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

BIOMASS PROGRAM

INTEGRATED BIOREFINERIES

2011 Platform Review Report

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

Review Date

February 1–3, 2011

February 2012

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 Biomass Program's Integrated Biorefinery Platform Review meeting, held on February 1–3, 2011, at the U.S. Department of Energy, 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 Integrated Biorefineries 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.

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 Integrated Biorefinery Platform Peer Review meeting.

Neil Rossmeissl
Integrated Biorefinery Platform Technology Manager
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

EXECUTIVE SUMMARY

Summary from Review Panel

On February 1–3, 2011, the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Biomass Program held a Peer Review of its Integrated Biorefinery (IBR) Platform. The Peer Review meeting featured introductory presentations by Program staff to provide information on the Platform and presentations by the principal investigators of the federally funded projects that comprise the IBR Platform project portfolio. Due to the number of projects being reviewed (50 total projects), the IBR Platform portfolio utilized two independent Review Panels and balanced their workload to ensure that the review panels had a similar number of large-scale demonstration and deployment projects and smaller projects. Approximately 110 people attended the IBR Platform Review meeting and learned about the state-of-the-art research, development, and deployment activities being performed by the Program.

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 and multi-year program plans, as well as in the potential redirection of individual projects.

IBR Platform Peer Review Process

The goals of the independent review panel were to provide an objective and unbiased review of the individual research, development, deployment, and demonstration (RDD&D) projects, as well as the overall structure and direction of the IBR Platform. In forming its review panel, the IBR Platform evaluated 16 candidates with extensive experience in the contruction and operation of various types of large-scale projects. The Steering Committee helped ensure the independence and transparency of the overall Peer Review process by reviewing available biographies for Review Panel candidates during the planning process and provided feedback and recommendations to the Platform teams. A total of 12 reviewers, split into two Review Panels, were selected to ensure a breadth of experience and expertise relevant to the Platform portfolio. A list of Review Panel members for the IBR Platform can be found in Exhibit 2 on page 6 of this report.

At the Platform Review meeting, project principal investigators (PIs) presented their project budgets, goals, accomplishments, challenges, and relevance to the IBR Platform, as well as answered questions from the review panels and general audience. Projects were evaluated by the Review Panel solely on the basis of information that was either presented by the PI or contained in a multi-year program plan. Reviewers used a software tool developed to facilitate both scoring and constructive comments on a range of evaluation criteria. The results of these evaluations are available in a compendium document. Please refer to the Compendium Information on page 35 for additional information.

General Comments on the IBR Review

Based on the comments recorded by the two Review Panels, the overall balance of the projects in the Platform is good, and individual projects are generally strong. The strength of the Platform portfolio is demonstrated by the maturity of projects, many of which are poised to enter the construction phase in the coming 12 months. Overall the reviewers felt that the Platform had achieved a good variety of feedstocks, conversion technologies, and products. Additionally, the Review Panel was in almost universal agreement that the competitively awarded projects in the portfolio were well-articulated and highly relevant.

Large commercial-scale projects in the Platform face challenges in accessing capital. Presenters discussing these larger projects acknowledged a significant challenge in financing, either by obtaining substantial loan guarantee commitments by the federal government, acquiring sufficient equity, or both.

Project Performance

The peer reviewers generally reported that the IBR projects were performing well against targets and budgets. This observation is summarized well by one reviewer who wrote: "Management of the projects using front-end loaded (FEL) steps, funding approval steps, value engineering, and detailed independent engineering/ financial reviews appears to be working well. A number of projects reported improved plans and economics from these efforts."

Several projects acknowledged slippage against certain benchmarks, but, in general, the reviewers understood the projects' explanations for these occurrences and their approach to either overcome these hurdles and return to the anticipated benchmarks or adjust future activities to avoid compounding delays and overruns. It is recommended that more stringent and timely reviews of detailed Project Management Plans be implemented and strict enforcement of "go-no go" decisions be applied to these projects. For those that are not meeting their plans, it would be prudent to have progress reported more often than at peer reviews; on-site visits also may be appropriate

The reviewers routinely expressed some frustration regarding an absence of discussion on economics, the lack of detail on Project Management Plans, and/or insufficient description of how critical success factors will be managed. Often, presenters cited competitive business confidential information as a reason certain economic information required by the standard peer review presentation template was not provided in the review, whereas other presenters willingly disclosed the same information. This issue should be resolved in future reviews by communicating informational requirements to presenters in advance of the meeting.

While acknowledging the difficulty in accurately discerning technological synergies within the peer review process, some reviewers suggested that DOE consider a more defined or proactive initiative to transfer knowledge and experiences across the IBR portfolio, particularly in areas like effective C5 sugar fermentation, solvent recovery, and integration approaches for co-location at petroleum refineries and pulp and paper mills.

Portfolio Gaps

Catalytic biomass pyrolysis is not represented in the project portfolio. While classic pyrolysis is indeed part of the portfolio, emerging pyrolysis systems that incorporate catalysts appear ready for commercialization. Benefits of catalytic pyrolysis include the production of stable pyrolysis oil and potentially improved conversion yields. A few reviewers lamented the absence of wood-fired power and co-fired biomass/coal projects, but the co-lead reviewers believe these projects are outside the scope of the IBR Platform.

Several reviewers observed that the Platform should consider allocating more resources toward research and development (R&D) projects to promote a pipeline of innovation beyond those currently embodied in the project portfolio. This is being accomplished through projects in the individual technology platforms.

Increased resources in R&D may also include integrated bench-scale and pilot-scale competitive awards for technologies that show potential for deployment within existing systems, as well as novel integrated biomass conversion systems.

Platform Performance

Overall, reviewers believed the Platform is performing well. Many projects are scheduled to begin construction with the next 12–18 months, signifying visible progress to the public and legislators.

Reviewers highlighted feedstock sourcing and logistics and product off-take arrangements as crucial concerns on all Platform projects. As noted by one reviewer: “Feedstock logistics demonstrations should be part of any commercial-scale project.” Several commercial-scale projects experienced significant delays (1 year or more, as measured against the baseline plan) early in the process that were caused primarily by the significant efforts required to identify, contractually secure, and organize the necessary logistics (in one case, construct storage facilities). One reviewer observed, “[I]t will be interesting to see how feedstock prices react. As feedstocks begin to gather interest, their value and price is bound to rise with demand.”

Building upon this comment, two reviewers tied-in concerns about the long-term viability of product sales, noting: “One thing that does not appear to be adequately addressed is how viable and big the market is for their products … and methods to transport finished product to their customers. Who will customers be? It is not clear if they have a plan for actually ‘running’ a business.” And, “There is a concern that the projects may end up with a great plant but insufficient feedstock and/or market for their products unless they are required to provide evidence that they have covered these critical factors.”

Based on these observations, it is recommended that projects moving toward commercialization (i.e., those in demonstration- and pilot-stage now) should adequately consider both long-term feedstock acquisition and long-term product sales to assure DOE that their commercialization plans address potential feedstock and product supply-and-demand issues in order to advance their commercialization goals. Current demonstration- and pilot-scale projects appear to minimize or oversimplify the commercial and development issues associated with feedstock acquisition. These projects are focused on the technology viability and are less concerned with large market issues.

A few reviewers noted concerns surrounding the vagueness regarding start-up and operating costs. Adequately addressing the schedule and costs in this critical phase of work should be a key DOE concern. The projects should be compelled to provide details on plans to provide contractor support and vendor support, as well as re-work contingencies and other issues that are common in even the most mature process industry projects.

Based on the comments from the project presenters and the general observations among peer reviewers, the largest single and common obstacle to address is financing programs for larger commercial-scale projects. Unless this issue is addressed quite soon, the effort and expenditure of private and public funding to finalize the design and planning stages of the larger projects will, at best, enter a phase of re-pricing or re-scoping that will further delay groundbreaking and construction phases. Commercial-scale projects are dependent upon significant (80% to 100%) loan guarantees, and securing adequate equity funds (which reviewers believe to be a requirement for the loan guarantee commitment) will be dependent upon securing loan guarantees.

Secondary items identified by reviewers for strengthening the portfolio include initiatives focused on aggressive technology transfer and requiring projects to demonstrate sufficient long-term feedstock and product off-take arrangements. Both of these items are addressed elsewhere in this summary.

Suggested Changes to Improve the IBR Platform to Better Meet the Goals of the Biomass Program

DOE should continue to promote and evaluate crosscutting technologies in individual technology platforms that have potential to move into the pilot or demonstration phase. Reviewers suggested the following areas for future funding:

- Biomass fractionation as it applies to bio-based chemicals
- Coordinated applied technology development among experienced firms for catalyst applications that address aqueous and gas phase conversion processes
- Solvent or acid separation and recovery systems
- Value-added processing of waste streams
- Applications of membrane separation technologies (e.g., concentration of liquids or water removal)
- Catalyst development for alkene production
- Anaerobic digestion systems (and controls) for mixed, high Chemical Oxygen Demands (COD) waste streams
- Esterification in a catalytic distillation column
- Difficult solid and slurry material handling process steps.

DOE should remain vigilant in its projections of the anticipated quantities of fuels and products coming into the market from the IBR portfolio. Success of the portfolio is "heavily dependent on the success of individual projects. [And] because most projects are stretching the technology beyond known boundaries, the chance of success for individual projects is uncertain," one reviewer wrote. It is worth noting the following comment offered by one reviewer: "An examination of the portfolio projects and public knowledge from the peer review and the press indicates two projects may not be able to perform, and thus their contribution to 2014 production capacity targets will fall short. These projects are Range Fuels (19% of the total capacity) and Lignol (2.5%)."

Conduct of Future Peer Reviews

Need for a single panel: Future peer reviews should convene a single panel to review all projects. Convening a single panel may extend the days needed to accomplish the presentations and on-site, but a single panel would promote a more uniform ranking of Platform projects.

Need for standardized disclosures on schedule, budgets, progress: Co-lead Reviewers observed a theme in individual comments that suggest to DOE that public non-confidential reviews should be complimented with confidential reviews from a smaller panel to ensure consistent economic metrics and evaluations and promote in-depth technology reviews. Future peer reviews would benefit from summary reviews for individual projects prepared by DOE's independent engineer review teams as suggested by the 2009 Peer Review. This "Independent Engineer Summary" will help normalize key issues on schedule, budget benchmarks, and technical progress. Such a report may also include comments on the closure of material and energy balances and a commercial summary of feedstock and product off-take arrangements.

Addressing the hesitation to disclose certain information: Many projects were hesitant to disclose certain information due to proprietary concerns. This compelled some reviewers to reduce the scoring on those projects, and many reviewers noted this in their individual comments. To address this matter, one reviewer commented: "I would like to see a distinction and justification for doing publicly available results and presentations vs. the comprehensive project reviews, which, in my opinion, are MUCH more valuable to the project leads, and the contract and technical monitors. If we do public reviews, then we need to change the scoring and tracking accounting so that when the answer to the question is 'proprietary' during the reviews, we aren't inclined to down-score them."

Allocation of reviewers' time between larger and smaller projects: This individual comment reflects the feeling of many reviewers: "Reviews may benefit to [give] more presentation time and review to larger projects. To give a $250,000 or less project the same presentation time and review as the multi-million dollar projects is somewhat unbalanced." One approach would be to allow smaller projects (e.g., less than $2 million) to present their accomplishments in poster sessions while allowing larger projects to give longer oral presentations.

Need for transfer of "lessons learned" among projects Upon reviewing the individual peer reviewer's comments, there is a weakness in reviewing performance that can be addressed by a formalized process to promote sharing of "lessons learned." Upon reviewing the individual reviewers' comments, the lead reviewers believe a formalized process to promote sharing of "lessons learned" would be desirable. Admittedly a "lessons learned" synopsis likely would be difficult to implement, especially when many details on budgetary and schedule issues often are buried under confidentiality. Recognizing this limitation, it is suggested that DOE use appropriate resources to review and compile data and report on common issues that delay projects or cause cost overruns at set benchmarks and at project completion. A "lessons learned" synopsis may also embrace technology transfer issues (discussed later). Project successes and best practices should be compiled as well.

Independent Review of Range Fuels

The reviewers noted in their comments and in discussions during the on-site review that the recent publicly announced difficulty at Range Fuels was a significant event that was not adequately addressed. This was due to legal limitations on what could be openly discussed by DOE's Platform Manager. Apparently, representatives of Range Fuels declined to attend the Peer Review.

Building upon these sentiments, the panel recommends a Blue Ribbon review of the Range Fuels project. The lead reviewers understand that DOE is currently reviewing the failure of the project and will use its findings to guide future efforts. General themes that should be investigated and reported by an independent panel may include the following:

- Evaluation of the origins and approval of the initial project award
- Evaluation of the input and advice from DOE and its IE team during the course of the project, especially at critical decision points for scoping, schedule, and process performance evaluation
- Assessment of the decision-making steps that approved the use of public funds to proceed to construction and on multiple changes in scope and product mix
- Consideration of the lack of impact or influence of the 2009 Peer Review process in which this project was rated low and the peer reviewers' skeptical comments were largely dismissed by Range Fuels in its response to those comments.

Summary of Results: Platform

Criteria	Average	Range	Std. Dev.
Relevance	8.2	6-9	2.42
Approach	7.3	4-9	2.36
Progress	6.6	5-9	2.12

* 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	
5.5.10.1	Enerkem Heterogeneous Biorefinery Project, Pontotoc, Mississippi; Enerkem Corporation; Denis Arguin	8.4	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.1.4.1	Scale-up and Mobilization of Renewable Diesel and Chemical Production from Farnesene using US-based Fermentable Sugar Feedstocks; Amyris; Neil Renninger	8.4	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.7.4.1	Wood to green gasoline using Carbona gasification and Topsoe TIGAS processes; Haldor Topsoe, Inc.; Niels Udengaard	8.4	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.2.4.1	INEOS New Planet BioEnergy Indian River County Facility Peer Review Feb 1, 2011; INEOS Bio; Dan Cummings	8.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.6.1.1	Project Independence: Construction of an Integrated Biorefinery for Production of Renewable Biofuels at an Existing Pulp and Paper Mill Abstract - WBS 5611; NewPage Corporation; Douglas Freeman	8.1	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.5.12.1	Recovery Act: Pilot Integrated Cellulosic Biorefinery Operations to Fuel Ethanol DE-EE0002875; ICM, Inc; Douglas Rivers	8.0	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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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	
5.7.2.1	Biomass to Gasoline and Diesel Using Integrated Hydropyrolysis and Hydroconversion; Gas Technology Institute; Terry Marker	8.0	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.6.3.1	Demonstration Plant: Biomass Fuels to Liquids; Flambeau River BioFuels, Inc.; Robert Byrne	7.9	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.11.1.1	Integrated Algal Biorefinery (IABR) Commercial Demonstration Project; Sapphire Energy; Jaime Moreno	7.6	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.7.3.1	Demonstration of a Pilot Integrated Biorefinery for the Economical Conversion of Biomass to Diesel Fuel; Renewable Energy Institute International; Greg Tamblyn	7.4	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.5.3.2	BlueFire Fulton Cellulosic Ethanol Biorefinery; BlueFire Ethanol; William Davis	7.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.8.1.21	Biodiesel Production from Grease Waste; Eastern Municipal Water District; Mike Luker	7.1	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.5.11.1	High-Yield Hybrid Cellulosic Ethanol Process Using High-Impact Feedstock; ZeaChem Inc.; Tim Eggeman	7.0	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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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	
5.5.9.1	ClearFuels-Rentech Integrated Biorefinery Pilot Project for Diesel and Jet Fuel Production by Thermochemical Conversion of Woodwaste (CF-RTK IBR); Rentech, Inc.; Joshua Pearson	6.9	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.4.3.3	POET Project LIBERTY; POET; James Sturdevant	6.7	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.11.1.2	Integrated Pilot-scale Biorefinery for Producing Ethanol from Hybrid Algae; Algenol Biofuels Inc.; Craig Smith	6.7	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.8.1.20	Alabama Institute for Deaf and Blind Biodiesel Project Green; Alabama Institute for Deaf and Blind; Terry Graham	6.7	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.4.1.1	Development of Biofuels Using Ionic Transfer Membranes - Phase II. University of Nevada Las Vegas, Las Vegas, NV; University of Nevada Las Vegas; Lipinska-Kalita Kris	6.7	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.7.2.15	Anaerobic Digestion/ Combined Heat & Power Concept Development Project; Washington Suburban Sanitary Commission; Robert Taylor	6.5	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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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	
5.6.2.1	Integrated Forest Products Biorefinery in Old Town, ME DOE # DE-EE0003364; Red Shield d/b/a Old Town Fuel & Fiber; Richard Arnold (RSA)	6.5	-	X	-	This project will continue, but rescoped based on the results of a comprehensive project review performed outside of the Platform Review Process
5.7.1.1	Alpena Biorefinery;American Process Inc.; Theodora Retsina	6.5	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.7.5.1	Corn-to-Cellulosic Migration; LOGOS Technologies; EdeniQ, Inc.; Daniel Lane	6.5	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.4.9.1	Conversion of Lignocellulosic Biomass to Ethanol and Ethyl Acrylate; Archer Daniels Midland; Thomas Binder	6.4	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.5.7.1	Demonstration of Integrated Biorefinery Operations for Producing Biofuels and Chemical / Materials Products Mascoma MAS10BIO5; Mascoma Corporation; Michael Ladisch	6.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.2.3.1	Myriant Succinic Acid Biorefinery; Myriant; Alif Saleh	6.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.4.3.11	SUNY Cobleskill's Biowaste to Bioenergy Project; SUNY Cobleskill; Douglas Goodale	6.2	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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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	
5.5.5.1	West Coast Biorefinery Update; Pacific BioGasol; Paul Koehler	6.1	X	-	-	This project is ending due to mutual agreement.
5.4.10.1	UOP Pilot Scale Biorefinery for Sustainable Fuels from Biomass via Integrated Pyrolysis and Catalytic Hydroconversion; UOP LLC; F Stephen Lupton	6.1	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.4.8.1	Elevance Pilot Biorefinery - Metathesis Based Biorefinery for Chemicals and Fuels; Elevance; Chander Balakrishnan	6.1	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.4.5.11	Award Number: EE00000435 Seattle Steam Company Seattle, WA; Seattle Steam Company; Stan Gent	6.0	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.7.2.17	Pecos Valley Biomass Energy Project; Pecos Valley Biomass Coop; Jay Lazarus	5.9	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.4.4.1	Integrated Biorefinery for Conversion of Biomass to Ethanol, Synthesis Gas, and Heat, 2011 IBR Platform Review; Abengoa; Gerson Santos	5.8	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.8.1.26	"Development of an Economic and Efficient Biodiesel Production Process."; University of North Carolina at Pembroke; Cornelia Tirla	5.7	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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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	
7.7.2.8	Hot Water Extraction of Woodchips and Utilization of the Residual Chips and Wood Extracts; SUNY ESF; Thomas Amidon	5.6	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.5.7.3	Southern Pine Based Biorefinery Center; Georgia Tech; Arthur Ragauskas	5.5	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.8.1.23	The Biorefinery in New York – Bio Butanol from Biomass; SUNY ESF; Thomas Amidon	5.4	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.7.2.12	Biogas Center of Excellence;Michigan Economic Development Corporation (MEDC); Nadia Abunasser	5.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.7.4.10	Trenton Fuel Work Biorefinery Development Project;Trenton Fuel Works LLC; Stephen Paul	5.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.8.1.22	WI Biodiesel Blending Program; Wisconsin Office of Energy Independence; Maria Redmond	5.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.8.1.24	Institute for Sustainable Energy (ISE); University of Alabama; Ajay Agrawal	5.2	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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7.4.3.8	Town of Munster, Indiana Centennial Park Waste-to-Energy Cogeneration Project (IN); Waste-to-Energy Cogeneration Project (IN); Jim Mandon	4.9	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.4.1.10	Feasibility Studies on Process Coupling of Transesterification and Methanol Synthesis Using Cellulose Biomass and Bio-oil; Western Kentucky University Research Foundation; Wei-Ping Pan	4.9	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.3.6.4	Green Power Initiative; University of Iowa; Barry Butler	4.7	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.4.2.7	Fly Ash Emerging Frontiers; Ceramatec; Chett Boxley	4.6	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.3.6.3	Minnesota Center for Renewable Energy; Minnesota State University - Mankato; John Knox	4.6	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.7.2.20	Next Generation Biofuels; University of Nevada, Reno;	4.6	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.

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			Continue Project	Continue with Possible Adjustments to Scope	Other	
7.5.9.2	Biorefinery Demonstration Project; University of Georgia; David Lee	4.3	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
7.5.7.2	Biomass Energy Resource Center - Core and Program Support;Biomass Energy Resource Center (BERC);Adam Sherman	4.0	X	-	-	This project is recommended for continuation, provided all contractual are satisfied.
5.5.6.1	Peer Review 2011 presentation for Lignol Biorefinery Demonstrtaion Plant;Lignol Innovations Inc.;Michael Rushton	3.7	-	-	X	This project is ending due to mutual agreement.

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INTRODUCTION

On February 1–3, 2011, the U.S. Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Biomass Program held a Peer Review of its Integrated Biorefinery (IBR) 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.

Neil Rossmeissl was designated by the Biomass Program as the lead for the IBR 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. Mr. Rossmeissl was 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 110 people attended the IBR 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 IBR Review Panel, and describes the role of the Steering Committee.

This report represents the results of the IBR 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 IBR 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 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 Integrator, and contractor support. The planning team held weekly planning meetings beginning September 2010 to outline the review procedures and processes, plan each of the individual Platform Reviews and subsequent Program Review, and 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 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. The Steering Committee serves as a working partner with the Biomass Program, and members are involved throughout the planning and implementation of the review process, providing comment and direction to ensure that the Program receives and publishes calibrated, independent, and transparent project portfolio feedback. Among 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 process and 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 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. For the purposes of the Peer Review process, the individual Platform Review meetings are held, information is processed, and Platform Review comments and scoring outputs generated to preform a comprehensive review of the Biomass Program. The 2011 Biomass Program Peer Review process reviewed eight platforms in three distinct series of meetings held from February through April 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 Program technology platform areas. The overall structure and direction of each platform was also reviewed. A separate Review Panel and designated Lead Reviewer were selected for each platform review. Review Panels comprised 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 the six members of the Steering Committee and the Lead Reviewer from each of the eight Platform Review Panels.

IBR Platform Review Panel

Each platform portfolio was reviewed by a Review Panel of experts from outside the Program. The purpose of the Review Panel was 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. In forming its Review Panel, the IBR Platform evaluated 19 candidates 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 the COI form.

Due to time and meeting constraints, the large IBR Platform Project portfolio was split and reviewed by two separate, but balanced review panel teams, over the course of the 3 day meeting. These teams were rotated at set intervals so that both review panel teams, identified as Panel A and Panel B, reviewed an equal number of large demonstrations and smaller projects that make up the portfolio. Neil Rossmeissl, the Biomass Program lead for the IBR Platform, designated two members of the review panel to serve as the Lead Reviewers for the Panel A and Panel B. Drs. David Webster and George Parks were selected to these positions in Panel A and B, respectively. Drs. Webster and Parks as the Lead Reviewers in the IBR Platform were responsible for coordinating Review Panel activities, ensuring independence of the Panel, overseeing the production of the Platform Review Report. George Parks represented the Panel at the Program Peer Review in June.

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, as well as provided feedback. Platform review planning teams considered the Steering Committee feedback in making final decisions on the Review Panel. Exhibit 2 lists Review Panel members for the IBR Platform.

Exhibit 2 | IBR Review Panel

Name	Affiliation
Panel A	
Mark Downing	Oak Ridge National Laboratory
R. Lynn Montague	Harris Group, Inc.
Todd Potas	US Water Services
Alan Propp	Merrick & Company
Robert Reed	Consultant
David Webster*	Ark Resources, LLC; Auburn University's Alabama Center for Paper and Bioresource Engineering
Jimmie Humphrey (via webinar)	GDX Automotive
Panel B	
Don Frikken	Monsanto (retired); Becht Engineering
Roger Griffith	Consultant
Steve Moorman	Babcock & Wilcox Company
George Parks*	Conoco Phillips (retired)
Thomas Richard	Penn State University
Ken Robinson	Consultant

* Denotes Lead Reviewer

Organization of this Report

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

- Results of review panel comments on the overall IBR Platform
- The Biomass Program IBR 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—PI responses to reviewer evaluations for their projects can be found in a compendium document.

PLATFORM OVERVIEW AND EVALUATION

Platform Overview

The role of the Integrated Biorefineries (IBR) Platform is to demonstrate and validate cost and performance data for various biofuel conversion pathways through building and operation of pilot-, demonstration- and commercial-scale IBR facilities by public-private partnerships. The IBR Platform is focused on resolving key issues involved in the scale-up of IBR systems. These projects will help overcome barriers and promote commercial acceptance, ultimately reducing risk for private sector financing of follow-on plants.

The activities of the IBR Platform contribute to all of the biorefinery pathways. The Biomass Program is committed to completing the construction and operation of pilot-, demonstration- and first-of-a- kind commercial-scale projects that convert biomass into advanced biofuels. The cost-shared partnerships are essential to bridging the "valley of death" between R&D and commercial deployment of renewable biofuels technologies.

For additional information on the IBR Platform, please review the most recently available information, which is presented in the Biomass Program's Multi-Year Program Plan (MYPP), section 2.3 (http://www1.eere.energy.gov/biomass/pdfs/mypp_april_2011.pdf); or the presentation materials presented at the Platform Review (http://obpreview2011.govtools.us/presenters/public/InSecureDownload.aspx?filename=Biomass%20Program%20overview.pdf).

RESULTS

Reviewers evaluated the IBR 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: 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 IBR Platform ranged between 8.4 and 3.6, with a mean of 6.2. 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*	Standard Deviation	Range
Relevance	8.2	0.94	6-9
Approach	7.3	1.30	4-9
Progress	6.6	1.16	5-9

* Average represents mean of individual reviewer scores. Review Panels did not develop consensus scores. The critera “Overall Impressions” and “Additional Recommendations, Comments, and Observations” were not scored.

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?

Reviewer Comments

The Platform goals and technical targets are clearly articulated. Two Biofuels Consortia have been assembled to break down critical barriers for commercialization of algae-based and other advanced biofuels. The Platform goals and planned activities support the goals and objectives outlined in the MYPP.

To increase commercial viability of the IBR Platform, it is recommended that Biomass Program-funded projects (PIs and Managers) fully report complete and accurate economics of their projects, as addressed in "Appendix C: Calculation Methodology for Cost Targets" in the MYPP.

It is recommended that projects be required to achieve closure of material and energy balances (greater than 95%), collaborate with other organizations (especially the process industries), and develop remedial solutions to prevent safety problems before they occur. This should occur in very early phases of any experimental testing.

The Platform goals were well articulated and all project types were relevant to the DOE Biomass Program goals.

The Platform goals in the MYPP are very comprehensive and the selection of projects for the IBR Platform covered a wide spectrum of feedstocks and conversion technologies that end up making a variety of fuels—ethanol, biodiesel, gasoline, and algae crude.

The goals of the MYPP could be met if the major demonstrations, and other projects in the portfolio can make it to the finish line.

The technologies are there and will very likely work, the economics are just really hard. Without some kind of boost for biofuels (subsidy) or some penalty placed on conventional fuels it is going to be tough to make this work as a commercial process.

For now, the best that can be done is to demonstrate the technologies, find the most promising ones, gain public acceptance and go to work trying to reduce the production cost.

Given there is an economically feasible process, it will be interesting to see how feed stock prices react. As feedstocks begin to gather interest their value and price is bound to rise with demand.

This Platform's relevance was highly bi-modal.

The competitive awards were for the most part highly relevant, while the smaller projects often are not.

It is unfortunate that there are no smaller competitive awards for pilot-scale integration of new technologies, as there are a number of innovative new approaches that are not represented in the portfolio and do not have a clear path to demonstrate the effectiveness of integration.

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Reviewer Comments

The goals of the IBR Platform as expressed in the Biomass Program Strategy and Timeline for Technology Development support the overall goals of the MYPP.

The IBR Platform goals are aggressive, clearly stated and appear to be achievable based on the review of the projects. The projects reviewed are well positioned to significantly contribute to and accelerate commercialization of biofuels.

Although recognized as an IBR Platform challenge, the current IBR projects needs more work on feedstock logistics as the demonstration plants progress toward commercial scale. Feedstock will be a limitation on the overall success of the MYPP goals.

Financial resources for the startup and operation periods of most of the projects reviewed will be critical to project success. If possible, some DOE funding should be allocated to operating periods on all projects.

In most projects reviewed it appears that DOE funding will be used to minimize first costs to improve project economics.

This Platform's relevance was highly bi-modal.

The competitive awards were for the most part highly relevant, while the smaller projects often are not.

It is unfortunate that there are no smaller competitive awards for pilot-scale integration of new technologies, as there are a number of innovative new approaches that are not represented in the portfolio and do not have a clear path to demonstrate the effectiveness of integration.

The goals of the IBR Platform as expressed in the Biomass Program Strategy and Timeline for Technology Development support the overall goals of the MYPP.

The IBR Platform goals are aggressive, clearly stated and appear to be achievable based on the review of the projects. The projects reviewed are well positioned to significantly contribute to and accelerate commercialization of biofuels.

Although recognized as an IBR Platform challenge, the current IBR projects needs more work on feedstock logistics as the demonstration plants progress toward commercial scale. Feedstock will be a limitation on the overall success of the MYPP goals.

Financial resources for the startup and operation periods of most of the projects reviewed will be critical to project success. If possible, some DOE funding should be allocated to operating periods on all projects.

In most projects reviewed it appears that DOE funding will be used to minimize first costs to improve project economics.

The Platform goals are clearly identified in the opening slides.

These goals clearly support the goals and objectives outlined in the MYPP.

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Reviewer Comments
Platform goals, technical targets, and barriers are well articulated and coordinated within the MYPP. The current portfolio of projects and upcoming planned activities for individual projects appear well positioned to advance the MYPP. While delays and even some failures might reasonably be anticipated, the commercial viability of sustainable biofuel will advance, as many projects mature into the construction and operations phases in the 2011–2013 period. Due to confidentiality claims this reviewer finds it difficult to comment on likelihood of the Platform's projects to achieve the production cost targets. This matter must be evaluated by the Program in its independent and confidential reviews wherein full disclosure by portfolio projects can be obtained. The Platform can be improved by implementing the following: An aggressive initiative aimed at transferring empirical "lessons learned" knowledge across its portfolio. This initiative will help accelerate the commercialization of biofuel/biochemical production projects now completing design and starting construction. For new competitive solicitations, adequate budgets should be provided to reviewers to assure reasonable professional compensation for professionals' advice so that the evaluation and selection process can expand its pool to include professionals in the biomass conversion industry employed by smaller firms. Adequate budgeting to address this change will attract professionals outside of large corporations, academia, and other government agencies who do not need to rely upon, or indeed are prohibited from accepting, compensation to accomplish this important aspect of the program.
I am very pleased with the IBR Platform. I can't think of anything in particular that I would change about it. Good work.
I am recommending that the differences between the "Platform" status of IBR and Infrastructure be more clearly defined. Reviewers will always struggle with the relationship between IBR/Infrastructure and the other Platforms. If there is any confusion between the relationship between sustainability and logistics within the Feedstock Platform, we exacerbate it by discussing the relationship between research, demonstration-, and commercial-scale work in the IBR and Infrastructure areas. Do we still do a MYTP as well as the MYPP?
Excellent mix of projects with commercial potential, IBR, and pilot-scale projects along with contributing bench-scale research.
This was my first opportunity to participate in this type of review. I do not feel that I can fairly offer changes to the Platform.
Program has assembled a good portfolio of projects of varying scales, technologies, and levels of maturity.
Platform goals are clear and support the objectives described in the plan. Completing construction, startup and operation of the IBR projects will help us find the commercially viable pathways. Some will succeed, some will become expensive experiments. It seems to me that a project aimed at improving safety and efficiency of the use of firewood to heat buildings might be a valuable addition to the portfolio.

Technology Manager Response/Comment

The Technology Manager appreciates your comments and generally agrees with them. The Platfrom will work within the Program to address reviewer critiques and implement recommendations. We will continue to make improvements to the reporting of project economics while protecting company sensitive data.

Approach (1-10)

Please evaluate the degree to which:

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.

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?

Reviewer Comments

The Platform portfolio appears to be focused and balanced to achieve the Biomass Program and IBR Platform goals.

The Platform approach of monitoring the progress of projects through Peer Reviews provide the opportunity to keep projects on track in terms of meeting goals on time and within budget.

Unfortunately, multiple projects are behind schedule, over budget, and/or challenged to meet their technical goals.

It is recommended that more stringent and timely reviews of detailed Project Management Plans be implemented and strict enforcement of "go-no go" decisions be applied to these projects.

For those that are not meeting their plans, it would be prudent to have them report their progress more often than at Peer Reviews and on-site visits may be appropriate.

The Platform approach was effective and kept the projects on schedule and on track.

The project participants know a great deal about their resource areas, like timber, paper mills, etc., but not very much about chemical processing.

This could lead to some problems in commercialization.

- Every project needs a chemical engineer/process chemist on their staff.
- Stoichiometry, heat and material balances, thermodynamics, and heat transfer all need to be addressed in a technically rigorous way.

I believe the Platform approach is well conceived and organized.

The Platform has a balance of feedstocks and conversion technologies that all deserve a chance at demonstration.

The large demonstrations projects that I reviewed had experienced and knowledgeable principals in charge and had reasonable plans for deployment including phased spending and ongoing research running parallel with project development.

Unfortunately the general economy and the process economics are making the deployment of demonstrations difficult.

More financial support is needed to get these demonstrations to the finish line. That's a hard sell these days.

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Reviewer Comments
I did not get as clear an explanation as I would have liked for why DOE is investing IBR funds in different categories, or why those categories are the only relevant ones. It seems like the Program would benefit from additional effort to articulate goals and aspirations. However, because I was not able to participate on the final day, I may have missed some of this material.
I did not get as clear an explanation as I would have liked for why DOE is investing IBR funds in different categories, or why those categories are the only relevant ones. It seems like the Program would benefit from additional effort to articulate goals and aspirations. However, because I was not able to participate on the final day, I may have missed some of this material.
The IBR group of projects is an impressive portfolio with variety in scale, technology, feedstocks, and business plans. Many reviewed projects presented well developed implementation plans and have passed critical independent review steps. Management of the projects using front end loaded (FEL) steps, funding approval steps, value engineering, and detailed independent engineering/financial reviews appears to be working well. A number of projects reported improved plans and economics from these efforts. Feedstock logistics demonstrations should be part of any commercial scale project.
In general the Platform approaches are effective and are in line with technology development goals.

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Reviewer Comments

The projects in the Platform generally adhere to a technically sound approach through emphasis on pilot-/demonstration-scale integrated testing.

Overall the portfolio is well balanced between conversion pathways, unit operations, and product mix.

This reviewer notes that the Myriant project appears to be an exception to this generalization in that it is solely focused on a commodity chemical.

Other projects (e.g., Red Shield/Old Town, Flambeau) also pursue product value outside the ethanol market, but they are more squarely aligned with the MYPP focus on fuels.

The Platform shows a good diversity of projects and there are reasonable synergies among projects.

Focus has been maintained in key technical areas that feed into the IBR Platform (e.g., feedstock, conversion RD&D, market issues.).

A weakness in product market impacts was observed by this reviewer for the current pilot-scale projects, but these projects (at this time) are focused on the technology viability and less concerned with large market issues.

Understandably, market issues play a much more prominent role when development efforts move beyond technology validation and towards larger-scale deployments (i.e., demonstration-, and especially commercial-scale projects).

The single item required to strengthen the portfolio in the next 12 months is for DOE to assure there is aggressive transfer of knowledge ("lessons learned") across projects. This reviewer is unclear about the Platform's approach to transferring knowledge in critical areas and this is best exemplified by projects relying on ag-waste feedstocks.

Abengoa and POET, for example, have many experiences in the nuts-and-bolts of identifying, securing (via contracts), harvesting and arranging storage of feedstocks. They have worked with original equipment manufacturers on harvesting equipment. This reviewer sees several opportunities where this knowledge will benefit other projects (e.g., UOP, ADM) in either their current project or their plans for large scale commercialization.

Other areas of experience related to the R&D areas in the MYPP that are transferable to other projects (and eventually, this emerging industry) include effective C5 fermentation, solvent recovery, and integration approaches for collocation at petroleum refineries and pulp-and-paper mills. Given that public monies have been invested to facilitate development of selected projects,

DOE must incorporate a method to transfer this type of synergist knowledge across its portfolio. This will avoid repeating mistakes and accelerate other projects' deployment and commercialization.

Refer also to "additional comments" section.

The technology development is taking longer than anticipated.

The DOE can't do much more than it has, except make guaranteed loans more available.

Whether that's feasible in today's budgetary climate I don't know.

It appears this is the age-old problem of funding R&D before funding for commercial development.

It is difficult to move commercial development forward when there are still some glaring research holes.

Some of the Projects, earmarks and other "things" are tough to pigeon-hole in the IBR and Infrastructure area.

At the risk of stove-piping, perhaps DOE should think about Thermochemical IBRs or Education and Outreach Congressionally Directed Projects (CDPs) being included and guided by others in the Program.

There are clear distinctions between research in thermochem, biochem; education and outreach; work toward feedstock characterization and resource assessment; and sustainability/NEPA compliance.

They probably all deserve more equitable consideration.

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Reviewer Comments
Approach has been productive at developing technologies to the commercial scale and several will be breaking ground this year. It may be difficult for projects economically, except for the ones making higher value speciality chemicals.
This was my first at this type of review. I do not feel that I can fairly offer changes to the Platform or comment on weakness and strengths.
Flambeau River & NewPage projects use identical technology. Should both be funded, or should funds have gone to a different technology?
The IBR approach is appropriate. The smaller projects reviewed as part of the IBR Platform, many of which are only remotely relevant to the program, considerably dilute the efforts of DOE staff and contractors in managing meaningful projects.

Technology Manager Response/Comment

The Technology Manager generally agrees with the comments on our approach and appreciates the thought and consideration put into these comments. We will continue to make adjustments and improvements in our overall approach, implementing your comments and recommendations as feasibl

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.

Reviewer Comments

The best projects appear to be on track with their technology, timeline, and budget, which indicates that the Platform is progressing toward achieving Biomass Program and Platform goals.

Some projects are not on track.

It is difficult to know what to expect from some projects because they don't all appear to be using the same basis for determining their economics.

- Perhaps it would be helpful if the projects were provided a spreadsheet with cells for them to "drop-in" specific numbers. The spreadsheet would calculate results and DOE could see the basis for their economics and clearly understand how they are progressing.
- It is also recommended that projects be required to report degree of closure for material and energy balances.
- It would be helpful if projects provided copies of letter agreements they have with feedstock suppliers and potential customers, and project financing. There is a concern that the projects may end up with a great plant, but insufficient feedstock and/or market for their products unless they are required to provide evidence that they have covered these critical factors

I had some confidence that technically all of these projects that were part of the DOE funding made sense.

In fact, I came away from the meeting realizing that many of these will eventually be commercialized.

We have come a long way from 4–5 years ago.

The emphasis on corn based ethanol left me feeling queasy in the past, but I now see that this broader based Biomass Program will not pick a winner too early, but let things play out as they may.

Given the small pilot process that some of the demonstration plant's designs were based on, there is a lot of technology risk to be managed.

Financing these projects is also a challenge given the risks involved and the difficulty in projecting the final cost of the biofuels product.

Getting these demonstration projects up and running and then closely scrutinizing the actual plant performance, including feedstock cost and operating and maintenance expenses, to get a handle on the true production cost, are key deliverables that are needed to gauge the success of the Biomass Program.

Progress has been quite slow.

This is a particular problem for the commercial biorefinery demonstrations, which are having great difficulty getting financing.

There is a lot of uncertainty in the investment community about the potential for success, and seems like several projects would have benefited from mid-scale pilot operations to build confidence.

Any failures in commercial-scale operations will be a public relations as well as financial disaster; this Platform cannot afford to fail.

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Reviewer Comments

Great progress has been made in advancing numerous projects to start of construction and to the decision point for start of construction.

A number of projects are at a critical stage where they cannot progress without financing.

The IBR Platform needs to work to assure needed approval steps are not delayed and the associated loan guarantees are timely.

Strategy for financing the projects needs continuous development during the project selection, review, and implementation.

The Platform is progressing toward meeting the technology development timeline goals.

This progress is slower than anticipated and the timeline may slip.

Lack of funding appears to be the major cause of delay in some of the projects coupled with unrealistically optimistic schedules.

Milestones and schedules for individual projects are in general agreement with the overall IBR schedule given in the MYPP.

Progress tracking measures appear satisfactory.

Marking progress in production cost targets is assumed by this reviewer to be a useful metric when full disclosure is made in confidential reviews conducted by DOE and it's IE experts.

However, requirements outside the Program's control may adversely effect the current schedule and performance targets. Specifically, several large projects (Abengoa, POET) expressly tied their near-term ability to start construction with loan guarantees (a separate Program within DOE).

Other projects expressed the need for additional equity to meet award conditions to proceed with their projects.

An examination of the projects and public knowledge from the Peer Review and the press indicates two projects may not be able to perform and thus their contribution to 2014 production capacity targets will fall short. These projects are Range Fuels (19% of the total capacity) and Lignol (2.5%).

A reduction in scoring was made due to the potential impact on the production capacity targets if these two projects are not successful.

It unlikely that the biofuels industry will achieve the stated goals of the MYPP.

The following is my recommendation:

- DOE should use an earned value management system on its projects. It's the best way I know how to track the progress on these projects.

DOE is doing better than in the past.

DOE has a change-control process and other research that provides some bounds on the probability of achieving targets, but it would be good to have probabilities assigned to the chances of actually achieving these by a certain time.

Recommendation:

- DOE should have a distinction and justification for doing publicly available results and presentations vs. the comprehensive project reviews.
- If DOE continues to use public reviews, then we need to change the scoring and tracking accounting so that when the answer to the question is "proprietary" during the reviews, we aren't inclined to down-score them.

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Reviewer Comments
Progress is somewhat behind schedule due to financing on the applicant side, while some projects that are the most promising have reduced their DOE operating scope of work limiting the data that will be generated.
I recommend a more detailed review and analysis of data and site visit would be useful in tracking progress. Perhaps this is or will be done.
Most projects on schedule. Financing for large projects may delay or prevent execution.
The IBR projects are making good progress, many more slowly than originally scheduled. Most projects that are behind the original schedule were delayed until the technology to be employed matures sufficiently, which is a good approach to minimize wasteful spending. I believe the goals have a reasonable chance of being met, but they depend heavily on the success of individual projects. Because most projects are stretching the technology beyond known boundaries, the chance of success for individual projects is uncertain.

Technology Manager Response/Comment

The Technology Manager agrees with the comments regarding our progress and reviewer acknowledgment of progress that has been made since the last review. Our portfolio projects have significant barriers to overcome in order to achieve project success. We will explore all means of implementing reviewer comments and recommendations.

Overall Impressions

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

The IBR Platform project portfolio addresses the MYPP in terms of diversity of feedstocks, conversion technology, and products.

Reviewer Comments
Some of the projects appear to be on the cusp of economic viability though it is not entirely clear what is included in their economics. One thing that does not appear to be adequately addressed is how viable and big the market is for their products. Also, some projects do not address costs and methods for collection, transportation, and storage of feedstock to the plant or costs and methods to transport finished product to their customers. Who will customers be? It is not clear if they have a plan for actually "running" a business.
Overall, the Biomass Platform review ran quite well. I heard from one of my friends in Colorado that listened to the webinar presentations and she got a lot out of the talks. You can tell that a lot of effort went into this Peer Review and it came off reasonably well. Keep up the good work....
In general I think the Program is very comprehensive. I was a bit surprised that there was no demonstration of a large biofuels co-firing project. I would have thought a co-firing project might have made it to demonstration.
The competitive biorefinery grants are very effective and well balanced across demonstrated technologies. The congressionally directed projects often are not. The opportunity cost of supporting those projects is large, especially relative to similar sized competitive projects that could be pioneering much more innovative technologies.
Given the number of projects, the diversity of scale, process technology, and feedstocks, the Program appears to be on track for making an important contribution to the MYPP goals. The IBR Project strengths are technology and project management. The projects are generally based on strong business plans, which show industry support for the MYPP goals.
The mix of projects is very good. There is a wide mix of feedstocks and conversion technologies represented. There is some concern with the smaller companies which are lacking resources and adequate funding. The larger companies that have the resources and are familiar with the ethanol industry and have experience developing ethanol plants (i.e. Poet. ICM, Abengoa, ADM, etc.) have a much better chance of demonstrating integrated biorefineries in the near future.

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Reviewer Comments
This reviewer was encouraged by the Platform's progress and its planned activities for the coming 2 years. The MYPP appears to have been updated based on experiences across the Program and, although still ambitious, appears realistic. Weaknesses and gaps include: • Tracking and identifying true cellulase and xylase enzymes cost and production capacity remains a very fuzzy area. • The need for more emphasis on biobutanol and its downstream reforming. • De-risking thermal & energy integration techniques including value-added waste processing
My overall impression of the program is very favorable. Unlike the general public and the *Wall Street Journal*, I understand that these projects take a long time, are expensive, and some of them may fail. None of that should, however, hinder us from continuing to seek ways to reduce our dependence on foreign, fossil fuels. I didn't see all the presentations, but one gap that I believe exists is that there doesn't seem to be any open pond-based biofuels development. Some of the industry pundits claim that the only way that algae-based biofuels will ever be produced economically is in open ponds. The basic contention is that photobioreactors, regardless of their design, will always be too expensive. Therefore, I would recommend funding an open pond-based algae-to-biofuels company in the next round.
We are going to need to address power in addition to fuels and chemicals. These all compete for the same pile of biomass under more and more stringent sustainability measures.
Platform is impressively diverse in geographical coverage including many different feedstocks and technologies for them. Risk of not producing successful projects in the mix is low.
My overall evaluation is that the things are managed well with the size of the work load. Because of work load size, some compromises are necessary.
Programs are generally well managed and well selected. Large programs are entering crucial execution phase.
The IBR portion of the Program is very well done. The main weakness is the resource loss to mostly irrelevant smaller projects that were reviewed as part of this portfolio. It seems to me that improving the safety and efficiency of heating buildings with firewood might be a good pathway to explore.

Technology Manager Response/Comment

The Technology Manager appreciates reviewer comments on their overall impressions on the projects and Platform management. The comments and recommendations will be fully considered and, to the extent possible, reviewer input will be used to guide future directions within these activities and in our review processes. Recommendations pertaining to biopower or combined heat and power operations currently are being considered in other areas of the Program.

Additional Recommendations, Comments, and Observations.

Reviewer Comments
The following are recommended: • That Principal Investigators and Managers of IBR projects fully employ the information and principles provided in the MYPP in the areas of (1) economic analyses, (2) IBR process safety, and (3) collaboration with others, particularly the process industries. • Principal Investigators and Managers of IBR projects should review pages 2-52 to 2-61 for IBR coverage and Appendices B-1 to C-13 in the MYPP for economic guidelines, bases, and targets.
I was impressed how the two wood projects in Wisconsin (Flambeau River and NewPage) collaborated and compared their economics. Need to see more of that kind of cooperation. There are some great projects underway in the DOE SBIR program that look at many of the same issues and it would be helpful to take a look at these on water removal from ethanol, via membranes, esterification in a catalytic distillation column, etc. Perhaps co-processing of coal with biomass would be good to look at. Also, there is a new pump available that GE bought the technology (Stamet), which is excellent for pumping high moisture coal and would probably work for biomass. It was originally developed for pumping shale into a pressurized retort, but is now used to feed high moisture coal and lignite into a GE gasifier. It will be used on a project in Wyoming to gasify Powder River Basin coal. Commercialization will ultimately hinge on getting financing, so it is critical for the federal government to set up both a loan guarantee for the capital and also to set a limit on the lowest price that the product can be sold for. If this is done, it will convince investors to put their money into these biofuel projects and not worry about it being at a huge risk, if world oil prices drop down significantly.
The difficulty is trying to gauge the economics of all of the projects. Would there be a way to generate a common economic formula, which everyone had to use that included a fixed set of criteria, i.e., discount rate, interest charge, evaluation time, dollar year, etc.? We did it with Levelized Cost Of Energy (LCOE) in evaluating Clean Coal's technologies. Is there a way to derive a levelized cost of biofuels that would be able to place all of the technologies on some kind of equal footing for techno-economic evaluation? I enjoyed the opportunity to review the projects. The impression is that only a few of the projects had the opportunity to be game changers in biofuels production. Only a few of the university projects looked to have the chance to make a big impact on biofuels development. However, if the biofuels business is to be successful there will need to be professors and students that are learning the technology. It is a good opportunity to expose them to biofuels processing and provide the next generation of plant designers, developers, and operators. For that reason alone, I think many of the congressionally directed projects were worth the price.

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Reviewer Comments

The public venue is difficult for this type of review of private company projects with significant trade secret concerns.

Many of the companies were unwilling to share key technical details that we considered important for our evaluation. We therefore needed to assume the internal DOE program officers have the technical expertise to critically review the technology. But given the technical expertise of the reviewers, this seems like a missed opportunity.

The review process would benefit from earlier scheduling of reviewers, hotel rooms, team assignments, etc. The on-site activities could use a bit more scheduled down-time to catch up with reviews.

Finally, although I have suggested some potential improvements, I did feel the process was professional and will have positive impact.

Thank you for this opportunity!

For projects going into commercial operation, the financial plans need to have sufficient reserves to manage problems. Business plans should not depend on revenue from high plant availability in the early years of operation.

Well before start up at commercial scale, the projects should include demonstration of feedstock logistics (for crop waste or fuel crops) and integration with the plant intake process step. Material handling problems are very often a major challenge in start-up and early operations.

Although Group A did not review all the commercial-scale nor demonstration-scale projects, it appears that most projects have not done much work on the difficult solid and slurry material handling process steps (although a few projects indicated good progress with specific equipment).

A suggestion is for larger scale projects to share specific equipment experiences through DOE sponsored conferences or through user groups. As noted by several projects, the commercial success can depend on equipment vendor involvement. The major equipment vendors for the commercial size plants should be recognized and encouraged by DOE to advance the Program goals.

Given the size of the DOE investment in commercial plants, the IBR Platform should monitor construction efforts and have experts identified that can assist in solving problems if needed during start up and operation.

A lot of the projects seem to have the tendency to cut back on operations and testing funds or test duration when they are over budget or have overruns in the early stages of project.

While this will be difficult to prevent, it should be monitored closely and discouraged.

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Reviewer Comments

This reviewer offers three additional recommendations to strengthen the portfolio and to help advance the overall objectives of the MYPP:

DOE should consider additional Funding Opportunity Announcement's focused on the development of unit operations/processes. These may be maturing and within the biomass conversion process.

Scoping of the solicitation can draw upon the technical barriers and challenges in the existing projects and may include an element to encourage vendors with existing commercial systems to adapt their equipment for biofuel/biomass systems or validate new equipment for biofuel use.

Examples include:

- Solvent or acid separation and recovery systems;
- Value-added processing of waste streams;
- Application of membrane separation technologies;
- Catalyst development for alkene production;
- Anaerobic digestion (AD) systems (and controls) for mixed, waste streams with high Chemical Oxygen Demands (COD).

DOE should initiate (or, better publicize) activities to introduce U.S. biofuel companies to current advances and existing systems available abroad. For example, AD systems and controls using mixed substrates are well developed and deployed in the European Union market area.

This initiative may include:

- Coordinated outreach to foreign "sister" agencies in energy/environment and their commercial affairs offices
- Follow-up symposia funded partly by foreign vendors to demonstrate and promote technologies for the U.S. market
- Opportunities in licensing, fabrication, or direct investment may arise.

The "shuttering" of Range Fuels was the elephant-in-the-room at the Peer Review. While the Program and professionals involved in the biofuel/biomass conversion industry appreciate the challenges and risks inherent in the industry, a failure at Range will have a chilling effect on the overall Program, industry, and financing climate - including the separate loan guarantee program. Range was not at the 2011 Peer Review, but it was in the 2009 session. The 2009 Peer Report is worth re-reading to appreciate Range's approach to the (apparently) prescient skepticism of the Peer Panel— Range attacked the Peer Review and (unattributed) reviewers individually. After $76 million in public funds, a public investigation should be made to understand the causes of this apparent failure and to implement adjustments to the Platform's approach so that current and future IBR projects (many of which are poised for spending tens of millions of public money for construction) can be made.

I was impressed by the professionalism of the evaluators, the observers and the DOE personnel involved in this process.

I can't point to any specific thing I would change, and think that overall the Program is being administered very well.

I am fortunate to have been able to be involved in this process of management, as well as Program and Project guidance and review. Thank you.

Reviews may benefit if more time is given to larger projects.

To give a $250K or less congressionally appropriated project the same presentation time and review as the multi-million dollar projects is somewhat unbalanced.

May want to have less reviewers involved in congressionally directed projects, as well, to get more information out of the reviewers on the larger projects.

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Reviewer Comments
It would make the reviewer more efficient if project assignments could be made when given access to the projects. Also air travel costs could be lower if travel authorization could be made earlier
Make sure that ALL learnings--good and bad--are well publicized.

Technology Manager Response/Comment

The Technology Manager appreciates all of the comments that were submitted and generally agrees with the comments. While there are too many comments to respond individually to each of them, we will be considering them as we update our major Program documents and budget requests. The focus on large-scale deployment projects as a result of Presidential direction and infusion of ARRA funding has provided an opportunity to aggressively address some of the challenges to the IBR concept. The comments and observations made by this Review Panel is impressive, and we thank you for the diligence put forth by the entire Review Panel in carrying out a thorough review of the projects.

Project Review

Project Scoring Summary Table

Project Number	Project Title; Presenting Organization; PI Name	Approach		Technical Progress and Accomplishments		Project Relevance		Critical Success Factors		Benefits and expected outcomes		**Total Average Score**	Percenticle Rank %
		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
Project Grouping 1													
5.4.4.1	Integrated Biorefinery for Conversion of Biomass to Ethanol, Synthesis Gas, and Heat, 2011 IBR Platform Review; Abengoa; Gerson Santos	6.2	1.67	5.8	1.21	7.2	1.46	5.7	0.94	4.2	0.90	**5.8**	40%
5.4.3.3	POET Project LIBERTY; POET; James Sturdevant	7.2	0.69	7.0	0.82	7.8	1.46	6.7	0.75	4.8	0.69	**6.7**	57%
5.5.3.2	BlueFire Fulton Cellulosic Ethanol Biorefinery; BlueFire Ethanol; William Davis	7.4	1.02	7.6	1.02	7.8	0.75	6.6	2.06	7.2	0.75	**7.3**	83%
5.5.7.1	Demonstration of Integrated Biorefinery Operations for Producing Biofuels and Chemical / Materials Products Mascoma MAS10BIO5; Mascoma Corporation; Michael Ladisch	7.0	1.10	6.2	0.40	6.6	0.80	7.6	0.80	4.2	1.17	**6.3**	55%
5.6.3.1	Demonstration Plant: Biomass Fuels to Liquids; Flambeau River BioFuels, Inc.; Robert Byrne	8.3	0.70	7.7	1.28	8.9	0.99	7.6	0.90	6.9	1.12	**7.9**	88%
5.6.1.1	Project Independence: Construction of an Integrated Biorefinery for Production of Renewable Biofuels at an Existing Pulp and Paper Mill Abstract - WBS 5611; NewPage Corporation; Douglas Freeman	8.3	0.70	8.0	0.76	8.9	0.83	7.9	0.64	7.3	0.88	**8.1**	90%

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RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Approach		Technical Progress and Accomplishments		Project Relevance		Critical Success Factors		Benefits and expected outcomes		**Total Average Score**	Percenticle Rank %
		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
5.2.4.1	INEOS New Planet BioEnergy Indian River County Facility Peer Review Feb ruary 1, 2011; I NEOS Bio;Dan Cummings	8.9	0.83	8.1	0.99	9.0	0.76	8.0	1.20	7.3	2.25	**8.3**	98%
5.5.6.1	Peer Review 2011 presentation for Lignol Biorefinery Demonstrtaion Plant; Lignol Innovations Inc.; Michael Rushton	4.5	1.50	3.0	1.29	4.7	2.21	3.5	1.38	2.5	0.96	**3.7**	7%
5.5.5.1	West Coast Biorefinery Update; Pacific BioGasol; Paul Koehler	6.5	1.26	5.3	1.11	6.3	1.70	5.0	1.29	7.3	0.47	**6.1**	50%
5.4.8.1	Elevance Pilot Biorefinery - Metath-esis Based Biorefinery for Chemicals and Fuels; elevance; Chander Balakrishnan	6.2	1.67	5.3	1.60	7.0	1.29	6.7	1.49	5.2	1.77	**6.1**	46%
5.5.9.1	ClearFuels-Rentech Integrated Biorefinery Pilot Project for Diesel and Jet Fuel Production by Thermo-chemical Conversion of Woodwaste (CF-RTK IBR); Rentech, Inc.; Joshua Pearson	7.7	0.75	7.7	1.80	7.2	1.46	6.8	1.21	5.3	1.97	**6.9**	79%
5.7.3.1	Demonstration of a Pilot Integrated Biorefinery for the Economical Conversion of Biomass to Diesel Fuel; Renewable Energy Institute International; Greg Tamblyn	7.7	0.94	7.5	1.12	7.5	1.12	7.0	1.63	7.3	0.75	**7.4**	81%
5.4.10.1	UOP Pilot Scale Biorefinery for Sustainable Fuels from Biomass via Integrated Pyrolysis and Catalytic Hydroconversion; UOP LLC;F Ste-phen Lupton	6.0	1.53	6.7	1.70	7.5	1.38	6.2	1.77	4.0	2.08	**6.1**	46%
5.2.3.1	Myriant Succinic Acid Biorefinery; Myriant;Alif Saleh	6.6	2.06	6.8	2.23	6.6	1.62	7.2	1.47	4.2	2.48	**6.3**	53%

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RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Approach		Technical Progress and Accomplishments		Project Relevance		Critical Success Factors		Benefits and expected outcomes		**Total Average Score**	Percenticle Rank %
		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
5.1.4.1	Scale-up and Mobilization of Renewable Diesel and Chemical Production from Farnesene using US-based Fermentable Sugar Feedstocks; Amyris;Neil Renninger	8.1	0.99	8.3	0.70	9.1	0.83	9.0	0.53	7.6	1.50	**8.4**	100%
5.5.11.1	High-Yield Hybrid Cellulosic Ethanol Process Using High-Impact Feedstock; ZeaChem Inc.; Tim Eggeman	7.3	1.67	7.3	1.03	7.6	1.68	7.0	1.60	5.7	1.75	**6.8**	75%
5.7.2.1	Biomass to Gasoline and Diesel Using Integrated Hydropyrolysis and Hydroconversion; Gas Technology Institute; Terry Marker	8.3	1.16	8.3	0.88	7.9	3.23	8.1	0.99	7.4	1.40	**8.2**	96%
5.11.1.2	Integrated Pilot-scale Biorefinery for Producing Ethanol from Hybrid Algae; Algenol Biofuels Inc.; Craig Smith	7.0	0.63	6.8	1.17	6.4	2.06	6.4	1.36	6.8	1.17	**6.7**	74%
5.11.1.1	Integrated Algal Biorefinery (IABR) Commercial Demonstration Project; Sapphire Energy; Jaime Moreno	7.8	2.04	8.6	0.80	9.0	0.89	7.6	1.85	4.8	1.72	**7.6**	85%
5.5.12.1	Recovery Act: Pilot Integrated Cellulosic Biorefinery Operations to Fuel Ethanol DE-EE0002875; ICM, Inc; Douglas Rivers	8.40	1.02	7.8	1.72	9.2	0.75	8.0	1.10	6.6	2.06	**7.8**	87%
5.7.4.1	Wood to green gasoline using Carbona gasification and Topsoe TIGAS processes; Haldor Topsoe, Inc.; Niels Udengaard	8.8	0.98	8.6	0.80	9.0	0.63	8.4	0.49	7.0	2.10	**8.1**	92%
5.5.10.1	Enerkem Heterogeneous Biorefinery Project, Pontotoc, Mississippi; Enerkem Corporation; Denis Arguin	8.8	0.40	8.4	0.49	9.4	0.49	8.0	0.89	7.2	3.19	**8.1**	92%

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RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Approach		Technical Progress and Accomplishments		Project Relevance		Critical Success Factors		Benefits and expected outcomes		**Total Average Score**	Percenticle Rank %
		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
5.7.1.1	Alpena Biorefinery; American Process Inc.; Theodora Retsina	6.8	1.30	6.8	1.79	6.3	1.79	6.5	1.66	6.3	2.17	**6.5**	62%
5.7.5.1	Corn-to-Cellulosic Migration; EdeniQ, Inc.; Daniel Lane	6.8	2.40	6.2	1.60	7.4	1.50	5.8	0.98	6.2	1.33	**6.5**	61%
5.6.2.1	Integrated Forest Products Biorefinery in Old Town, ME DOE # DE-EE0003364; Red Shield d/b/a Old Town Fuel & Fiber; Richard Arnold	7.2	1.47	7.0	0.89	6.4	1.74	5.6	1.36	6.4	1.36	**6.5**	64%
5.4.9.1	Conversion of Lignocellulosic Biomass to Ethanol and Ethyl Acrylate;Archer Daniels Midland; Thomas Binder	7.2	1.17	7.2	1.17	7.0	1.26	6.0	0.89	4.8	1.60	**6.4**	59%
Project Grouping 2													
7.3.6.3	Minnesota Center for Renewable Energy; Minnesota State University - Mankato; John Knox	5.1	1.46	6.0	1.31	4.7	2.03	3.6	1.59	3.4	1.92	**4.6**	12%
7.3.6.4	Green Power Initiative; University of Iowa; Barry Butler	5.7	1.83	6.7	1.03	4.7	1.67	3.7	1.98	2.9	1.64	**4.7**	16%
7.4.1.1	Development of Biofuels Using Ionic Transfer Membranes - Phase II. University of Nevada Las Vegas, Las Vegas, NV; University of Nevada Las Vegas; Lipinska-Kalita Kris	7.4	1.05	7.4	1.05	5.6	2.19	6.6	1.40	6.3	1.16	**6.7**	70%
7.4.1.10	Feasibility Studies on Process Coupling of Transesterification and Methanol Synthesis Using Cellulose Biomass and Bio-oil; Western Kentucky University Research Foundation; Wei-Ping Pan	5.7	1.91	5.7	1.83	5.3	1.67	5.0	1.93	2.7	1.58	**4.9**	18%

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RESULTS

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		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
7.4.2.7	Fly Ash Emerging Frontiers; Ceramatec; Chett Boxley	6.1	1.81	6.3	1.83	1.6	1.05	5.7	1.39	3.4	2.32	**4.6**	14%
7.4.3.11	SUNY Cobleskill's Biowaste to Bioenergy Project; SUNY Cobleskill; Douglas Goodale	6.2	1.77	6.5	1.50	6.2	1.86	6.0	2.00	6.3	2.13	**6.2**	51%
7.4.3.8	Town of Munster, Indiana Centennial Park Waste-to-Energy Cogeneration Project (IN); Waste-to-Energy Cogeneration Project (IN); Jim Mandon	5.2	1.34	5.5	1.61	3.8	0.69	4.7	1.25	5.3	1.80	**4.9**	22%
7.4.5.11	Award Number: EE00000435 Seattle Steam Company Seattle, WA; Seattle Steam Company; Stan Gent	6.3	2.21	7.3	2.05	4.8	1.21	5.8	1.34	5.5	2.36	**6.0**	44%
7.7.2.8	Hot Water Extraction of Woodchips and Utilization of the Residual Chips and Wood Extracts; SUNY ESF; Thomas Amidon	5.8	2.03	6.3	1.37	6.0	1.29	5.8	2.11	4.7	1.89	**5.5**	37%
7.5.7.2	Biomass Energy Resource Center - Core and Program Support; Biomass Energy Resource Center (BERC); Adam Sherman	4.5	2.06	4.3	1.80	4.3	1.49	3.5	1.98	3.2	1.57	**4.0**	9%
7.5.7.3	Southern Pine Based Biorefinery Center; Georgia Tech; Arthur Ragauskas	5.5	1.50	5..7	1.60	6.2	0.90	52	1.34	5.2	2.79	**5.5**	35%
7.5.9.2	Biorefinery Demonstration Project; University of Georgia; David Lee	5.4	1.99	4.7	2.19	4.7	2.05	4.0	1.07	2.9	1.96	**4.5**	11%

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RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Approach		Technical Progress and Accomplishments		Project Relevance		Critical Success Factors		Benefits and expected outcomes		**Total Average Score**	Percenticle Rank %
		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
7.7.2.12	Biogas Center of Excellence; Michigan Economic Development Corporation (MEDC); Nadia Abunasser	5.9	1.81	6.4	1.92	5.4	2.13	5.6	1.84	3.3	1.98	**5.2**	27%
7.7.2.15	Anaerobic Digestion/ Combined Heat & Power Concept Development Project; Washington Suburban Sanitary Commission; Robert Taylor	7.4	0.90	7.1	1.46	6.1	2.23	6.1	2.10	5.9	1.73	**6.5**	66%
7.7.2.17	Pecos Valley Biomass Energy Project; Pecos Valley Biomass Coop; Jay Lazarus	6.3	1.28	6.7	1.28	5.9	2.36	5.9	2.36	4.9	1.81	**5.8**	42%
7.7.2.20	Next Generation Biofuels; University of Nevada, Reno;	6.2	1.46	5.5	2.36	5.4	2.19	4.4	1.76	3.0	1.41	**4.8**	20%
7.7.4.10	Trenton Fuel Work Biorefinery Development Project; Trenton Fuel Works LLC; Stephen Paul	4.6	1.02	4.8	1.47	6.0	2.28	4.8	1.17	6.2	2.23	**5.3**	33%
7.8.1.20	Alabama Institute for Deaf and Blind Biodiesel Project Green; Alabama Institute for Deaf and Blind; Terry Graham	6.8	1.07	7.3	0.94	6.7	1.25	6.3	1.37	6.2	2.34	**6.7**	72%
7.8.1.21	Biodiesel Production from Grease Waste; Eastern Municipal Water District; Mike Luker	7.0	1.26	6.8	1.17	7.2	1.17	7.4	1.20	7.2	1.17	**6.9**	77%
7.8.1.22	WI Biodiesel Blending Program; Wisconsin Office of Energy Independence; Maria Redmond	6.2	2.32	4.6	2.80	5.0	2.28	6.2	2.23	4.4	2.33	**5.2**	25%
7.8.1.23	The Biorefinery in New York – Bio Butanol from Biomass; SUNY ESF; Thomas Amidon	6.2	1.47	6.0	0.89	6.6	1.36	5.8	1.47	2.4	1.36	**5.4**	31%

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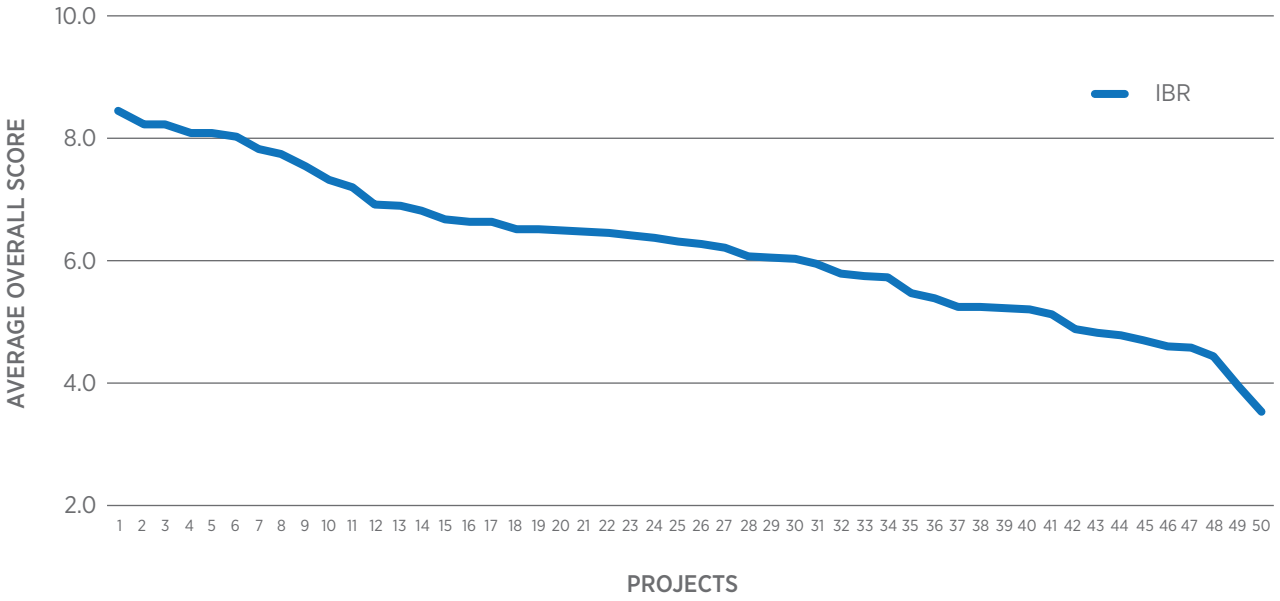
RESULTS

Project Number	Project Title; Presenting Organization; PI Name	Approach		Technical Progress and Accomplishments		Project Relevance		Critical Success Factors		Benefits and expected outcomes		**Total Average Score**	Percenticle Rank %
		Average	SD	Average	SD	Average	SD	Average	SD	Average	SD		
7.8.1.24	Institute for Sustainable Energy (ISE); University of Alabama; Ajay Agrawal	6.0	1.41	5.6	1.20	4.8	0.98	5.2	2.32	4.6	2.24	**5.2**	29%
7.8.1.26	"Development of an Economic and Efficient Biodiesel Production Process."; University of North Carolina at Pembroke; Cornelia Tirla	5.8	1.34	6.2	1.21	6.3	1.97	6.3	1.37	4.0	1.63	**5.7**	38%

Project Scoring Chart



The following provides a graphical depiction of the IBR project scoring for projects without attribution. Because the projects reviewed in the IBR Platform Review consisted of both large deployment projects and smaller projects, the reviewers focused the bulk of their attention on the 26 competitively awarded deployment projects.

The following information has been prepared to explain project anomalies that were noticed in the scoring and attributed to the two-Panel approach that was used to review the IBR Platform projects. After much consideration, the Co-Lead Reviewers decided that a normalization of the data was essential for accurately communicating the results in the Program Review Meeting. Due to time and meeting constraints, the large IBR Platform Project portfolio was split and reviewed by two separate, but balanced, Review Panel teams throughout the 3-day meeting. These teams were rotated at set intervals, so that both Review Panel teams—identified as Panel A and Panel B—reviewed an equal number of large demonstrations and smaller projects that make up the portfolio. Following the public forum presentations and compilation of raw scores, meeting organizers and the Co-Lead Reviewers observed a notable scoring bias between the aggregate project scores reported by the two Panels.

To illustrate this observation, the raw aggregate scores showed that 9 of the 10 projects scored by Panel B were ranked as the top 9 projects of the whole 26 project competitively awarded portfolio offered for review. Conversely, the raw scores from Panel A showed the lowest 14 projects of the whole portfolio. When examined using the "Student's T Value," the raw scores indicated a P value of less than 0.001, signifying an extremely statistically significant differences between Panel A and Panel B.

To address this issue, the Co-Lead Reviewers consulted with members of the Steering Committee. The merits and applicability of several approaches were discussed and evaluated, including simply reporting the raw scores "as-received." In addition, the co-reviewers again reviewed individual reviewer comments to attempt to discern qualitatively if Panel B's projects indeed were "better" than Panel A's. The Co-Lead Reviewers were unable to discern or conclude that the projects assigned to Panels A and B for review were qualitatively different based on the criteria used for scoring.

Following this determination, the Co-Lead Reviewers agreed that the difference in the raw scoring was due to the Panels and not the projects. The Co-Lead Reviewers agreed to mathematically adjust the scores of each Panel by normalizing the mean score of each panel. The co-reviewers presented this mathematical technique to the Steering Committee. The co-reviewers recommended this adjustment in scores (i) to remove the scoring bias between panels so that the scoring between individual projects was better distributed, and (ii) to better reflect the written, qualitative narratives offered by the reviewers on each project. To illustrate the mathematical adjustment, the information on the mean values of Panels A & B, and their normalized mean are presented below:

Raw Score Mean – Panel A: 6.34

Raw Score Mean – Panel B: 8.03

Normalized Mean – Both Panels: 6.99

The normalized scoring was presented in detail at the Program Review as were the following figures.

Figure 1 | Raw Scores

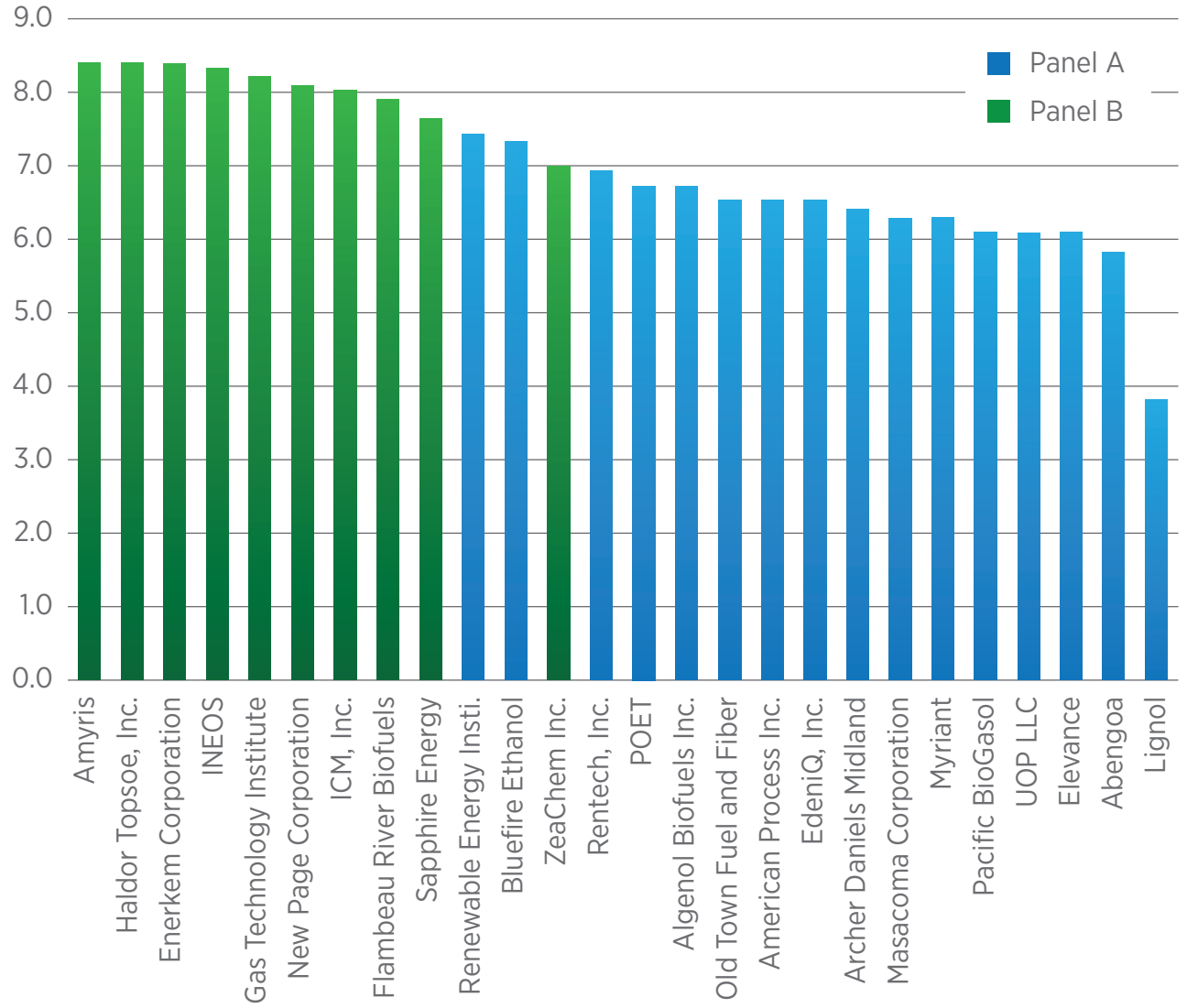
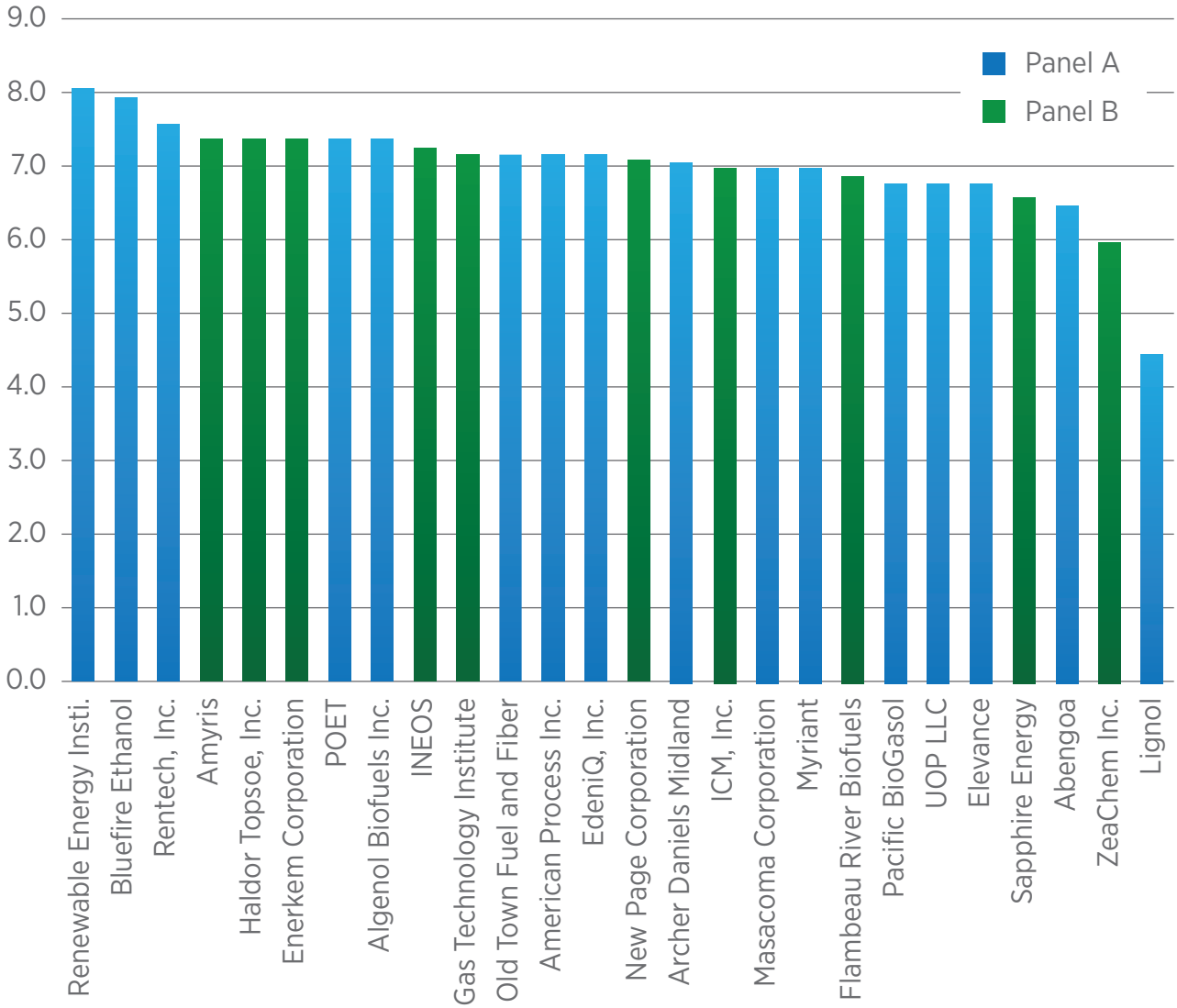


Figure 2 | Normalized to Mean of All Data Scores



COMPENDIUM INFORMATION

1. Biomass Program MYPP: www.eere.energy.gov/biomass/pdfs/mypp_november_2011.pdf
   Integrated Biorefineries Platform: Page 89 (PDF)

2. Full Compilation of Reviewer Comments for the Integrated Biorefineries 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_ibr_review_comments.pdf

3. Peer Review Portal Website Peer Review Page: http://obpreview2011.govtools.us
   Integrated Biorefineries Page: http://obpreview2011.govtools.us/IBR/

ATTACHMENTS

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

Integrated Biorefinery Platform Review Meeting Agenda

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
Date: 2/1/2011 (Location: 1E-245)				
8:00 a.m. – 8:15 a.m.	0.0.0.0	Platform Overview (Presentation)	Technology Manager	U.S. Department of Energy Biomass Program
8:15 a.m. – 9:00 a.m.	5.4.4.1	Integrated Biorefinery for Conversion of Biomass to Ethanol, Synthesis Gas, and Heat, 2011 IBR Platform Review (Presentation)	Gerson Santos	Abengoa
9:00 a.m. – 9:45 a.m.	5.4.3.3	POET Project LIBERTY (Abstract, Presentation)	James Sturdevant	POET
10:00 a.m. – 10:45 a.m.	5.5.3.2	BlueFire Fulton Cellulosic Ethanol Biorefinery (Abstract, Presentation)	William Davis	BlueFire Ethanol
10:45 a.m. – 11:30 a.m.	5.5.7.1	Demonstration of Integrated Biorefinery Operations for Producing Biofuels and Chemical / Materials Products Mascoma MAS10BIO5 (Abstract, Presentation)	Michael Ladisch	Mascoma Corporation
LUNCH				
BIOENERGY KNOWLEDGE DISCOVERY FRAMEWORK (KDF) DEMONSTRATION IN BF-118 COMPUTER LAB				
1:45 p.m. – 2:30 p.m.	5.6.3.1	Demonstration Plant: Biomass Fuels to Liquids (Presentation)	Robert Byrne	Flambeau River BioFuels, Inc.
2:45 p.m. – 3:30 p.m.	5.6.1.1	Project Independence: Construction of an Integrated Biorefinery for Production of Renewable Biofuels at an Existing Pulp and Paper Mill Abstract – WBS 5611 (Abstract, Presentation)	Douglas Freeman	NewPage Corporation
3:30 p.m. – 4:15 p.m.	5.2.4.1	INEOS New Planet BioEnergy Indian River County Facility Peer Review Feb 1, 2011 (Abstract, Presentation)	Dan Cummings	INEOS Bio
4:15-5:00 P.M. – WRAP UP				

CONTINUES ON NEXT PAGE

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
Date: 2/1/2011 (Location: GH-035)				
8:15 a.m. – 8:45 a.m.	7.3.2.3	Establishment of a Laboratory for Biofuels Research at the University of Kentucky (Abstract, Presentation)	Mark Crocker	University of Kentucky Center for Applied Energy Research
8:45 a.m. – 9:15 a.m.	7.3.6.3	Minnesota Center for Renewable Energy (Abstract, Presentation)	John Knox	Minnesota State University – Mankato
9:15 a.m. – 9:45 a.m.	7.3.6.4	Green Power Initiative (Abstract, Presentation)	Barry Butler	University of Iowa
10:00 a.m. – 10:30 a.m.	7.4.1.1	Development of Biofuels Using Ionic Transfer Membranes - Phase II. University of Nevada Las Vegas, Las Vegas, NV (Presentation)	Lipinska-Kalita Kris	University of Nevada Las Vegas
10:30 a.m. – 11:00 a.m.	7.4.1.10	Feasibility Studies on Process Coupling of Transesterification and Methanol Synthesis Using Cellulose Biomass and Bio-oil (Abstract, Presentation)	Wei-Ping Pan	Western Kentucky University Research Foundation
11:00 a.m. – 11:30 a.m.	7.4.2.7	Fly Ash Emerging Frontiers (Presentation)	Chett Boxley	Ceramatec
LUNCH				
1:00 p.m. – 1:30 p.m.	7.4.3.11	SUNY Cobleskill's Biowaste to Bioenergy Project (Presentation)	Douglas Goodale	State University of New York – Cobleskill
1:30 p.m. – 2:00 p.m.	7.4.3.7	Connecticut Biodiesel Power Generator (CT)	Lee Grannis	The Greater New Haven Clean Cities Coalition, Inc.
2:00 p.m. – 2:30 p.m.	7.4.3.8	Town of Munster, Indiana Centennial Park Waste-to-Energy Cogeneration Project (IN) (Abstract, Presentation)	Jim Mandon	Waste-to-Energy Cogeneration Project (IN)
2:30 p.m. – 3:00 p.m.	7.4.5.11	Award Number: EE00000435 Seattle Steam Company, Seattle, WA (Abstract, Presentation)	Stan Gent	Seattle Steam Company

CONTINUES ON NEXT PAGE

Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
3:00 p.m. – 3:15 p.m.	7.7.2.8	Hot Water Extraction of Woodchips and Utilization of the Residual Chips and Wood Extracts (Abstract, Presentation)	Thomas Amidon	State University of New York College of Environmental Science and Forestry
3:15 p.m. – 3:45 p.m.	7.5.7.2	Biomass Energy Resource Center – Core and Program Support (Abstract, Presentation)	Adam Sherman	Biomass Energy Resource Center (BERC)
3:45 p.m. – 4:15 p.m.	7.5.7.3	Southern Pine Based Biorefinery Center (Abstract, Presentation)	Arthur Ragauskas	Georgia Institute of Technology
ADJOURN				
Date: 2/2/2011 (Location: 1E-245)				
8:15 a.m. – 8:45 a.m.	5.5.6.1	Peer Review 2011 Presentation for Lignol Biorefinery Demonstrtaion Plant (Abstract, Presentation)	Michael Rushton	Lignol Innovations, Inc.
8:45 a.m. – 9:15 a.m.	5.5.5.1	West Coast Biorefinery Update (Abstract, Presentation)	Paul Koehler	Pacific BioGasol
9:15 a.m. – 9:45 a.m.	5.4.8.1	Elevance Pilot Biorefinery – Metathesis Based Biorefinery for Chemicals and Fuels (Abstract, Presentation)	Chander Balakrishnan	Elevance
10:00 a.m. – 10:45 a.m.	5.5.9.1	ClearFuels-Rentech Integrated Biorefinery Pilot Project for Diesel and Jet Fuel Production by Thermochemical Conversion of Woodwaste (CF-RTK IBR) (Abstract, Presentation)	Joshua Pearson	Rentech, Inc.
10:45 a.m. – 11:30 a.m.	5.7.3.1	Demonstration of a Pilot Integrated Biorefinery for the Economical Conversion of Biomass to Diesel Fuel (Abstract, Presentation)	Greg Tamblyn	Renewable Energy Institute International
LUNCH				

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Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
1:00 p.m. – 1:45 p.m.	5.4.10.1	UOP Pilot Scale Biorefinery for Sustainable Fuels from Biomass via Integrated Pyrolysis and Catalytic Hydroconversion (Abstract, Presentation)	F Stephen Lupton	UOP, LLC
1:45 p.m. – 2:30 p.m.	5.2.3.1	Myriant Succinic Acid Biorefinery (Presentation)	Alif Saleh	Myriant
2:45 p.m. – 3:30 p.m.	5.1.4.1	Scale-up and Mobilization of Renewable Diesel and Chemical Production from Farnesene using US-based Fermentable Sugar Feedstocks (Abstract, Presentation)	Neil Renninger	Amyris
3:30 p.m. – 4:15 p.m.	5.5.11.1	High-Yield Hybrid Cellulosic Ethanol Process Using High-Impact Feedstock (Abstract, Presentation)	Tim Eggeman	ZeaChem, Inc.
4:15 p.m. – 4:45 p.m.	5.7.2.1	Biomass to Gasoline and Diesel Using Integrated Hydropyrolysis and Hydroconversion (Abstract, Presentation)	Terry Marker	Gas Technology Institute
WRAP UP				
Date: 2/2/2011 (Location: GH-035)				
8:15 a.m. – 8:45 a.m.	7.5.9.2	Biorefinery Demonstration Project (Presentation)	David Lee	University of Georgia
8:45 a.m. – 9:15 a.m.	7.7.2.10	Center for Clean Fuels and Power Generation (Abstract, Presentation)	Michael Harold	University of Houston
9:15 a.m. – 9:45 a.m.	7.7.2.12	Biogas Center of Excellence (Abstract, Presentation)	Nadia Abunasser	Michigan Economic Development Corporation (MEDC)
10:00 a.m. – 10:30 a.m.	7.7.2.15	Anaerobic Digestion/ Combined Heat & Power Concept Development Project (Abstract, Presentation)	Robert Taylor	Washington Suburban Sanitary Commission
10:30 a.m. – 11:00 a.m.	7.7.2.17	Pecos Valley Biomass Energy Project (Abstract, Presentation)	Jay Lazarus	Pecos Valley Biomass Coop
11:00 a.m. – 11:30 a.m.	7.7.2.2	City of Stamford Waste-to-Energy Project (CT)	Jeanette Brown	City of Stamford

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Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
		LUNCH		
1:00 p.m. – 1:30 p.m.	7.7.2.20	Next Generation Biofuels from Non-traditional Feedstock (Abstract, Presentation)	Mano Misra	University of Nevada, Reno
2:00 p.m. – 2:30 p.m.	7.7.3.5	University of Northern Iowa's National Agricultural Based Lubricants (NABL) Project (Presentation)	Wes James	University of Northern Iowa
2:45 p.m. – 3:15 p.m.	7.7.4.10	Trenton Fuel Work Biorefinery Development Project (Abstract, Presentation)	Stephen Paul	Trenton Fuel Works, LLC
3:15 p.m. – 3:45 p.m.	7.8.1.14	San Francisco Biofuels Program (CA)	Domenec Jolis	San Francisco Public Utilities Commission Biofuel Program
3:45 p.m. – 4:15 p.m.	7.8.1.20	Alabama Institute for Deaf and Blind Biodiesel Project Green (Abstract, Presentation)	Terry Graham	Alabama Institute for Deaf and Blind
		ADJOURN		
Date: 2/3/2011 (Location: 1E-245)				
9:00 a.m. – 9:45 a.m.	5.11.1.2	Integrated Pilot-scale Biorefinery for Producing Ethanol from Hybrid Algae (Presentation)	Craig Smith	Algenol Biofuels, Inc.
10:00 a.m. – 10:45 a.m.	5.11.1.1	Integrated Algal Biorefinery (IABR) Commercial Demonstration Project (Abstract, Presentation)	Jaime Moreno	Sapphire Energy
10:45 a.m. – 11:30 a.m.	5.5.12.1	Recovery Act: Pilot Integrated Cellulosic Biorefinery Operations to Fuel Ethanol DE-EE0002875 (Abstract, Presentation)	Douglas Rivers	ICM, Inc
		LUNCH		
1:00 p.m. – 1:30 p.m.	5.7.4.1	Wood to green gasoline using Carbona gasification and Topsoe TIGAS processes (Abstract, Presentation)	Niels Udengaard	Haldor Topsoe, Inc.

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Time	WBS#	Project Title	Presenter/ Recipient	Performing Organization
1:30 p.m. – 2:15 p.m.	5.5.10.1	Enerkem Heterogeneous Biorefinery Project, Pontotoc, Mississippi (Abstract, Presentation)	Denis Arguin	Enerkem Corporation
2:30 p.m. – 3:15 p.m.	5.7.1.1	Alpena Biorefinery (Abstract, Presentation)	Theodora Retsina	American Process Inc.
3:15 p.m. – 3:45 p.m.	5.7.5.1	Corn-to-Cellulosic Migration (Abstract, Presentation)	Daniel Lane	EdeniQ, Inc.
3:45 p.m. – 4:15 p.m.	5.6.2.1	Integrated Forest Products Biorefinery in Old Town, ME DOE # DE-EE0003364 (Abstract, Presentation)	Richard Arnold	Red Shield d/b/a Old Town Fuel & Fiber
4:15 p.m. – 4:45 p.m.	5.4.9.1	Conversion of Lignocellulosic Biomass to Ethanol and Ethyl Acrylate (Abstract, Presentation)	Thomas Binder	Archer Daniels Midland
Date: 2/3/2011 (Location: GH-035)				
8:15 a.m. – 8:45 a.m.	7.8.1.21	Biodiesel Production from Grease Waste (Abstract, Presentation)	Mike Luker	Eastern Municipal Water District
8:45 a.m. – 9:15 a.m.	7.8.1.22	WI Biodiesel Blending Program (Abstract, Presentation)	Maria Redmond	Wisconsin Office of Energy Independence
9:15 a.m. – 9:45 a.m.	7.8.1.23	The Biorefinery in New York – Bio Butanol from Biomass (Abstract, Presentation)	Thomas Amidon	State University of New York College of Environmental Science and Forestry
10:00 a.m. – 10:30 a.m.	7.8.1.24	Institute for Sustainable Energy (ISE) (Abstract, Presentation)	Ajay Agrawal	University of Alabama
11:00 a.m. – 11:30 a.m.	7.8.1.26	"Development of an Economic and Efficient Biodiesel Production Process." (Abstract, Presentation)	Cornelia Tirla	University of North Carolina at Pembroke
ADJOURN				

List of Attendees

First Name	First Name	Organization
Nadia	Abunasser	Michigan Economic Development Corporation
Ajay	Agrawal	University of Alabama
Patrick	Ahlm	Algenol Biofuels, Inc.
Berry	Allen	Elevance Renewable Sciences
Thomas	Amidon	State University of New York – College of Environmental Science and Forestry
Dirk	Andreas	Enerkem Corporation
Rodney	Andrews	University of Kentucky Biofuels Research Laboratory (KY)
Andy	Argo	National Renewable Energy Laboratory
Denis	Arguin	Enerkem Corporation
Denis	Arguin	Enerkem Corporation
Richard	Arnold	Red Shield d/b/a Old Town Fuel & Fiber
Jennifer	Aurandt	Kettering University
Shekar	Balagopal	Ceramatec, Inc.
Chander	Balakrishnan	Elevance Renewable Sciences
Bianca	Beeks	ITECS
David	Belcher	Pecos Valley Biomass Cooperative
thomas	binder	Archer Daniels Midland
Chett	Boxley	Ceramatec, Inc.
David	Brinkmann	Solazyme, Inc.
Jeanette	Brown	City of Stamford
Paul	Bryan	U.S. Department of Energy, Biomass Program
Bruce	Bunting	Oak Ridge National Laboratory
Dan	Burciaga	ThermoChem Recovery International, Inc.
Barry	Butler	University of Iowa
Robert	Byrne	Flambeau River BioFuels, Inc.
Yan	Cao	ICSET, WKU
Ranyee	Chiang	U.S. Department of Energy, Biomass Program
Devicharan	Chidambaram	University of Nevada Reno
Pallavi	Chitta	Ceramatec, Inc.
Steve	Cohen	Elevance Renewable Sciences
Kevin	Craig	U.S. Department of Energy, Golden Office
Mark	Crocker	University of Kentucky Center for Applied Energy Research
Mark	Crocker	University of Kentucky Center for Applied Energy Research
Dan	Cummings	INEOS Bio
John	Cuzens	BlueFire Renewables
Robert	Czincila	U.S. Department of Transportation

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First Name	First Name	Organization
Eric	Darmstdeater	Clearfuels
K.C	Das	University of Georgia
Grant	Davies	AECOM
William	Davis	BlueFire Renewables
Charles	Davis	Verenium Corporation
Mark	Decot	U.S. Department of Energy, Biomass Program
Thomas	DeGiulio	Town of Munster, Indiana
Daniel	Derr	Logos
Martin	Dober	Michigan Economic Development Corporation
Mark	Downing	Oak Ridge National Laboratory
Brian	Duff	U.S. Department of Energy, Biomass Program
Jessica	Edmistpn	Alabama Institute for Deaf and Blind
Tim	Eggeman	ZeaChem, Inc.
John	Ellersick	Myriant Technologies
Shab	Fardanesh	U.S. Department of Energy, Biomass Program
John	Ferrell	U.S. Department of Energy, Biomass Program
Daniel	Fishman	BCS, Incorporated
Ed	Frank	Argonne National Laboratory
Douglas	Freeman	NewPage Corporation
Donald	Frikken	Engineering Consulting
Stan	Gent	Seattle Steam Company
Josh	Gesick	National Renewable Energy Laboratory
Douglas	Goodale	State University of New York – Cobleskill
Terry	Graham	Alabama Institute for Deaf and Blind
Lee	Grannis	The Greater New Haven Clean Cities Coalition, Inc.
Roger	Griffith	RLG Associates
Neal	Gutterson	Mendel Biotechnology
Zia	Haq	U.S. Department of Energy, Biomass Program
Michael	Harold	University of Houston
Frank	Hartz	Washington Suburban Sanitary Commission
Lou	Honary	University of Northern Iowa-ABIL Program
John	Houghton	U.S. Department of Energy, Office of Science
Jimmy	Humphrey	Self Employed
Jeremy	Javers	ICM, Inc.
David	Jenkins	WI Office of Energy Independence
Clay	Johnson	Town of Munster, Indiana
Domenec	Jolis	San Francisco Public Utilities Commission Biofuel Program
Mark	Jones	Dow Chemicals

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First Name	First Name	Organization
Mukund	Karanjikar	Ceramatec, Inc.
George	Kervitsky	BCS, Incorporated
Melissa	Klembara	U.S. Department of Energy, Biomass Program
John	Knox	Minnesota State University – Mankato
Paul	Koehler	Pacific BioGasol
Alex	Koukoulas	Flambeau River BioFuels, Inc.
Lipinska-Kalita	Kris	University of Nevada Las Vegas
Marie-Helene	Labrie	Enerkem Corporation
Michael	Ladisch	Mascoma Corporation
Daniel	Lane	EdeniQ, Inc.
Jay	Lazarus	Pecos Valley Biomass Cooperative
David	Lee	University of Georgia
Elliot	Levine	U.S. Department of Energy, Biomass Program
Valri	Lightner	U.S. Department of Energy, Loan Guarantee Program
Alicia	Lindauer-Thompson	U.S. Department of Energy, Biomass Program
Donte`	Little	Alabama Institute for Deaf and Blind
Yulin	Lu	Mascoma Corporation
Mike	Luker	Eastern Municipal Water District
Michael	Lunda	UOP, LLC
F Stephen	Lupton	UOP, LLC
Sarah	Lynch	U.S. Department of Energy, Biomass Program
Hank	Majdeski	Solazyme, Inc
Jim	Mandon	Waste-to-Energy Cogeneration Project (IN)
Terry	Marker	Gas Technology Institute
Liz	Marshall	USDA ERS
Laura	McCann	U.S. Department of Energy, Biomass Program
Benamin	McCool	Algenol Biofuels, Inc.
Robert	McDonald	Range Fuels, Inc.
Sarah	McQuaid	Solazyme, Inc.
Bob	Miller	Leonardo Technologies Inc.
Ferman	Milster	University of Iowa
Mano	Misra	University of Nevada, Reno
Ralph Lynn	Montague	R Lynn Montague
Liz	Moore	U.S. Department of Energy, Golden Office
Stephen	Moorman	Babcock & Wilcox
Jaime	Moreno	Sapphire Energy
Sheila	Moynihan	U.S. Department of Energy, Biomass Program
Anthony	Nickens	Ceramatec, Inc.
Mark	Niederschulte	INEOS Bio

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First Name	First Name	Organization
Jeff	Otto	U.S. Department of Energy, Loan Guarantee Program
Wei-Ping	Pan	Western Kentucky University Research Foundation
George	Parks	FuelScience, LLC
Stephen	Paul	Trenton Fuel Works, LLC
Joshua	Pearson	Rentech, Inc.
Gene	Petersen	U.S. Department of Energy, Golden Office
Leslie	Pezzullo	U.S. Department of Energy, Biomass Program
Todd	Polanowicz	Mascoma Corporation
Todd	Potas	DENCO, LLC
Ahmad	Pourmovahed	Kettering University
Alan	Propp	Merrick & Company
Arthur	Ragauskas	Georgia Institute of Technology
Albert	Ratner	University of Iowa
Maria	Redmond	Wisconsin Office of Energy Independence
Robert	Reed	Self Employed
James	Rekoske	Honeywell UOP
Neil	Renninger	Amyris
Theodora	Retsina	American Process, Inc.
Tom	Richard	The Pennsylvania State University
Deanna	Richeson	Michigan Economic Development Corporation
Douglas	Rivers	ICM, Inc.
Ken	Robinson	Ken Robinson
Neil	Rossmeissl	U.S. Department of Energy, Biomass Program
Michael	Rushton	Lignol Innovations, Inc.
Alif	Saleh	Myriant Technologies
Gerson	Santos	Abengoa
Chad	Schell	U.S. Department of Energy, Golden Office
Robert	Schuetzle	Pacific Renewable Fuels
Amy	Scwhab	National Renewable Energy Laboratory
Garry	Shanks	POET Ethanol Products
Adam	Sherman	Biomass Energy Resource Center (BERC)
Craig	Smith	Algenol Biofuels, Inc.
Glenn	Sonntag	U.S. Department of Energy, Biomass Program
Colin	South	Lignol Innovations, Inc.
Henry	Stern	Van Ness Feldman PC
Christy	Sterner	U.S. Department of Energy, Golden Office
Beverley	Stinson	AECOM
James	Sturdevant	POET Ethanol Products

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First Name	First Name	Organization
Necitas (Necy)	Sumait	BlueFire Renewables
Parekh	Swaroop	U.S. Department of Energy
Sam	Tagore	U.S. Department of Energy, Biomass Program
Greg	Tamblyn	Renewable Energy Institute International
Rob	Taylor	WSSC
Travis	Tempel	U.S. Department of Energy, Biomass Program
Cornelia	Tirla	University of North Carolina at Pembroke
Niels	Udengaard	Haldor Topsoe, Inc.
Darrell	Waite	Red Shield d/b/a Old Town Fuel & Fiber
Steve	Walk	Protec Fuel
David	Webster	Ark Resources, LLC
Theodore	Wegner	U.S. Department of Agriculture, Forest Service, Forest Products Laboratory
Emily	Wheeler	U.S. Department of Energy, Loan Guarantee Program
Harold	Wright	Rentech, Inc.
Joyce	Yang	U.S. Department of Energy, Biomass Program

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

IBR 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. Complete one form for each project presented.

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. Approach (1–10):
Please evaluate the degree to which

a) The project performers have implemented technically sound research, development, and deployment approaches and demonstrated necessary results to meet their targets

b) The project performers have 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 both 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. Critical Success Factors (1–10):
Please evaluate the degree to which:

a) The project has identified critical success factors, including technical, business, market, regulatory, and legal factors) that impact technical and commercial viability of the project

b) The project has 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) Product cost (earnings before interest, taxes, depreciation and amortization with debt included)

b) Return on investment with 25-year life

c) Product Yield (gallons fuel/dry tonne of feedstock)

d) Water use (gallons water/gallon fuel produced)

e) Energy demand (kWhr/tonne feedstock, kWhr/gallon fuel)

f) Environmental sustainability (e.g., water use and energy demand)

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.

7. 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.

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