Biomass Research and Development

Technical Advisory Committee

March 2–3, 2011

Meeting Summary

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List of Acronyms

BMP – Best Management Practices
Board – Biomass Research and Development Board
BRDI – Biomass Research and Development Initiative
Committee – Biomass Research and Development Technical Advisory Committee
DOE – Department of Energy
DOI – Department of the Interior
DOT – Department of Transportation
EPA – Environmental Protection Agency
FFVs – Flex Fuel Vehicles
FY – Fiscal Year
GHG – Greenhouse gas
INL – Idaho National Laboratory
KDF – Knowledge Discovery Framework
LCA – Life Cycle Assessment
NAREEE – National Agricultural Research, Extension, Education, and Economics
NSF – National Science Foundation
PDU – Process Demonstration Unit
RDD&D – Research, development, demonstration and deployment
USDA – Department of Agriculture

I. Purpose

On March 2–3, 2011, the Biomass Research and Development Technical Advisory Committee (Committee) held its first quarterly meeting of 2011. The purpose of the meeting was to discuss and receive updates about the recent activities of the U.S. Department of Energy (DOE) and U.S. Department of Agriculture (USDA). DOE representatives delivered presentations about the Biomass Program, as well as introduce its new Program Manager Paul Bryan. USDA representatives delivered presentations about current agency activities and the Biomass Research and Development Initiative (BRDI). In addition, Board Working Group representatives provided updates from their most recent meeting. The afternoon included a presentation from Idaho National Laboratory (INL) on feedstock logistics. Shortly thereafter, the Committee broke out into subcommittees to begin discussing their 2011 recommendations. On the second day, Committee members received a National Agricultural Research, Extension, Education and Economics (NAREEE) update and listened to a presentation on biomass densification for co-firing applications.

See Attachment A for a list of meeting attendees. See Attachment B to review the meeting agenda. Meeting presentations can be viewed online at http://biomassboard.gov/committee/meetings.html.

Background: The Committee was established by the Biomass R&D Act of 2000 (Biomass Act) which was repealed and replaced by Section 9008 of the Food, Conservation, and Energy Act of 2008. The Biomass Research and Development Board (Board) was established under the same legislation to coordinate activities across the federal agencies. The Committee is tasked with advising the Secretary of Energy and the Secretary of Agriculture on the direction of biomass research and development.

II. U.S. Department of Energy Update

Laura McCann, Biomass Program, U.S. Department of Energy

Laura McCann provided an overview on Committee business and DOE's Biomass Program, including information on upcoming events, and the fiscal year 2012 budget request. She reminded the Committee that federally registered lobbyists are no longer allowed to serve as Committee members, and that while they will be permitted to remain on the Committee they will not be eligible for reappointment.
Key upcoming events include the Analysis & Sustainability, Feedstock, and Algae Platform Reviews, which will be held in April, and the Program Peer Review, which will be held in June A complete list of dates can be found at http://obpreview2011.govtools.us/.

The Biomass 2011 *Replace the Whole Barrel, Supply the Whole Market Conference* will be held July 26–27, 2011. More information can be found at http://www1.eere.energy.gov/biomass/biomass_2011.html.

The *Bioenergy Knowledge Discovery Framework (KDF)* was launched publicly and can be found at https://bioenergykdf.net/.

The *Biopower Technical Strategy Workshop Report* was released and can be downloaded at http://www1.eere.energy.gov/biomass/pdfs/biopower_workshop_report_december_2010.pdf.

The Biomass Program's budget request for Fiscal Year (FY) 2012 was approximately $350 million. The budget for feedstock production and feedstock logistics has decreased, while the proposed budget for thermochemical conversion, algae, and the cellulosic reverse auction has increased. DOE has also made a conditional loan guarantee to Diamond Green Diesel for a 137-million-gallon per year renewable diesel facility in Norco, Louisiana.

The next 2011 Committee meetings will take place on the following dates:

- Week of May 16–20
- Week of August 22 – 26 (formerly August 15–19)
- Week of November 7–10.

III. U.S. Department of Agriculture Update

Bill Hagy, Bioenergy Program, Rural Development, U.S. Department of Agriculture

Bill Hagy updated the Committee on various topics, including Title IX Programs, new outreach and marketing efforts, and the USDA Biofuels Roadmap. Recently, USDA signed Memorandums of Understanding with the Department of the Navy, the Federal Aviation Administration (through the "Farm to Fly" initiative), and the dairy industry. In addition, USDA has identified Regional Biomass Research Centers throughout the United States.

Mark Maher indicated his support for USDA's strategy to focus on blender pumps and mid-level blends, and related the auto industry's concerns about the availability of E85 infrastructure and E85 retail station availability. When Bill Hagy reiterated his understanding of the U.S. auto industry's commitment to dramatically increase the production of Flex Fuel Vehicles (FFVs), Maher responded by noting that GM and other automakers had made those commitments with the understanding that government would continue to invest in the necessary infrastructure. However, with only around 2,000 E85 retail stations out of more than 160,000 retail stations nationwide, the auto industry is beginning to question its commitment.

Stephen Long asked about the USDA biobased markets program, including whether or not USDA could track the program's economic value. Bill Hagy responded to his question, advising that about 5,100 products had been tested and certified by USDA as meeting the standards for bio-certified. At this time, USDA has not been able to determine the exact economic impact of the program, but the agency is interested in developing matrices to track job creation, greenhouse gas (GHG) emission reductions, and more. USDA welcomes the Committee's support in trying to determine these standards.

A participant from the audience commented that USDA feedstock analysis often overlooked the potential for purpose-grown trees and focused too much on herbaceous energy crops and algae. Bill Hagy agreed with this comment and indicated that forestry and mill residue would play a much larger role in future editions of the feedstocks roadmap.

Pam Reilly-Contag asked if the Regional Biomass Research Centers were located in areas with sufficient feedstocks to support optimal bioenergy production. Bill Hagy directed her to the USDA website to view the locations of these facilities. In addition, he explained that while there was certainly a need to find a regional balance, one goal of the USDA roadmap was to identify suitable opportunities for feedstock production in each region of the United States.

IV. Biomass Research and Development Initiative Status

Carmela Bailey, National Institute of Food and Agriculture, U.S. Department of Agriculture

Carmela Bailey provided an overview on BRDI topics, including the selection and evaluation process, the role of DOE and USDA, and funding contributions. She explained that the FY 2011 solicitation was currently under review at DOE's Golden Field Office. The solicitation will be announced in mid to late March. In addition, she advised that the FY 2010 awards were in process and would be jointly announced in late April. In FY 2010, BRDI focused on advanced biofuels and biobased industrial products, with an interest in small-scale, rural-based processing and manufacturing. FY 2010 awards were in the range of $3–7 million.

Rodney Williamson inquired about why the funding for feedstock production and logistics was increasing at USDA and decreasing at DOE. Laura McCann explained that the Administration's *Growing America's Fuels Report* designated USDA as the lead for feedstock production and DOE as the lead for conversion technologies and deployment. DOE and USDA are working together to coordinate efforts through the Committee, the interagency board, and in other forums.

Stephen Long asked about funding levels for the Sun Grant Initiative. Carmela Bailey explained that—to date—the majority of funding has not come from USDA, but from the Department of Transportation (DOT) and DOE. Stephen Long and several other Committee members discussed ways to keep the Sun Grant Initiative funded, and agreed on the importance of keeping the grant centers running for a full five years in order to get sufficient data, especially on perennials, for long-term yields and soil impacts. Pam Reilly-Contag commented that while collecting data on long-term yields was important, it was also necessary to focus on yield impacts in different regions of the country where differences in elevation, soil quality, precipitation, and more could have significant impacts.

V. U.S. Department of Energy, Office of the Biomass Program Overview

Paul Bryan, Biomass Program Manager, U.S. Department of Energy

Paul Bryan provided an overview on the Biomass Program's objectives and strategic direction. His presentation focused on two main themes: (1) rebalancing the portfolio and (2) achieving mandates detailed in the Energy Independence and Security Act of 2007. While the Biomass Program's primary focus has been on the development of cellulosic ethanol, the new Program direction will include research on renewable hydrocarbon fuels for jet, diesel, and gasoline replacements.

Paul Bryan highlighted ethanol's capacity to only replace 40% of a barrel of petroleum. In addition, he noted that ethanol blends higher than 10% can create a variety of problems for petroleum refiners. However, the Biomass Program is not giving up ethanol, and while no single molecule can serve as a solution, the Biomass Program is investing in a wider variety of fuels that have the potential to replace the whole barrel of petroleum.

Stephen Long, Bruce Dale, and others expressed concerns about shifting the focus away from cellulosic ethanol. They noted that the technology for cellulosic ethanol was very close to commercialization, and that diverting attention towards these new fuels could possibly leave the industry with nothing. Bruce Dale felt that a shift from cellulosic ethanol would undermine investor confidence. Stephen Long suggested that investing in these new fuels would require research to overcome two hurdles, not just one. Paul Bryan noted the significant roadblocks in the marketplace for ethanol—such as the "blend wall"—and emphasized his belief that the industry would get left behind if it didn't invest in alternatives

for the whole range of petroleum-based fuels and products. He also cited companies that are using cellulosic feedstocks to produce hydrocarbon fuels, such as Solazyme and LS9.

Mark Maher expressed some skepticism about refiners not being able to handle ethanol blends higher than E10. He and other Committee members related their mutual concern that the needs of the biofuels industry were being relegated to the needs of the petroleum industry. Paul Bryan described the variety of technical problems associated with integrating higher-level ethanol blends into existing refineries. He emphasized that the U.S. refining industry and existing petroleum infrastructure represent a multitrillion dollar investment, and that pyrolysis oil, green crude, and other intermediates compatible with the existing refineries and infrastructure would offer an excellent path for the success of the biofuels industry moving forward.

VI. Board Working Group Report Outs

Presentation: Genetics/Genomics Improvement
Kay Simmons, Agricultural Research Service, U.S. Department of Agriculture

Kay Simmons delivered a presentation on the genetic sequencing of potential biomass feedstocks. Her research program at USDA is primarily focused on sequencing the genome of switchgrass and mapping various properties that could make switchgrass more or less useful as a feedstock for bioenergy.

After her presentation, Kay Simmons engaged in a discussion with Stephen Long, David Bransby, and Bruce Dale about the potential risks for genetically modified switchgrass to overtake native populations and become an invasive species. Pamela Reilly-Contag questioned whether genetically modified switchgrass presented any risks that were different than species of switchgrass produced through selective breeding.

Presentation: Best Management Practices
Marilyn Buford, Forrest Service, U.S. Department of Agriculture

Marilyn Buford provided a brief overview on the Best Management Practices (BMP) team, discussing its efforts to synthesize and disseminate information on BMPs for sustainable feedstock production and management systems. BMP team members include representatives from USDA, DOE, the Environmental Protection Agency (EPA), and the Department of the Interior (DOI). Upcoming deliverables include a white paper on regionally relevant best practices indicators and efforts to work with state and federal agencies in education and outreach on the implementation of BMPs.

Presentation: Logistics
John Ferrell, Biomass Program, U.S. Department of Energy

John Ferrell delivered a presentation on the Feedstock Logistical Working Group. Research and development in this area is focused on activities designed to ensure a high-quality, high-density, stable feedstock supply for various bioenergy applications. Key challenges involve lowering logistics costs, dealing with moisture content, and expanding the viable collection range.

The goal is to commoditize the feedstock supply to as high a degree as possible, to take diverse feedstock inputs, and to create a uniform format supply system. Some of the projects related to these efforts include the Deployable Process Demonstration Unit (PDU) and five industry and university

projects for field-scale demonstration; INL is completing most of the core engineering and design work for these projects.

Todd Werpy asked what the basis was for the cost model and projections. John Ferrell explained that they were based on the Program's *Multi-Year Program Plan*.

David Bransby inquired whether there were any expectations for the future structure of the industry—if the platform was looking at feedstock logistics models involving small farmers or large-scale industrial agriculture. John Ferrell agreed that there was some uncertainty surrounding the future structure of the industry, and acknowledged that while reducing feedstock logistics costs would be important, the Program recognized that lowering conversion costs would most likely be the key factor.

Steven Long pointed out that many of the large-scale industrial feedstock projects were taking place in Europe, and asked what the Program was learning from these projects. John Ferrell noted that the Program was involved in a variety of international collaborative efforts with the European Union, China, India, and other countries.

Presentation: Distribution
Shawn Johnson, Research and Innovative Technology Administration, U.S. Department of Transportation

Shawn Johnson provided an overview of recent DOT efforts that involve the Biobased Transportation Research Program and Advanced Vehicle Technology Program. She described the roles and responsibilities of the various federal agencies involved in the transportation of biomass and bioenergy products, including the roles of DOE, USDA, EPA, DOI, DOT, and the Occupational Safety and Health Administration. She also provided an overview of the upcoming Interagency Biofuels Infrastructure Workshop that will be held on April 11–12, 2011, at DOT Headquarters. However, the workshop had been postponed due to the federal budget crisis. The Interagency Biofuels Infrastructure Workshop is now rescheduled for June 13–14, 2011.

Craig Kvien asked for Shawn Johnson's opinion on what role she saw for the use of pipelines in transporting ethanol and other biofuels. Shawn Johnson explained that the Pipeline Hazardous Materials Safety Administration at DOT would be involved with the infrastructure workshop, as it is the lead agency for the certification of pipeline safety standards. However, given the infrastructure compatibility issues associated with transporting ethanol in pipelines, she felt that transporting ethanol via rail and truck would be the most important modes for the foreseeable future.

Rodney Williamson asked Shawn Johnson if there were any impacts expected to come out of the interagency workshop. She explained that the workshop would help identify priority areas of future research and funding efforts, as well as primary areas for collaboration and synergy between the disparate federal agencies involved in the transportation and distribution of biofuels. Information and various insights from the workshop will eventually filter up to the Secretary level and could help determine overall federal priorities and national infrastructure objectives.

Finally, Shawn Johnson responded to a question from Stephen Long about transportation issues associated with other biofuels by explaining that the workshop would also help DOT and DOE prepare for other issues on the horizon, such as the certification, testing, and standards development for new biofuels, as well as other issues.

Presentation: Report on Early Activities from the Conversion Working Group

George Antos, Directorate for Engineering, National Science Foundation, Co-Chair Conversion Working Group; Valerie Sarisky-Reed, Biomass Program, Department of Energy, Partner Co-Chair

George Antos provided a brief overview on the early activities conducted by the Conversion Working Group, which was established by the Board. The slide presentation did not open, so an extemporaneous discourse was provided. To provide some background, the role and deliverable from the first Conversion Working Group (under the previous Board) was discussed. The mission facing the current Working Group is more difficult than the previous Working Group because technology delivery has become the focus, rather than simple information gathering. The Working Group charter elements were discussed, including extending the field of view beyond the technical to the economic, health, social, and environmental. In addition, tactics, membership, and deliverables were mentioned. A cross-agency inventory of projects will be revived, and the information mined for gaps. Assessing technology readiness and level of success are seen as two essential, but difficult features. This provoked discussion about how much interaction with industrial companies will or can take place, and how to gain more involvement with industry to enable gap-filling research work to be done.

The National Science Foundation's (NSF's) involvement in funding various bioenergy-related projects was mentioned. NSF funding would typically support fundamental research and education grants in new energy systems (in this case) that are renewable and environmentally friendly. There is some flexibility in individual programs, such that funding is applied to cross-cutting research and development initiatives, which can have a variety of applications. Through collaboration with the Working Group, NSF will be working with industry and federal agencies to determine research needs and where NSF funding can have the greatest impact in making biomass products a reality.

Jim Matheson asked about the total level of NSF funding in terms of dollars. George Antos advised that there were between 300–500 clean energy projects, totaling many millions of dollars, and that most projects were front-end, university-related projects. He also stated that in recent years, significant portions of bioenergy project funding was focused on improving catalysis and bio-catalysis technologies, as they are related to biomass conversion. Due to mission and funding significance, close working cooperation between DOE and USDA is highly desirable in this area.

VII. Idaho National Laboratory Feedstock Logistics

Richard Hess, Idaho National Laboratory

Richard Hess delivered a presentation on the research and development of feedstock logistics at INL. Feedstock logistics involve the harvesting and collection of biomass, storage, preprocessing, transportation, and handling. Richard Hess emphasized the importance of the interface on both ends of the supply chain with feedstock production systems and conversion technologies.

In addition, he identified many of the challenges associated with conventional feedstock supply systems and outlined alternative approaches that could utilize advanced logistics systems and help unlock biomass resources in a much larger portion of the country. With a uniform format approach, biomass feedstocks would be standardized in order to develop a national, commodity-scale exchange market. This model could guarantee material specifications, stabilize average transportation costs, reduce spatial and temporal variability, and eliminate the risks in obtaining a stable feedstock supply.

Richard Hess also provided an overview on new research and development logistics systems, including the Deployable PDU, which is a portable, reconfigurable feedstock handling system equipped with grinder, milling, and densification modules. PDU is currently in testing at INL.

David Bransby asked for clarification about the quoted logistics price. Richard Hess explained that the logistics prices were calculated from the farm gate to the plant gate. He also relayed plans to add price information and other data to the Bioenergy KDF.

VIII. Subcommittee Breakout Summaries

Feedstocks:
Rodney Williamson and Stephen Long

- Needs:
    - Funding mechanisms for long-term trials; and to continue to take advantage of existing trials rather than restarting the trial process.
    - Long-term measurement of GHGs from various and emerging feedstock. NEON? NSF.
    - Evaluating agave crops (e.g., sissal) for semi-arid lands that do not compete with food crops.
- Critical Questions:
    - Is there a dataset on land use outside current agriculture that measures use to identify land that is underutilized? (Does it exist?)
    - Where is the land that can be used for second- generation feedstocks? (Include ownership details.)
- Indirect Effects:
    - Analysis on the indirect effects across all fuel types. Analysis should incorporate future fuel sources, including fossil fuel oil (e.g., tar sands and deep sea oil).
- Woody Biomass:
    - Need to assess the potential of cropping some full-grown forests in the eastern forest.
        - Take into account carbon sequestration practices.
        - Critical Questions:
            - How will this benefit overall GHG balance and local economies?
            - What management practices will be optimal in achieving these goals?
- Productivity:
    - Need to examine quarantine facilities and the process of importing germplasm for breeding purposes to improve the productivity of energy crops.
    - Need to employ strategies to ensure that pollen does not reach wild communities of the same species when native species have been bred as feedstocks.
- Algae and Other Organisms:
    - Need techno/economic engineering analysis for algae, including Life Cycle Assessment (LCA) and environmental analysis.
- Improving Biomass Logistical Systems:
    - Linking feedstocks to end uses is critical to determine the optimum system.
    - Having system tools to prioritize efforts and optimize logistics from harvest to delivery.

Sustainability:
Bruce Dale

- Consider the beginning, middle, and end of the process:
    - Beginning – corn ethanol
    - Middle – technology transition
    - End – renewable fuel nation.
- What is the plan for using 36 billion gallons of ethanol?
- Why is there no implementation pathway for cellulosic ethanol?
- Should research that enables oil refineries to become biorefinery-compatible be encouraged?
- How well do the interests of oil refiners coincide with the larger societal interests of providing sustainable oil alternatives? (This is not [yet] a consensus.)
- What affect will changes in Congress and the federal budget have on the industry?
- Need contingency planning for the industry that has been expecting particular budgets.
- Need clarity on the priorities of agencies.
- What are the redundancies?
- Where are the most viable areas and venues for research?
- Government provided infrastructure in the past to enable commerce:
    - Transcontinental railroad, interstate highway system, etc.
- What is a comparable role today?
- How can government make a truly sustainable program?
- Timeline of decision-making has to match research and development and commercialization timelines.
- Biodiversity and invasive species:
    - Need to think about the definition of invasive species in a regional way, not national borders.
    - Can't be sustainable unless we think regionally and assess globally.
    - System of systems model.
    - Need research/data collection on genetic engineering and breeding on species that can outcompete others. Need local-, regional-, and global-level examination.
    - Biodiversity, competitiveness, and environmental role:
        - It doesn't take much to throw things out of balance.
        - Research should examine unintended consequences.
        - Want engineered plants to make better biofuels, but don't want future generations to have to live with unintended consequences.
- What infrastructure is necessary for FFVs and blender pumps to create a sustainable market for ethanol?
- What is the critical mass number of blender pumps and FFVs, nationally and by state, in order to match demand potential with the Renewable Fuel Standard mandate?
- What is the timeline to get there?
- Need 50% vehicle and fueling penetration to say there is an unlimited market.
- What is the number of blender pumps and FFVs that could still allow the market to flourish?
- What is the current timeline to get to 50% vehicle and fueling penetration?

Infrastructure:
William Berg

Revisions Required:

- Market Creation – Vehicles:
    - Agencies and departments should be advised to harmonize vehicle emission, diagnostic, and fuel economy test procedures for all commercial biofuel blend levels—low-level, mid-level, and high-level—based on the blends known physical properties.
    - Required test fuels should match commercially available fuels to protect consumer interests.
    - Immediate rulemaking should be undertaken to incorporate E10 fuels as emission and fuel economy test fuels (MATCH WAIVER) with appropriate accommodations for their fuel properties.
    - Review certification fuels as time goes on and make adjustments to reflect commercially relevant blends.
- Market Creation – Non-Vehicle, End-Use Devices:
    - Research should be undertaken to understand the design requirements of establishing a minimum biofuel blend capability in non-vehicle, end-use devices (marine, outdoor power equipment, and others).
        - This should follow the vehicle fuel waiver.

Conversion:
David Bransby

- Todd Werpy agreed to take on the role of second co-chair for this subcommittee.
- The Committee discussed several issues that relate to the Committee Charter. We noted that Item 2.2 charges the full Committee with responsibilities related to solicitations and funding, but the information provided to the Committee on these issues has been somewhat limited. In light of this, we recommend that a presentation be made to the full Committee at the next quarterly meeting on the full solicitation and award process for both grants and loan guarantees. This presentation should preferably include:
    - Writing the solicitation
    - Distributing the solicitation
    - Choosing reviewers
    - Reviewing the solicitation.
- In relation to conversion needs, the Committee recommends that one or more qualified speakers be invited to provide an overview on catalyst-based conversion technologies for the production of drop-in replacement hydrocarbon biofuels as a first step in identifying research needs on this topic.
- Information obtained from these presentations will provide a useful basis for making 2011 recommendations by the end of the year.

IX. National Agricultural Research, Extension, Education and Economics Update

Carol Keiser-Long, National Agricultural Research Extension, Education and Economics Committee Chair

Carol Keiser-Long gave a very brief overview on NAREEE research goals related to bioenergy. Her presentation focused on the importance of building strategic capabilities, enhancing workforce development, and developing a global baseline for life cycle GHG emissions standards. She suggested that global LCA standards would eventually be needed for each feedstock and conversion technology. She said that NAREEE was completing several reports, one of which was a bioenergy white paper, and that she would have more information relevant to the renewable energy committee actions to present at the next Committee meeting.

X. Biomass Densification for Co-Firing Applications

Elliott Levine, Biomass Program, U.S. Department of Energy

Elliott Levine provided an overview on the Biomass Program's efforts to assemble the knowledge base for the development of utility-scale biopower technology RDD&D subprogram element. . Biopower technology activities, which begin in FY 2011, will investigate pathways for near-term sustainable biopower RDD&D and the mid-term development of more efficient biopower technologies. Elliott Levine discussed different biopower and conversion technologies, as well as the various technical, economic, and regulatory risks associated with the development of utility-scale biopower.

As presented, the success of biopower development in the United States will likely depend on the strategies for co-firing coal and biomass mixtures and the advantages that can be achieved through those strategies—namely, improved power plant emissions that result from lower capital investment requirements. Approximately half of the United States has instituted statewide Renewable Portfolio Standards. However, these standards have only had a marginal impact on the expansion of biopower (to date). A proposed national standard (depending on how emissions were calculated) or a national tax on carbon emissions could have a more significant impact on the use of biomass for electricity generation. Elliott Levine also provided an overview on the results of the Biopower Technical Strategy Workshop, which was held in December 2009.

Todd Werpy expressed some skepticism about the assertion that coal plants would begin to employ carbon capture and storage if carbon emissions were priced at $60 per ton. Several members of the Committee agreed, citing various technical and geologic challenges. Kevin Craig raised the issue of balancing the use of biomass for fuels versus power generation. Elliott Levine and the other Committee members discussed the relative merits of using biomass to produce electricity for electric vehicles versus existing and future reductions in carbon emissions from biofuels. Mark Maher commented that ultimately both the electricity generation and transportation fuel pathways would be 'greened' by the use of biopower and biofuels.

XI. 2011 Work Plan and Future Biomass Committee Meeting Agenda Topics

Steve Briggs, Co-Chair

Laura McCann asked Committee members what other speakers and/or organizations they would like to have address the Committee in future meetings. Bruce Dale suggested inviting Tom Richard, a scientist from Penn State University, to speak about the most effective use of biomass. Mark Maher suggested inviting someone from the American Society for Testing and Materials to speak about fuel standards and

other related issues. Bill Hagy recommended inviting scientists from the Bioenergy Research Centers, or someone from the biochemicals industry. It was agreed that in future Committee meetings, a slot would be kept open for invited outside speakers, and that speaker recommendations would continue to be solicited at future Committee meetings.

The Committee then discussed potential locations for their August meeting. Todd Werpy proposed Illinois, with the potential for a tour of ADM's large biochemical plant in Decatur. Stephen Long recommended combining this idea with a trip to the University of Illinois-Champaign to tour the university's energy crops. Bill Hagy welcomed this idea, but suggested an alternative in case either fell through. He put forth the notion of considering a trip to San Francisco and a meeting with Solazyme.

XII. Public Comment

None

IX. Closing Comments

Steve Briggs, Co-Chair

Steve Briggs closed the meeting.

Attachment A: Committee Member Attendance – March 2-3, 2011 Meeting

Co- Chairs	Affiliation	Attended?
Steve Briggs		YES

Members	Affiliation	Attended?
Robert Ames	Tyson Foods	YES
William Berg	Dairyland Power Cooperative	YES
David Bransby	Auburn University	YES
Pamela Reilly Contag	Cygnet Biofuels	YES
Bruce Dale	Michigan State University	YES
Joseph Ecker	Salk Institute for Biological Studies	NO
Dermot Hayes	Iowa State University	NO
Jennifer Holmgren	LanzaTech	YES
E. Alan Kennett	Gay & Robinson Sugar	NO
Craig Kvien	University of Georgia	YES
Stephen Long	University of Illinois	YES
Mark Maher	General Motors	YES
Jim Matheson	Flagship Ventures	YES
Mary McBride	CoBank, ACB	YES
Mitchell Peele	North Carolina Farm Bureau	NO
Michael Powelson	The Nature Conservancy	YES
J. Read Smith	Agricultural Energy Work Group	NO
David Vander Griend	ICM	YES
Todd Werpy	Acher Daniels Midland Company	YES
Rodney Williamson	Iowa Corn Promotion Board	YES

Total: 16 of 21 members attended

Attachment B: Agenda – March 2–3, 2011 Meeting

Day 1: Technical Advisory Committee Meeting **March 2, 2011**

8:00 a.m. – 8:30 a.m.	*Breakfast (to be provided for Committee)*
8:30 a.m. – 8:45 a.m.	Welcome *Co-Chair – Steve Briggs*
8:45 a.m. – 9:00 a.m.	Presentation: Commitee Business *Laura McCann, Biomass Program, U.S. Department of Energy*
9:00 a.m. – 9:30 a.m.	Presentation: USDA Update on Biomass R&D Activities *Bill Hagy, Rural Development, U.S. Department of Agriculture*
9:30 a.m. – 9:45 a.m.	Presentation: BRDI Status *Carmela Bailey, National Institute of Food and Agriculture, U.S. Department of Agriculture*
9:45 a.m. – 10:00 a.m.	*Break*
10:00 a.m. – 10:30 a.m.	DOE Office of the Biomass Program Overivew *Paul Bryan, Biomass Program Manager, U.S. Department of Energy*
10:30 a.m. – 12:00 p.m.	Presentation: Board Working Group Report Outs: Feedstocks: • Genetics/Genomics Improvement: *Kay Simmons, Agricultural Research Service, U.S. Department of Agriculture* • Best Management Practices: *Marilyn Buford, Forest Service, U.S. Department of Agriculture* Logistics and Distribution: • Logistics: *John Ferrell, Biomass Program, U.S. Department of Energy* • Distribution: *Shawn Johnson, Research and Innovative Technology Administration, U.S. Department of Transportation* Conversion: • *George Antos, Directorate for Engineering, National Science Foundation*
12:00 p.m. – 1:00 p.m.	*Lunch (to be provided for Committee)*
1:00 p.m. – 2:00p.m.	Presentation: INL Feedstock Logistics *Dr. Richard Hess, Idaho National Laboroatry*

2:00 p.m. – 3:00 p.m.	Breakout: Subcommittees
3:00 p.m. – 3:15 p.m.	*Break*
3:15 p.m. – 4:30 p.m.	Breakout: Subcommittees

Day 2: Technical Advisory Committee Meeting: March 3, 2011

8:00 a.m. – 8:30 a.m.	*Breakfast (to be provided for Committee)*
8:30 a.m. – 10:30 a.m.	Discussion: Subcommittee Report Outs *Feedstocks, Conversion, Infrastructure, and Sustainability*
10:30 a.m. – 10:45 a.m.	Presentation: NAREEE Update *Carol Keiser-Long, National Agriculture Research, Education, Extension, and Economics Commiteee Chair*
10:45 a.m. – 11:00 a.m.	*Break*
11:00 a.m. – 11:30 a.m.	Presentation: Biomass Densification for Cofiring Applications *Elliott Levine, Biomass Program, U.S. Department of Energy*
11:30 a.m. – 12: 00 p.m.	Discussion: 2011 Work Plan and Future Biomass Committee Meeting Agenda Topics *Co-Chair – Steve Briggs*
12:00 p.m. – 1:00 p.m.	*Lunch (to be provided for Committee)*
1:00 p.m. – 1:15 p.m.	Public Comment
1:15 p.m. – 1:30 p.m.	Closing Comments *Co-Chair – Steve Briggs*
1:30 p.m.	Adjourn