appears to be just a bunch of unrelated projects.

The current Program portfolio mainly focuses on providing reactive support to Program and not to provide direction to advance the availability of next generation biofuels. This should be changed to a more proactive approach where specific models are used to assess the sensitivity to certain inputs, so that high-impact factors are identified and support can be directed to improve their performance.

Since corn ethanol production is already nearing the mandated limit, focus should be on the progress and needs of advanced conversion technologies and related feedstocks. Appropriate analysis should be able to gauge the current status of technology development, determine possible rate of technology improvement given current market and financial situation, identify areas with highest potential impact on fuel production, identify high-impact areas of technology development in need of support, establish possible outcome scenarios based on technology status, and characterize uncertainties around predicted outcomes.

All this is highly relevant to biofuels.

Platform Response

The Technology Manager generally agrees with the comments and will work within the Program and Platform budget constraints to address reviewer critiques and implement recommendations.

Approach

Reviewer Comments

The Platform focuses on analyzing state of technologies, land-use change impacts, and feedstock resource assessment. A multi-sector approach is stressed to account for inter-sector linkages of the economy. While this approach is very useful to assess the economy-wide impacts of biofuels production and use, caution must be taken to customize models by making realistic assumptions using accurate data. This Platform will help meet the national goal of producing 60 billion gallons of biofuel per year by 2050.

Significant Weakness:

Portfolio focus/balance: The many different projects on land use/resource availability/sustainability seem disjointed, and it was difficult to understand how they were coordinating with each other. Add a roadmap or another way to show linkages between the projects.

Minor Weaknesses:

LUC – tied to sustainability activities? This was not clear.

Resource assessment – tied to Feedstock Platform? This was not clear.

Minor Strengths:

R&D/SOT approach: Very detailed, but only one process. How could you better serve all the different processes being developed? Less detail around a group of processes rather than a lot around one? Are there IP issues? Serves the National Renewable Energy Laboratory's research and development (R&D) efforts, but needs to serve DOE's R&D efforts.

Pyrolysis pathway discussed integrating info from the NABC and pyrolysis solicitation—this is a start at being less myopic in R&D results that go into the SOT and target cost development.

Significant Strength:

The Platform leader appears very involved and committed to high-quality analysis work. It is not clear that he has enough control or say over what projects are funded.

Suggestion: Publish a handbook on how to do a SOT and Target case for integrated biorefineries and other solicitation winners to use to develop their own and is consistent with best DOE practices. (Andy mentioned there is a standard pro forma being developed for DOE projects.)

Much focus on understanding first-of-a-kind technologies is missing from many of the portfolio projects. Understanding how corn and sugarcane-based ethanol behaves is only the first step in correctly identifying the right path for the Biomass Program. A clear analysis of emerging technologies and their impact should be included in the approach.

Attention on error and certainty of model assumptions and input data need to be more prevalent.

The Analysis Platform is well constructed to provide answers to DOE.

Platform Response

The Technology Manager generally agrees with the comments and will work within the Program and Platform budget constraints to address reviewer critiques and implement recommendations.

Progress

Reviewer Comments

A lot of progress has been made in conducting analysis relating to state of technologies, land-use change impacts, and resource assessment. Results of these analyses are providing scientific basis to formulate policies and stimulating investments in the biofuels sector. Whenever and wherever possible, synergistic opportunities must be explored in terms of data sharing, model development, and generating key results.

Minor Weakness:

Progress of the Platform not really shown in the overview presentation—only one example of a paper—although a good paper (PEW).

Minor Strengths:

SOT presentation shows a significant amount of progress toward linkage between the R&D in the labs and strategic analysis.

From the collection of projects presented, it appears that all are progressing, and most are supporting MYPP analysis goals.

Question: The MYPP targets, while cost goals, are really process specific (i.e., biochem targets are tied to dilute acid, enzymatic hydrolysis process) because they are built from process-specific designs and cost estimates. How could this be expanded to allow multiple processes to address a target? Could drill down from a market price, but I think that may already have been tried with less than desirable results.

Even though the goals set to the currently supported project is to be as inclusive as possible of all biofuels possibilities, much of the current progress is on what happened in the past, and how these existing (first generation) biofuels related practices would change and impact the future. The uncertainty of these models, however, is not addressed. A clear error analysis on all model assumptions should be undertaken to understand uncertainty of model predictions and identify highly uncertain data that may need improvement via more accurate data collection.

Progress on identifying what are the most leveraging moves are not yet addressed by the portfolio projects. The future direction of the Platform should be to clearly identify and focus on high-impact areas.

Many of the projects in the portfolio focus on modeling feedstock-related issues. While this is an important aspect of biofuels, without clearly understanding and modeling the potential impact of various conversion technologies it is unclear what type and form of feedstock will be needed in the future, and therefore much of the analysis is hypothetical. More focus on understanding the status of technology development, the needs of the technology development and the expected learning curve of improvement would be needed to clearly identify areas with high-impact on advanced biofuel production.

With some exceptions, the progress has been very good.

Platform Response

The Technology Manager generally agrees with the comments and will work within the Program and Platform budget constraints to address reviewer critiques and implement recommendations.

Overall Impressions

Reviewer Comments

The relevance, approach, and progress of the Analysis Platform are excellent. The outputs generated from this Platform are helping the biofuels sector move forward in a sustainable manner. More emphasis should be given on testability of the models and enhancing the quality of the data. Need to find avenues to compare and contrast the results of various models to ensure reliability and validity of results.

The Platform presentation did not really show much detail about the Platform.
Difficult to access the relevance and approach with limited information from the presentation.

Questions:

- 1) About the SOT case: How does this guide where R&D dollars go beyond driving the research at the national labs? Is it used to set up solicitations? Its role/use in the larger context of the programs was not clear from the presentation. Understand that it helps set the MYPP targets, but then how are those worked on outside of the national labs' R&D?
- 2) Was there a time limit that was too short to really address the evaluation topics? This reviewer had a hard time fitting the presentation to the evaluation form, which probably resulted in scores that were low simply due to lack of directed information provided.

The Analysis Platform has accomplished much in understanding various implications of biofuel productions. A great understanding of the life cycle has been achieved. Moving forward, the techniques developed should be strengthened by improving input data accuracy, establishing prediction uncertainties and sensitivities, including first-of-a-kind technologies, and used to identify high-impact areas for future Biomass Program support.

I have made some suggestions for improvement to the various areas in the Analysis Platform.

Platform Response

The Technology Manager generally agrees with the comments and will work within the Program and Platform budget constraints to address reviewer critiques and implement recommendations.

Additional Recommendations, Comments, and Observations

Reviewer Comments

The Analysis Platform is fundamental to scientific thinking and scientific basis for policy formulation and implementation. So, strengthening of this Platform's activities would have huge positive societal and environmental impacts.

Comments to improve: Provide a longer presentation time to set the stage on the overall Platform structure, relevance, approach, and progress. It's okay if it repeats at a high level, some of the accomplishments discussed in later presentations.

Include some roadmap for the reviewers and audience to see how all the projects fit into the Platform and with each other. If there is overlap, show it—sometimes it is a good and necessary thing.

Limited overall analysis of data validity, correctness, and the need for further improvement in data quality. Much of the focus is on feedstock availability and not much on process validity, improvements, needs, etc. Because uncertainties and errors in available data and their effects on models are not investigated, focus is not on quality of input. Consequently, there is only a limited focus on obtaining data for all the models. The few cases where uncertainty is discussed, it becomes clear that the uncertainty and error around inputs impact the usability of many of the models.

I have made a number of recommendations for the individual areas.

Platform Response

The Technology Manager generally agrees with the comments and will work within the Program and Platform budget constraints to address reviewer critiques and implement recommendations.

RESULTS

Project Review

Project Scoring Summary Table

Project Number	Project Title; Presenting Organization; PI Name	Approach		Progress		Relevance		Benefits & Expected Outcomes		Total Average Score	Percentile Rank %
		Average	SD	Average	SD	Average	SD	Average	SD		
6.2.1.1.b	Biomass Scenario Model (BSM) Development & Analysis; NREL; Brian Bush	7.0	2.12	7.8	1.48	7.5	1.12	7.5	1.66	7.4	70%
6.2.1.2.d	Algae Resource Assessment; PNNL; Mark Wigmosta	7.3	1.30	7.3	1.48	9.3	0.43	7.0	0.71	7.7	90%
6.2.1.4.a	Bioenergy Knowledge Discovery Framework (KDF); ORNL; Budhendra Bhaduri	6.5	2.69	6.0	2.24	6.5	3.20	5.3	2.17	6.1	0%
11.2.3.4.a	Biomass Energy Data Book; ORNL; Stacy Davis	6.3	1.92	6.8	2.28	6.3	0.83	5.0	1.41	6.1	0%
6.2.1.2.b	GCAM Biomass and Land-Use Modeling; PNNL; Marshall Wise	6.0	1.87	7.3	1.79	8.3	0.83	7.0	1.22	7.1	60%
11.2.3.4.b	Land-Use Change Framework; ORNL; Budhendra Bhaduri	5.8	3.27	7.0	2.35	8.3	0.83	7.3	0.83	7.1	60%
6.2.1.4.b	Global Analysis of Biofuel Indirect Effects & Feedstock Potential; ORNL; Gbadebo Oladosu	6.0	2.35	6.0	2.12	5.3	1.79	7.0	1.87	6.1	0%

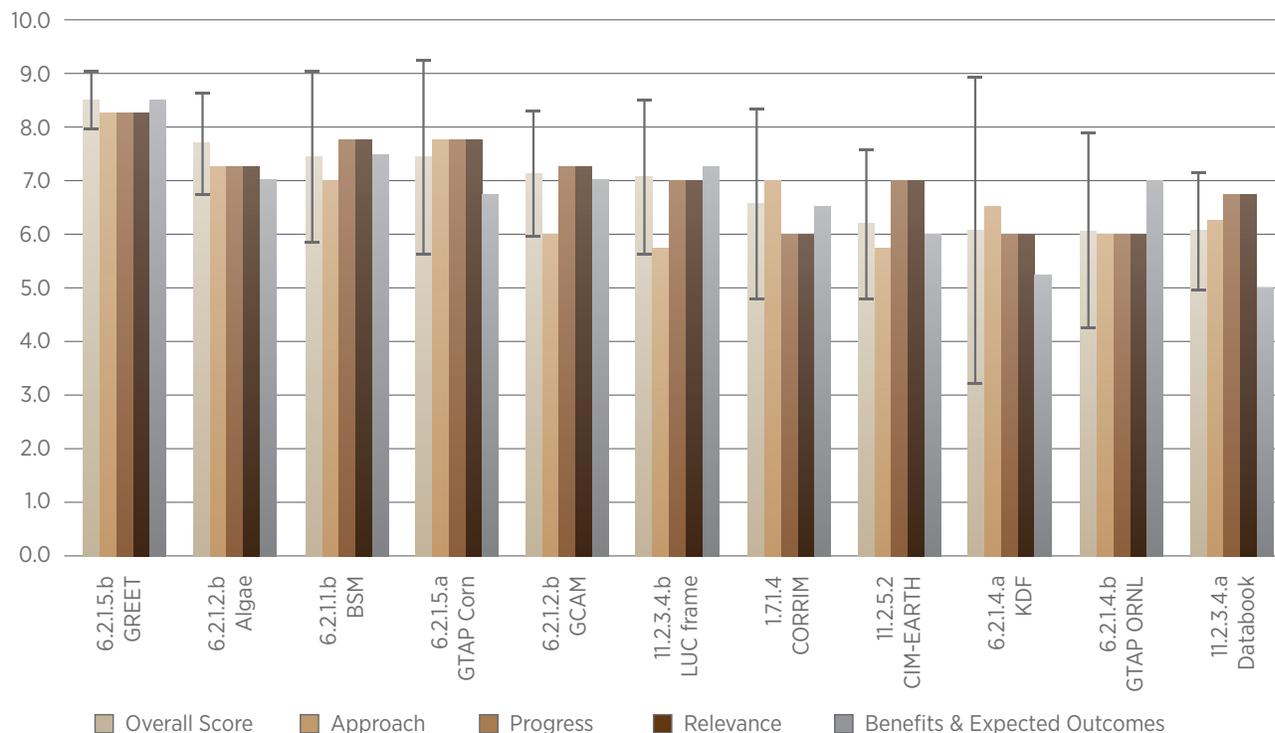
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RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Approach		Progress		Relevance		Benefits & Expected Outcomes		Total Average Score	Percentile Rank %
		Average	SD	Average	SD	Average	SD	Average	SD		
6.2.1.5.a	Land-Use Changes and Consequent CO ₂ Emissions Due to U.S. Corn Ethanol Production: A Comprehensive Analysis; Purdue University; Wally Tyner	7.8	1.30	7.8	1.79	7.5	1.66	6.8	1.79	7.4	70%
6.2.1.5.b	GREET Life-Cycle Analysis of Biofuels; ANL; Michael Wang	8.3	0.83	8.3	1.30	9.0	0.71	8.5	0.87	8.5	100%
11.2.5.2	Modeling of Land-Use Changes and Other Indirect Effects of Biofuel Production in CIM-EARTH; ANL; Todd Munson	5.8	1.48	7.0	1.41	6.0	2.00	6.00	1.2	6.2	30%
1.7.1.4	Technical, Economic, Environmental, and Social Impacts of Woody Biomass to Biofuels; CORRIM; Steve Kelley	7.0	1.00	6.0	2.55	6.8	1.79	6.5	1.66	6.6	40%

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

Project Scoring Chart



COMPENDIUM INFORMATION

1. Biomass Program MYPP: www.eere.energy.gov/biomass/pdfs/mypp_november_2011.pdf Analysis Platform: Page 139 (PDF)
2. Full Compilation of Reviewer Comments for the Analysis 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_analysis_review_comments.pdf
3. Peer Review Portal Website Peer Review Page: <http://obpreview2011.govtools.us>
Analysis Page: <http://obpreview2011.govtools.us/analysis/>

ATTACHMENTS

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

Analysis Platform Review Meeting Agenda

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
Date: 4/4/2011				
8:00 a.m. – 8:15 a.m.	0.0.0.6	Welcome & Analysis Platform Overview (Presentation)	Zia Haq	U.S. Department of Energy, Biomass Program
8:15 a.m. – 8:45 a.m.	6.2.1.1.a / 6.2.1.2.a	Biomass State of Technology Analysis (NO EVALUATION) (Presentation)	Andy Aden	National Renewable Energy Laboratory
8:45 a.m. – 9:15 a.m.	6.2.1.1.b	Biomass Scenario Model (BSM) Development & Analysis (Abstract , Presentation)	Brian Bush	National Renewable Energy Laboratory
9:15 a.m. – 9:45 a.m.	6.2.1.2.d	Algae Resource Assessment (Abstract , Presentation)	Mark Wigmosta	Pacific Northwest National Laboratory
BREAK				
10:00 a.m. – 10:30 a.m.	6.2.1.4.a	The Bioenergy Knowledge Discovery Framework (KDF) (Abstract , Presentation)	Budhendra Bhaduri	Oak Ridge National Laboratory
10:30 a.m. – 11:00 a.m.	11.2.3.4.a	Biomass Energy Data Book (Abstract , Presentation)	Stacy Davis	Oak Ridge National Laboratory
11:00 a.m. – 11:30 a.m.	6.2.1.2.b	GCAM Biomass and Land Use Modeling (Abstract , Presentation)	Marshall Wise	Pacific Northwest National Laboratory
LUNCH				
12:30 p.m. – 1:00 p.m.	11.2.3.4.b	Land-use Change Framework (Abstract , Presentation)	Budhendra Bhaduri	Oak Ridge National Laboratory
1:00 p.m. – 1:30 p.m.	6.2.1.4.b	Global Analysis of Biofuel Indirect Effects & Feedstock Potential (Abstract , Presentation)	Gbadebo Oladosu	Oak Ridge National Laboratory

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COMPENDIUM INFORMATION

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
1:30 p.m. – 2:00 p.m.	6.2.1.5.a	Land Use Changes and Consequent CO ₂ Emissions due to U.S. Corn Ethanol Production: A Comprehensive Analysis (Abstract , Presentation)	Wally Tyner	Purdue University
BREAK				
2:15 p.m. – 2:45 p.m.	6.2.1.5.b	GREET Life-Cycle Analysis of Biofuels (Abstract , Presentation)	Michael Wang	Argonne National Laboratory
2:45 p.m. – 3:15 p.m.	11.2.5.2	Modeling of Land-Use Changes and Other Indirect Effects of Biofuel Production in CIM-EARTH (Abstract , Presentation)	Todd Munson	Argonne National Laboratory
3:15 p.m. – 3:45 p.m.	1.7.1.4	Technical, Economic, Environmental, and Social Impacts of Woody Biomass to Biofuels (Abstract , Presentation)	Steve Kelley	North Carolina State University

LIST OF ATTENDEES

First Name	Last Name	Organization
Janaki	Alavalapati	Virginia Tech
Mark	Allen	Algal Biomass Organization
Andrew	Argo	National Renewable Energy Laboratory – Systems Integration
Bob	Avant	Texas AgriLife Research
Budhendra	Bhaduri	Oak Ridge National Laboratory
Alison	Brady	Life Cycle Management
Adam	Bratis	National Renewable Energy Laboratory
Amy	Braun	U.S. Department of Agriculture
Brian	Bush	National Renewable Energy Laboratory
Calvert	Churn	Renewable Algal Energy
Leon	Clarke	Pacific Northwest National Laboratory
Aaron	Crowell	BCS, Incorporated
Virginia	Dale	Oak Ridge National Laboratory
Stacy	Davis	Oak Ridge National Laboratory
Yonas	Demissie	Argonne National Laboratory
Roxanne	Dempsey	U.S. Department of Energy, Golden Office
Chris	Detter	Los Alamos National Laboratory
Daniel	Drell	U.S. Department of Energy, Office of Science
Joshua	Elliott	Computation Institute/Argonne National Laboratory
Daniel	Fishman	BCS, Incorporated
Yaa-Yin	Fong	University of Hawaii
Ed	Frank	Argonne National Laboratory

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COMPENDIUM INFORMATION

First Name	Last Name	Organization
Christian	Fritsen	Desert Research Institute
Roxanne	Garland	U.S. Department of Energy, Fuel Cell Technologies Program
Alison	Goss Eng	U.S. Department of Energy, Biomass Program
Robin	Graham	Oak Ridge National Laboratory
Benjamin	Gramig	Purdue University
Zia	Haq	U.S. Department of Energy, Biomass Program
Andrew	Hashimoto	University of Hawaii
John	Heissenbuttel	Council on Sustainable Biomass Production
Becky	Herron	AGCO Corporation
Laura	Herron	AGCO Corporation
Richard	Hess	Idaho National Laboratory
John	Hewson	Sandia National Laboratories
Kelly	Ibsen	Lynx Engineering, LLC
Daniel	Inman	National Renewable Energy Laboratory
Cesar	Izaurrealde	Joint Global Change Research Institute
Jake	Jacobson	Idaho National Laboratory
Yetta	Jager	Oak Ridge National Laboratory
Libby	Jewett	National Oceanic and Atmospheric Administration
Susanne	Jones	Pacific Northwest National Laboratory
Doug	Karlen	U.S. Department of Agriculture, Agricultural Research Service
Steve	Kelley	North Carolina State University
Pat	Kendrick	AGCO Corporation
George	Kervitsky	BCS, Incorporated

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First Name	Last Name	Organization
Keith	Kline	Oak Ridge National Laboratory
Susan Carson	Lambert	Earthworks, LLC
Bruce	Lippke	Consortium for Research on Renewable Industrial Materials
Patrick	Luckow	Pacific Northwest National Laboratory, Joint Global Change Research Institute
Sebnem	Madrali	Natural Resources Canada
Andras	Marton	Independent Project Analysis, Inc.
Laura	McCann	U.S. Department of Energy, Biomass Program
John	McGowen	Arizona State University
Sheila	Moynihan	U.S. Department of Energy, Biomass Program
Todd	Munson	Argonne National Laboratory
Jami	Nettles	Weyerhaeuser Company
Terry	Nipp	Sun Grant Association
Jeff	Obbard	Cellana, LLC
Gbadebo	Oladosu	Oak Ridge National Laboratory
Vance	Owens	South Dakota State University
Mark	Paster	Self-Employed
Valerie	Reed	U.S. Department of Energy, Biomass Program
John	Rezaiyan	3E Consulting, LLC
Richard	Rhodes	University of Rhode Island
Mary	Rosenthal	Algal Biomass Organization
Martin	Sabarsky	Cellana, LLC
Richard	Sayre	Donald Danforth Plant Science Center
Leslie	Schulte	Kansas State University

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COMPENDIUM INFORMATION

First Name	Last Name	Organization
Amy	Schwab	National Renewable Energy Laboratory
Theresa	Selfa	State University of New York – College of Environmental Science and Forestry
Kelvin	Shen	GENEWIZ
Nagendra	Singh	Oak Ridge National Laboratory
Lesley	Snowden-Swan	Pacific Northwest National Laboratory
Wally	Tyner	Purdue University
P.T.	Vasudevan	University of New Hampshire
Rich	Venditti	North Carolina State University
Justin	Wimpey	Antares
Marshall	Wise	Pacific Northwest National Laboratory
Eugene	Yan	Argonne National Laboratory
Yunhua	Zhu	Pacific Northwest National Laboratory

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

Analysis 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 not 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 not 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 performers have

- 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 made progress in its objectives and stated project management plan and has met its objectives in achieving milestones and overcoming technical barriers.

3. Project Relevance (1–10):

Please evaluate the degree to which

- a) The project identifies with and contributes to meeting the Platform goals and objectives of the Biomass Program Multi-Year Program Plan
- b) The project has considered applications of the expected outputs.

4. Benefits and Expected Outcomes (1–10):

Please evaluate the degree to which the project has advanced the state of technology that impacts commercial viability or environmental performance by

- a) Providing detailed analyses of life-cycle costs and benefits, sustainability metrics, and environmental impacts
- b) Accounting for the latest information on technical status, barriers, and markets in order to weigh benefits against costs and risks.

5. 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.

6. Overall Impressions (no score):

Please provide an overall evaluation of the project, including strengths, weaknesses, and any recommendations to the project approach and scope, as well as any other overall comments.

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.

