

**Biomass Research and Development
Technical Advisory Committee**

February 27–28, 2014

Meeting Summary

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List of Acronyms

AFRI – Agriculture and Food Research Initiative
BER – Biological and Environmental Research
BETO – Bioenergy Technologies Office
Biomass Act – Biomass Research and Development Act of 2000
BRDI – Biomass Research and Development Initiative
BTEC – Biomass Thermal Energy Council
Committee – Biomass R&D Technical Advisory Committee
DOE – Department of Energy
DPA – Defense Production Act
EERE – Energy Efficiency and Renewable Energy
EISA – Energy Independence and Security Act of 2007
EPA – Environmental Protection Agency
FOA – Funding Opportunity Announcement
GBTL – Gas-biomass-to-liquids
GHG – Green house gas
KDF – Knowledge Discovery Framework
NIFA – National Institute of Food and Agriculture
R&D – Research and development
RFI – Request for Information
USDA – U.S. Department of Agriculture

I. Purpose

On February 27–28, 2014, the Biomass Research and Development Technical Advisory Committee (the Committee) held its first quarterly meeting of 2014. The Committee received updates about the U.S. Department of Energy’s (DOE’s) Bioenergy Technologies Office (BETO), and a U.S. Department of Agriculture (USDA) representative delivered presentations about current agency activities. The Committee was given presentations on upcoming BETO activities, the Biomass Research and Development Initiative (BRDI), and the Bioeconomy. Other presentations included an update of the Renewable Fuel Standard and Volumetric Requirement for Biofuels, as well as a summary of the Natural Gas to Liquids Workshop.

See Attachment A for a list of meeting attendees. See Attachment B to review the meeting agenda.

Meeting presentations can be viewed on the BRDI website:

<http://biomassboard.gov/committee/meetings.html>.

Background: The Committee was established by the Biomass Research and Development Act of 2000 (Biomass Act), which was repealed and replaced by Section 9008 of the Food, Conservation, and Energy Act of 2008.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 (the Board) was established under the same legislation to coordinate activities across federal agencies. This recently has been re-authorized in the Agricultural Act of 2014. The Committee is tasked with advising the Secretaries of Energy and Agriculture on the direction of biomass research and development (R&D).

II. Welcome

Kevin Kephart, Committee Co-Chair

Pamela Contag, Committee Co-Chair

Dr. Kephart and Dr. Contag welcomed the Committee to the first meeting of the year and called the meeting to order.

III. Committee Business for 2014 and U.S. Department of Energy Updates

Elliott Levine, U.S. Department of Energy, Designated Federal Official

Mr. Levine began by introducing the following:

New Committee Co-Chair

- Dr. Pamela Contag, Founder & CEO, Cygnet Biofuels

New Committee Members

- Dr. Valerie Thomas, Anderson Interface Associate Professor, Georgia Institute of Technology, School of Industrial and Systems Engineering, School of Public Policy
- Randy Jennings, Director of Program Operations, Tennessee Department of Agriculture

Mr. Levine then provided the Committee members with a background of the Committee establishment, authority, interaction with the Biomass Board and agencies, duties, and final products. He then provided an overview of the current activities of BETO, including the following:

- Incubator Program—DOE is creating a dedicated, annual funding mechanism to support innovative technologies that are not represented in DOE’s existing technology portfolio.
- Renewable Carbon Fiber—DOE is working to produce innovative new materials from biomass by utilizing sugars, lignin, and other biorefinery products to enhance industry economics.
- Natural Gas-Biomass to Liquids—DOE is exploring opportunities to combine biomass with low-cost natural gas for the production of liquid fuels.

Upcoming workshops/events

- Demonstration and Deployment Strategy Workshop: March 11–12, 2014
- Biomass Indirect Liquefaction Workshop: March 20–21, 2014
- Algal Biofuels Spring Strategy Workshop: March 26–27, 2014
- Bio-Oil Co-Processing: Expanding the Refinery Supply System: April 3, 2014
- Woody Feedstock Workshop: March 4–6, 2014
- Herbaceous Feedstock Workshop: June 24–26, 2014
- *Biomass 2014: Growing the Future Bioeconomy*: Planned for July 29-30, 2014 at Washington Convention Center

Other updates

- The Bioenergy Knowledge Discovery Framework (KDF) Legislative Library is now available. The Legislative Library allows users to track federal legislation proposed in the 112th and 113th Congresses (i.e., the current and most recently passed sessions of Congress) relevant to the production and use of biofuels in the United States.
- BETO and DOE’s Vehicle Technologies Office Collaboration on the Green Racing Challenge. Ineos has provided cellulosic E-10 and E-85 for Daytona 24-hour race in January. Primary feedstock for fuel is organic waste. Two diesel powered Mazda engines were fueled with synthetic diesel produced by Dynamic Fuels. Primary feedstock for fuel is poultry processing residues.
- Update on ARPA-E Electrofuels and REMOTE Programs
 - Electrofuels: Chemoautotrophic CO₂ to Fuels
 - REMOTE: Reducing Emissions using Methanotrophic Organisms for Transportation Energy/Bio-conversion of Methane to Liquid Fuels.

Office of Science – Solicitations

DOE Office of Science has issued two fiscal year (FY) 2014 funding opportunities announcements (FOAs) for basic research relevant to biofuels production from biomass:

- DE-FOA-0001034: Plant Feedstock Genomics for Bioenergy: A Joint DOE-USDA Funding Opportunity
- DE-FOA-0001060: Systems Biology of Microbes to Enable Next-Generation Biofuels Production.

IV. Department of Agriculture Updates

Todd Campbell, U.S. Department of Agriculture

Mr. Campbell provided updates on the Agriculture Act of 2014—Title IX Appropriations and other USDA activities.

- BioPreferred Program: \$3 million each year from FY 2014 to FY 2018
- Biorefinery Assistance Program: (\$100 million in FY 2014, \$50M in each FY 2015 and FY 2016)
- Repowering Assistance: \$12 million available until expended
- Bioenergy Program for Advance Biofuels: \$15 million each year from FY 2014 FY 2018
- Rural Energy for America Program: \$50 million each year from FY 2014 to FY 2018
- Biomass Research and Development Initiative: \$3 million each year from FY 2014 to FY 2017
- Biomass Crop Assistance Program: \$20 million each year from FY 2014 to FY 2018

2009–2012 Biorefinery Assistance Program Awardees

- Loan Note Guarantees issued:
 - Sapphire Energy, Inc., New Mexico: \$54.5 million (paid in full)
 - INEOS New Planet BioEnergy, Florida: \$75 million
 - Fremont Community Digester, Michigan: \$12.8 million
- Conditional Commitments awarded:
 - Zechem, Oregon: \$232.5 million
 - Fiberight, Iowa: \$25 million
 - Fulcrum Sierra Biofuels, Nevada: \$105 million
 - Chemtex, North Carolina: \$99 million

FY 2014 Biorefinery Assistance Applications

- Notice of Funds Availability closed January 30, 2014
- Eight applications were received
- There was \$510 million in loan guarantee authority requested

Partnership between U.S. Endowment for Forestry and Communities and the U.S. Forest Service

- Three-year partnership will promote cellulosic nanomaterial as a commercially viable enterprise

Agriculture and Food Research Initiative

- Awarded nearly \$10 million to a consortium of academic, industry, and government organizations led by Colorado State University

FY 2014 BioPreferred/Biobased Product Goals

- Begin including biobased clauses in all new janitorial/custodial and operations and maintenance procurements immediately.

Farm-to-Fleet Program

- Makes biofuel part of regular, operational fuel purchase and use by the military

V. Overview of the Biomass Research and Development Initiative

Daniel Cassidy, U.S. Department of Agriculture

Daniel Cassidy from the National Institute of Food and Agriculture (NIFA) updated the Committee on the BRDI updates from the Agriculture Act of 2014, which states that Biomass Research and Development Initiative will receive \$3 million per year from FY 2014 to FY 2017. Mr. Cassidy is currently developing his plan for BRDI solicitations based on the new authorization of funds. Mr. Cassidy asked the Committee for their thoughts and input on how to best allocate these funds to maximize the benefit for the Initiative. Mr. Cassidy also notified the Committee that NIFA has conducted a multi-state Committee review of 28 BRDI projects from FY 2005 to FY 2009. The Committee response to Mr. Cassidy is provided in the Subcommittee report summary below.

VI. Overview of DOE Bioenergy Technologies Office 2014 Activities

Dr. Jonathan Male, Director, Bioenergy Technologies Office, U.S. Department of Energy

BETO Director Dr. Jonathan Male provided an overview of recent and planned activities for the Office. First, Dr. Male introduced the newly appointed Deputy Assistant Secretary of Transportation for Energy Efficiency and Renewable Energy, Reuben Sarkar. Deputy Assistant Secretary Sarkar will oversee BETO, the Vehicle Technologies Office, and the Fuel Cells Technologies Office within DOE.

Dr. Male reported on FY 2013 BETO accomplishments, which included the Sun Grant Regional Feedstock Partnership that is holding meetings to collect data for the Bioenergy KDF, and the Advanced Logistical Systems and Harvesting Technologies that have been successful in developing new harvesting technologies.

Following the FY 2013 BETO accomplishments, Dr. Male provided the Bioenergy budget history which showed a total budget of over \$232 million FY 2014. Dr. Male provided an overview of the activities the Office will undertake in 2014 with these funds, which included highlighting 2014 FOAs. These include:

- Renewable Carbon Fiber – Released on February 3, 2014
- Bioenergy Technologies Incubator – Released on February 25, 2014.

He then provided an overview of activities to be undertaken in 2014 by each BETO area:

- Feedstock Supply & Logistics
- Biochemical Conversion
- Algae
- Thermochemical Conversion
- Demonstration and Market Transformation
- Analysis & Sustainability

- Defense Production Act (DPA) Initiative.

Finally, Dr. Male highlighted the *Process Design and Economics for the Conversion of Lignocellulosic Biomass to Hydrocarbon Fuels* Study, which has recently been updated to include the latest published data. He also summarized accomplishments that have been made in the aviation industry.

After Dr. Male's presentation, Bill Provine asked for more information regarding the driver behind the Incubator FOA. Dr. Male stated that the ARPA-E Program has been successful with a similar effort to identify new ideas and technologies that may not have fit within the current R&D direction. EERE management wanted to implement a similar mechanism that was complementary and met EERE's needs.

David Bransby asked about a previous Request for Information (RFI) on Waste to Energy and how the responses to that RFI will be addressed. Dr. Male explained that RFIs are vital to the Office looking into new areas of research. The feedback is used to identify what, if any, the role the federal government should undertake and where the greatest impact could be realized. It can also lead to future FOA opportunities. If not enough information is collected to answer all of the Office's needs, RFIs or stakeholder workshops can be conducted in the future to address any further needs.

VII. Update of the Renewable Fuel Standard and Volumetric Requirement for Biofuels

Paul Argyropoulos, U.S. Environmental Protection Agency

Mr. Argyropoulos, for the U.S. Environmental Protection Agency (EPA) started by providing background information on the proposed rule for the Renewable Fuel Standard Program 2014 Volume Standards. The Energy Independence and Security Act of 2007 (EISA) set year-by-year the volume of renewable fuel that generally must be used in transportation fuel, reaching a total of 36 billion gallons by 2022. EISA requires that each year EPA publish the annual standards for use of total, advanced, biomass-based diesel, and cellulosic renewable fuels that apply to obligated parties, which are typically refiners and importers of gasoline and diesel. EPA sets a percentage requirement for obligated parties based on gasoline and diesel projections from the EIA. EISA authorizes EPA to reduce volumes from the statutory requirements under certain circumstances. Mr. Argyropoulos provided key points for the 2014 proposal to the Committee.

Key points include:

- The rulemaking proposes volume requirements for the RFS program for 2014 and outlines a potential path forward for 2015 and beyond
- There are a number of new issues in 2014 that EPA must consider in setting the standards
- A key issue this year is what is commonly referred to as the ethanol "blendwall"—challenges associated with supplying more ethanol to the market than can be provided through blending up to 10% ethanol in gasoline (E10).
- For the first time, EPA proposed adjustments to the total renewable fuel and advanced biofuel standards to address these market issues
- EPA's intention in this rulemaking is to put the RFS program on a manageable trajectory that will support continued growth in renewable fuels.

He then provided an overview of the steps to propose advanced and total renewable volumes. Finally, he provided an overview of the possible three approaches which are based on (1) volume on Availability of Advanced, (2) volume on the Full Reduction in Cellulosic, and (3) volume on Availability of Advanced Biofuels but Considering the Blendwall.

VIII. Natural Gas to Liquids Workshop Summary

Zia Haq, Bioenergy Technologies Office, U.S. Department of Energy

Mr. Haq explained that an exploratory workshop was held on September 3, 2013 with the purpose to better understand how natural gas and biomass may be optimized and integrated into a conversion process to produce liquid fuels and chemicals and to obtain input from industry, academia, research establishments, and other experts to identify the pre-competitive R&D and scale-up challenges to commercializing gas-biomass-to-liquids (GBTL) technologies.

Key takeaways from workshop include:

- Rationale for integrating biomass and natural gas resources to produce liquid transportation fuels is the need for smaller scale distributed processes, greenhouse gas reduction and the need for a specific C/H ratio in the fuel
- GBTL processes can produce transportation fuels with 50% lower green house gas (GHG) emissions if substantial amounts of lignocellulosic biomass is co-processed with natural gas
- GBTL processes have significantly higher yields than processes converting only biomass
- Stranded biomass and stranded natural gas offer near-term opportunities to utilize currently unutilized feedstocks
- Research challenges: down-scaling GBTL systems, improved catalysts, biochemical conversion processes, feeding biomass into pressurized systems, production of co-products, and many more.

Feedback generated from the workshop will be made available in a white paper.

IX. Overview of the Bioeconomy Initiative

Todd Campbell, Rural Development, U.S. Department of Agriculture

Dr. Jonathan Male, Bioenergy Technologies Office Director, U.S. Department of Energy

Todd Campbell and Jonathan Male jointly introduced the Billion Ton Bioeconomy Initiative to the Committee. This Initiative has been proposed by the Biomass Research and Development (R&D) Board which intends to communicate with the Committee on future development of the Initiative. Mr. Campbell defined the Bioeconomy and provided an overview of what the current Bioeconomy looked like. His statements outlined the Bioeconomy Initiative vision as, “An expansion of the bioeconomy by five- fold in the next 15 years to supply and convert a billion dry tons annually to biofuels, bioproducts, and biopower.”

Dr. Male then provided some analysis as to what the Bioeconomy vision could produce including 1.7 million jobs, 50 billion gallons of biofuels and a reduction of CO₂ emissions of 530 million tons per year.

Results of the Initiative would include increased energy security, improved environment, and expanded economic opportunities. Dr. Male identified synergies in the Bioeconomy Initiative proposed by the Board, with the Committee's 2013 Grand Challenge recommendations. Dr. Male suggested that the Committee could participate in developing the Initiative further through the following measures:

- Discuss potential technical barriers and draft recommendations to the Board to help refine the Bioeconomy Initiative.
- Work with the Board to ensure industry participation and partnership with stakeholders during the development of the Bioeconomy initiative
- Participate *as individuals* in the Bioeconomy Workshop(s), webinars, and other road mapping meetings that would be open to the public
 - First Bioeconomy workshop is being planned for July 31st, in conjunction with the Office's Biomass Annual Conference (*Biomass 2014*)
- Serve as individual reviewers and provide external feedback.

Dr. Male also provided an overview of the roles of the Board and the Operations Committees in further developing the Initiative. In addition, Dr. Male presented an aggressive timeline that aims to realize the Bioeconomy Initiative by the Fall/Winter timeframe.

X. Subcommittee Breakout Summaries

Guidance from the Committee on suggestions to best implement BRDI with the current funding approved in the 2014 Farm Bill. This funding allocates \$3 million annually for five years. In response to your request for suggestions, the Committee, during our 2014 Q1 meeting, formulated, discussed, and voted on our best ideas to assist you in planning for a BRDI solicitation in 2014. The Committee voted and approved the following recommendations in no order of priority:

- That BRDI funds are released annually and not deferred in order to roll funds together.
- That BRDI fund several early stage, innovative, high-reward, "proof of concept" projects for biofuels and/or bioproducts.
 - Prioritization should be given for supporting small, both novel and compelling, proposals in "sustainable feedstock, production and logistics;" "biomass conversion;" or "products, markets, and systems."
 - Suggest award amounts ranging from \$100,000–\$500,000.
 - Encourage, where possible, a match in cost-share for BRDI funds.
 - Challenges and gaps identified in the 2013 Committee Grand Challenge Recommendations could be used as specific areas for consideration.
- That the BRDI FOA should support either systems-level or sub-system integration analyses.
 - Prioritize analytical work supportive of advancing the development of sustainable and economically competitive biofuels and bioproducts.
 - Identify economically and environmentally relevant R&D issues and focus R&D on the lack of knowledge in such systems.
 - Specific areas for consideration can be found in 2013 Committee Grand Challenge Recommendations.

XI. Public Comment

Joseph Seymour, Executive Director, Biomass Thermal Energy Council

I'm Joseph Seymour, Executive Director of the non-profit Biomass Thermal Energy Council (BTEC). BTEC is a nationwide industry association representing the views of 130 biomass feedstock producers, fuel refiners, appliance manufacturers, vendors, non-profits, state energy and environmental offices, and end users. I thank you for the opportunity to update to this Committee on a significant bioenergy initiative.

BTEC is coordinating a comprehensive state and national effort to establish and promulgate an efficiency test procedure for commercial size, solid biomass-fired boilers. Think of this project as "EnergyStar for Commercial-Scale Wood Energy Systems." The efficiency test procedure will be developed over 18-months using accepted standards-writing procedures and will represent the decision making of a balanced and experienced group of representatives from the biomass thermal industry, government and not-for-profit organizations, and other key regional and national stakeholders who are interested in improving efficiency and reducing emissions in biomass utilization. Domestically, it is the first of its kind.

The test procedure will build upon existing European standards, past efforts in the United States to develop standards for biomass-fired heating equipment, and US standards for oil and gas-fired boilers. The test procedure will address commonly-used, solid biomass fuels from both forest and agricultural feedstocks.

Once drafted and tested in an accredited lab environment, the efficiency test procedure will be published as a voluntary BTEC document and made available to state energy offices. Continuing work will then be performed to gain formal acceptance of the test procedure by a respected, national standards organization (e.g., UL or ASHRAE). BTEC will promote the efficiency testing procedure beyond the biomass industry to the HVAC industry, government officials, as well as consumers and businesses.

The final goal of the project will be evaluation and adoption of the new standard by federal government agencies, regulatory bodies, and state governments.

The benefits of such an efficiency protocol are clear. Growth of the biomass thermal industry in the U.S. will reduce dependence on foreign oil and energy sources from outside the United States. This will help to improve energy security for the region as well as reduce the economic drain that results from purchase of fuels from outside high fossil fuel heating states in the Northern Tier. The project will help commercial businesses to become more competitive through significant reductions in their fuel costs. Taxpayers will also save money through reduced fuel costs for government and public education facilities.

A valid test procedure for commercial, biomass-fired boilers will lay the groundwork for the biomass thermal market to expand. A trusted measure of efficiency is needed by all stakeholders in the biomass thermal supply chain, from manufacturers, to specifying engineers, to consumers, and energy regulators.

A lab validated efficiency test protocol will also allow consumers to make informed decisions, and will result in installation of systems with higher efficiencies. This means better use of biomass resources, overall energy efficiency improvements, and reduced emissions. Additionally, transparent and proven

efficiency measures allow supporters of commercial incentive programs to allocate limited funds to top performing biomass thermal systems with superior payback performance.

Finally, biomass system efficiency is a key factor in ensuring reduced emissions of criteria pollutants that result from biomass combustion. High efficiency, biomass-fired boilers help to reduce emissions by reducing fuel consumption and also typically by burning fuel more cleanly and completely. Reducing emissions is key to minimizing human health impacts from biomass utilization. Enabling consumers to choose systems with higher efficiencies will help to ensure that emissions are reduced. This will be especially important for air quality in regions where there are high concentrations of high cost heating fuel utilization (fuel oil and propane), which often drives the switch to locally-sourced and less expensive biomass.

The efficiency test procedure will address the firing rate "turn down" capability of biomass boilers and the related impact on efficiency. Boiler efficiency and emissions performance can vary significantly when biomass boilers are fired at their nominal capacity and at partial load. The current USEPA Method 28 test procedure requires boilers to be tested at 15% of their nominal firing rate. However, this firing rate is below what many manufacturers recommend for proper operation. The flame cooling that occurs at low firing rates can directly interfere with efficient and clean combustion.

High-efficiency, clean combustion requires having high temperatures in the combustion zone. With many conventional wood-fired boiler technologies, if the boiler is turned down to 15%, then the temperature of the burning fuel becomes too low resulting in increased creation of carbon monoxide and fine particulate emissions (especially when burning fuels with higher moisture contents).

Many advanced boilers control systems do not allow the boilers to operate below 30% of their nominal firing rate to avoid inefficient operation. They require the use of thermal storage tanks that can act as a buffer to absorb and release heat and keep combustion within the range of high efficiency.

It is anticipated that new, advanced technologies for biomass combustion will, however, help address the problem of limited turn-down of firing rate through measures such as increased refractory insulation in combustion chambers and recuperative pre-heating of incoming primary and secondary combustion air. The efficiency test procedure will address differences between the turn down capabilities of various biomass boilers and will provide testing options relating to modulation and thermal storage to enable equipment manufacturers to specify how their boilers should be installed and operated for optimal performance.

Furthermore, the efficiency protocol will address the subject of jacket losses and off-cycle draft losses, which are of particular importance in determining boiler efficiency during load conditions. Other variables that will be given consideration will be the use of diurnal heating load profiles and seasonal load variations based on typical weather data to better simulate real-world boiler operation. These considerations will be addressed by utilizing recent work by Bioenergy 2020+ of Austria to develop a variable load profile that incorporate diurnal-type load profiles within an 8 hour test cycle, and annual seasonal efficiency rating procedures as incorporated into the proposed ASHRAE 155 standard for gas and oil-fired commercial boilers.

Goals of the Project

- Provide a platform for bringing the state and national biomass industry together under an accepted standards-writing format to develop an efficiency testing procedure for commercial biomass-fired boilers.
- Develop a protocol that builds upon existing test procedures for residential biomass-fired boilers as well as for commercial gas and oil-fired boilers, and which draws on international testing experience, especially relating to the European standard EN 303-5.
- Perform initial activities to promote the efficiency testing procedure beyond the biomass industry to the HVAC industry, government officials, as well as consumers and businesses.
- Pursue promulgation of the standard by a standards organization.

Proposed Project Methods and Overall Research Design

- Information Gathering
- Scope Development
- Peer Review Process
- Laboratory Testing
- Standards Organization Analysis
- Promulgation of Proposed Standard (Technology Transfer/Information Dissemination)

Project Team Members and Partners

- BTEC Staff (Joseph Seymour, Executive Director, Project Lead)
- BTEC Technical and Regulatory Affairs Committee (Composed of biomass manufacturer members)
- Government Energy Agencies (U.S. Forest Service Forest Products Lab, Dept. of Energy's Brookhaven National Lab, U.S. Environmental Protection Agency, national Canadian and provincial energy agencies)
- Technical Assistants (Bioenergy 2020+, Independent Test Labs)

Following today's discussion, I'd like to explore with the Committee the appropriate contacts and resources within the Department of Energy to participate in the BTEC Thermal Efficiency Protocol Project.

Finally, I would like to invite the participants this Committee's participants to attend the 6th annual Northeast Biomass Heating Expo in Portland, ME, April 9-11. This event will address industry progress, barriers, demonstration projects, and much more. More information on the event may be found at www.nebiomassheat.com

Thank you again for the opportunity to speak today.

Respectfully submitted,
Joseph Seymour
Executive Director, Biomass Thermal Energy Council

XII. Closing Comments

Meeting was adjourned.

Attachment A: Committee Member Attendance—February 27–28, 2014

Co- Chairs	Affiliation	Attended?
Kevin Kephart	South Dakota State University	Yes
Pamela Reilly Contag	Cygnnet Biofuels	Yes

Members	Affiliation	Attended?
Dean Benjamin	NewPage Corporation	Yes
David Bransby	Auburn University	Yes
Paul Bryan	UC-Berkeley	Yes
Steve Csonka	Commercial Aviation Alt. Fuels Initiative	Yes
Claus Crone Fuglsang	Novozymes North America, Inc.	Yes
Joseph James	Agri-Tech Producers, LLC	Yes
Randy Jennings	State of Tennessee	No
Coleman Jones	General Motors	Yes
Craig Kvien	University of Georgia	Yes
Kit Lau	BioAmber Inc.	Yes
Johannes Lehmann	Cornell University	Yes
Stephen Long	University of Illinois	Yes
Maureen McCann	Purdue University	Yes
Bruce McCarl	Texas A&M	No
Christine McKiernan	BIOFerm Energy Systems	No
Ray Miller	Michigan State University	Yes
Neil Murphy	State University of New York,	Yes
David Nothmann	Battelle	Yes
William Provine	Dupont	Yes
James Seiber	University of California	No
Abolghasem Shahbazi	North Carolina A&T State University	Yes
Don Stevens	Cascade Science and Tech. Research	Yes
John Tao	O-Innovation Advisors LLC	Yes
Valerie Thomas	Georgia Tech	Yes
Alan Weber	MARC-IV Consulting / Weber Farms	No
Todd Werpy	Archer Daniels Midland Company	Yes

Total: 23 of 28 members attended

Attachment B: Agenda—February 27–28, 2014

Day 1: Technical Advisory Committee Meeting February 27, 2014

- 8:00 a.m. – 8:30 a.m. *Breakfast (to be provided for Committee)*
- 8:30 a.m. – 9:15 a.m. Welcome, Introduction of New Members, and Feedback from the Board on 2013 Recommendations
Committee Co-Chairs
- 9:15 a.m. – 9:45 a.m. Presentation: Committee Business for 2014
Elliott Levine, DFO, U.S. Department of Energy
- 9:45 a.m. – 10:00 a.m. Presentation: U.S. DOE Updates
Elliott Levine, U.S. Bioenergy Technologies Office, U.S. Department of Energy
- 10:00 a.m. – 10:15 a.m. *Break*
- 10:15 a.m. – 10:45 a.m. Presentation: USDA Update on Biomass R&D Activities and Farm Bill
Todd Campbell, Rural Development, U.S. Department of Agriculture
- 10:45 a.m. – 11:15 a.m. Presentation: Biomass Research and Development Initiative (BRDI) Update
Daniel Cassidy, NIFA, U.S. Department of Agriculture
- 11:15 a.m. – 12:00 p.m. Presentation: Overview of DOE Bioenergy Technologies Office 2014 Activities
Jonathan Male, Bioenergy Technologies Office Director, U.S. Department of Energy
- 12:00 p.m. – 1:00 p.m. *Lunch (to be provided for Committee)*
- 1:00 p.m. – 2:00 p.m. Presentation: Update of the Renewable Fuel Standard and Volumetric Requirement for Biofuels
Paul Argyropoulos, U.S. Environmental Protection Agency
- 2:00 p.m. – 2:30 p.m. Presentation: Natural Gas to Liquids Workshop Summary
Zia Haq, Bioenergy Technologies Office, U.S. Department of Energy
- 2:30 p.m. – 3:30 p.m. Presentation: Overview of the Bioeconomy Initiative

