Biomass Research and Development

Technical Advisory Committee

June 5–6, 2013

Meeting Summary

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List of Acronyms

AUD - advanced uniform design
Biomass Act - Biomass Research and Development Act of 2000
BRDI - Biomass Research and Development Initiative
Committee – Biomass Research and Development Technical Advisory Committee
D&D - Demonstration and Deployment
DOE - Department of Energy
FCEA - Food, Conservation and Energy Act of 2008
FOA - Funding Opportunity Announcement
GGE- gallon of gasoline equivalent
IBRs - integrated biorefineries
REAP - Rural Energy for America Program
USDA - U.S. Department of Agriculture

I. Purpose

On June 5–6, 2013, the Biomass Research and Development Technical Advisory Committee (Committee) held its second quarterly meeting of 2013. The Committee received updates about the Department of Energy's (DOE's) Bioenergy Technologies Office (BETO), and U.S. Department of Agriculture (USDA) representatives delivered presentations about current agency activities, as well as the Biomass Research and Development Initiative (BRDI). An overview of DOE EV Everywhere Grand Challenge was also provided, along with a presentation from Lonnie Ingram from the University of Florida.

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Background: The Committee was established by the Biomass Research and Development Act of 2000 (Biomass Act), which was repealed and replaced by Section 9008 of the Food, Conservation, and Energy Act of 2008 (FCEA). The Biomass Research and Development Board (Board) was established under the same legislation to coordinate activities across federal agencies. The American Taxpayer Relief Act of 2012, Title VII—Extension of Agricultural Programs, Sec. 701. "1-Year Extension of Agricultural Programs," subsection (f) Energy Programs, Paragraph 7 on "Biomass Research and Development" extended the Section 9008 through 2013. The Committee is tasked with advising the Secretary of Energy and the Secretary of Agriculture on the direction of biomass research and development (R&D).

II. Welcome

Ronnie Musgrove, Committee Co-Chair
Kevin Kephart, Committee Co-Chair

Mr. Musgrove and Mr. Kephart welcomed the Committee to the second meeting of the year and called the meeting to order. They also welcomed two new committee members who were in attendance:

- Paul Bryan, University of California (UC), Berkeley
- Ray Miller, Michigan State University.

III. Committee Business for 2013 and U.S. Deparment of Energy Updates

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

Mr. Levine provided the Committee with some overview and background information. Mr. Levine started by announcing the new Committee Co-Chair, Kevin Kephart, along with eight new Committee members. They are as follows:

- Paul Bryan, UC-Berkeley
- Ray Miller, Michigan State University
- Stave Csonka, Commercial Aviation Alternative Fuels Initiative
- Claus Crone Fuglsang, Novosymes North America, Inc.

- Man Kit Lau, BioAmber, Inc.
- Johannes Lehmann, Cornell University
- Christine McKiernan, BIOFerm Energy Systems
- Don Stevens, Cascade Science and Technology Research.

The Committee was established by the Biomass Act. This has since been amended by FCEA. The revised Biomass R&D Act outlines the Committee's objectives, membership requirements, and duties. The Biomass R&D Act also established the Interagency Biomass R&D Board and the BRDI. Mr. Levine stated that the Biomass R&D Act was extended through 2013 under House Resolution 8, the American Taxpayer Relief Act of 2012. Mr. Levine provided an overview of the Committee functions, including the recommendations they are tasked to develop. While the legislation authorizing the Committee was extended by Congress, no mandatory funding was set aside for BRDI, which results in no annual solicitation in Fiscal Year 2013.

Mr. Levine then provided an update on recent BETO solicitations:

- On April 22, 2013, DOE announced the four projects selected for negotiation for the innovative pilot funding opportunity announcement (FOA) for the production of advanced biofuels. Each project that was selected will be working to produce biofuels that meet military specifications for jet and diesel fuel.

- On December 14, 2012, BETO released the *Carbon, Hydrogen and Separation Efficiencies in Bio-Oil Conversion Pathways (CHASE Bio-Oil Pathways)* solicitation for up to $12 million.

- On January 28, 2013, the *Advanced Biomass Feedstock Logistics Systems II* solicitation for up to $6 million was released to support developing and demonstrating strategies, equipment, and rapid analytical methods to manage feedstock quality within economic constraints throughout the feedstock supply chain.

- On January 16, 2013, BETO released a solicitation for up to $10 million for the advancements in algal biomass yield to demonstrate—at a process development unit scale of one acre cultivation equivalent—algal biofuel intermediate yield of 2,500 gallons of biofuel feedstock (or equivalent dry weight basis) per acre per year by 2018.

- On May 24, 2013, the Defense Department awarded $16 million for three contracts as part of the Advanced Drop-In Biofuels Production Project, also known as the Defense Production Act Title III program.

Upcoming BETO solicitations include the following:

- WASTE: Waste Applications for Sustainable Technologies for Energy opening June 7.

Mr. Levine provided an overview of the BETO Project Peer Review that was held on May 20–23, 2013, in Alexandria, Virginia, where approximately 223 projects in 9 technology areas were reviewed in simultaneous review sessions. Projects reviewed represented $1.47 billion dollars of DOE funding,

without cost share. This will be followed by the BETO Project Management Review on July 30, 2013, in Washington, D.C. The results from the Project Peer Review will be highlighted, and the overall focus and proposed future direction for the Office will be reviewed. The BETO Project Management Review will take place immediately before the start of Biomass 2013 on July 31–August 1 at the Washington, D.C. Convention Center. This year's agenda will include a focus on celebrating successes, discussing current trends and frontiers, and highlighting sustainability and biorefinery projects.

Other BETO activities include the following:

- Natural Gas-Biomass to Liquids (GBTL) Workshop on September 3, 2013, in Chicago, Illinois. The objective of the GBTL Workshop is to obtain input from industry, academia, research establishments, and other experts on whether or not there is a role for DOE to R&D and develop new process technologies.
- Renewable Low-Cost Carbon Fiber for Lightweight Vehicles Workshop on June 4–5, 2013, in Detroit, Michigan. Issues discussed at this event will include the technical challenges of carbon fiber manufacturing, including meeting end-product specifications for vehicle structural components; the technical challenges of converting biomass resources to "drop-in" carbon fiber intermediates; and the resources, challenges, and opportunities in unconventional carbon fiber.
- On April 24, BETO announced that four national laboratory partners contributed to a joint study on biochemical biorefineries. The study concluded that an advanced uniform design (AUD) to biomass feedstock supply—which involves pre-processing the biomass into a higher-density, more stable, easily transportable format—would yield greater advantages over a conventional-bale system.

Mr. Levine concluded with an update of the Office of Science activities and solicitations and highlighted the confirmation of Ernest J. Moniz as the new Secretary of Energy.

IV. U.S. Deparment of Agriculture Updates

Todd Campbell, U.S. Department of Agriculture

Mr. Campbell provided updates from USDA on the following:

- Dairy Memorandum of Understanding (MOU), April 24, 2013: USDA renewed a historic agreement with U.S. dairy producers to accelerate the adoption of innovative waste-to-energy projects and efficiency improvements on U.S. dairy farms, both of which help producers diversify revenues and reduce utility expenses on their operations. Since signing the MOU, USDA has made nearly 180 awards that helped finance the development, construction, and biogas production of anaerobic digester systems with programs such as the Rural Energy for America Program (REAP), Bioenergy Program for Advanced Biofuels, Business and Industry Guaranteed Loan Program, Value Added Producer Grants, Environmental Quality Incentive Program, as well as develop a Biogas Roadmap.

- Farm to Fly 2.0: This is an interagency agreement between USDA, the Department of Transportation-Federal Aviation Administration, and other agencies. USDA and the Aviation

Enterprise acknowledge that their combined efforts have the potential to increase domestic energy security and improve sustainability for aviation.

- Farm Bill Title IX Update: Mr. Campbell gave a side-by-side comparison of the changes made by the House and Senate Bill on Title IX.
    - Current Solicitations:
        - Section 9002—Expect to open the program in near future
        - Section 9003—Expect to open the program in near future
        - Section 9004—Unfunded for 2013
        - Section 9005—Expect to open program in near future
        - Section 9007—Currently open with extended deadline, additional extension expected shortly
        - Section 9008—Unfunded for 2013
        - Section 9011—Unfunded for 2013.

- Energy Website Update: New functionality based upon user/agency feedback. The mapping/database environment has been established along with a redesign to increase functionality, improve user experience, and ensure scalability.

V. Overview of EV Everywhere Grand Challenge

David Howell, U.S. Department of Energy

Mr. Howell started with the EV Everywhere goal to enable U.S. companies to produce plug-in electric vehicles (EVs) as affordable and convenient as today's gas-powered vehicles by 2022. The steps they took to define this challenge included identifying the problem, potential solution, and barrier(s); an announcement by the President; development of a framing document; workshops for stakeholder input; developing a blueprint that specifies refined targets and updates to R&D roadmaps; and finally, issuing FOAs. Key themes from workshops include the following:

- "Majority of vehicle miles electric" or "Maximize electric miles driven"
- Payback time of five years may be too long for typical consumers
- Need nationwide standardizations of charging stations, signage, and payment
- Importance of workplace charging
- EVs should not just be a replacement product; they need value-added components.

A FOA released in February 2013 included DOE investment of more than $50 million. The request for R&D proposals was in four technical areas:

- Vehicle lightweighting
- Electric drive systems
- Advanced batteries
- Auxiliary load reduction.

VI. DOE IBR Portfolio – Lessons Learned

Brian Duff, U.S. Department of Energy

Mr. Duff gave a presentation on the role of the Demonstration and Deployment (D&D) subprogram in biomass conversion technology deployment. The D&D subprogram (formerly the Integrated Biorefinery Platform) is focused on demonstrating and validating biomass conversion technologies through successful construction and operation of cost-shared pilot-, demonstration-, and commercial-scale integrated biorefineries (IBRs). The purpose of the D&D subprogram is to "de-risk" emerging biomass conversion technologies sufficiently so that broad replication and industry expansion can occur. BETO does this by providing financial assistance for scale-up and demonstration of emerging technologies. The Office works in partnership with private-sector technology developers to leverage federal financial assistance funding.

The D&D subprogram plays a vital role in "de-risking" technologies in two primary ways:

- Technologically, to scale-up and validate conversion process performance so that "wrap-around" performance guarantees can be provided by engineering, procurement, and production firms.
- Financially, to verify the capital expenditures and operational expenditures so private-sector financing can invest without fear of default.

To date, BETO has or is investing in 33 R&D, pilot-, demonstration-, and commercial-scale IBR projects selected to validate technologies. They have a diverse feedstocks representation, and a variety of transportation fuels, biobased products, and biopower are being developed.

Of the 33 total IBR projects awarded to date, 5 were mutually terminated, 5 were completed (2 still compiling final report), 19 are active, and 4 new awards are under negotiation. Their makeup is as such: 16 are cellulosic ethanol, 12 are renewable hydrocarbons, 3 are algae oil, and 2 are bioproducts. Of the 19 active and 4 in negotiation, 4 are commercial scale, 5 are demonstration scale, and 14 are pilot scale; 7 are in operations phase, 2 semi-works plants are in commissioning phase, 5 are in construction, 2 are still in the FEED, and 3 are trying to finalize financing. Of the four commercial-scale projects awarded in 2007, two plants are under construction, one project is still trying to solidify financing, and one project was mutually terminated. Of the seven demonstration-scale projects awarded in 2008, one project is complete, one is still in FEED stage, one is still trying to solidify financing, and four projects were mutually terminated. Of the 18 projects awarded under the Recovery Act in 2009, 1 demonstration-scale project is in the operations phase, 2 demonstration-scale projects have completed construction and are undergoing commissioning in anticipation of start of operations this summer, 1 large demonstration-scale project is finalizing its FEED package and seeking additional financing, 6 pilot projects are currently in the operations phase, 4 pilot projects are still in the construction phase, 4 R&D projects have been completed (2 are preparing their final reports) , and none have been terminated.

Mr. Duff provided key lessons learned from the portfolio. They include the following:

- Applicants tend to exaggerate their technology readiness at all scales

- Applicants are uniformly over-optimistic in their cost and schedule assumptions
- All elements of projects take longer than estimated, so plan for it; this includes FEED, detailed design and engineering, construction, startup and commissioning
- Startup and commissioning uniformly take at least twice as long as project, if not three or four times longer
- Twenty-five percent contingency should be considered a minimum
- General rule of thumb: projects take twice as long and cost twice as much
- Project financing continues to plague large demonstration- and commercial-scale projects; documented cost share and contingency should be "in hand" at the start of projects
- Don't make any announcements based on schedule estimates; wait for the proof
- Feedstock handling, pre-processing, and introduction into reactors—both biochemical and thermochemical—continue to be a challenge
- "Scale-down" of commercially proven equipment for custom pilot and demo applications is not straightforward and has proven to be the source of costly redesigns and retrofits
- Syngas compression and cleanup continues to challenge technology demonstrations.

Mr. Duff was asked by the Committee on the financial barriers to commercial success. Mr. Duff stated that there are two critical locations where a shortfall of capital often comes into play. The first occurs early in a technology's development, just as it is ready to exit the lab. This barrier is known as the early-stage "Technological Valley of Death." The second barrier occurs later, when much more substantial levels of capital availability are needed to prove the viability of a new technology at commercial scale. This later-stage barrier is known as "Commercialization Valley of Death." The problems posed by this commercialization funding challenge represent fundamental, structural market shortcomings that most experts believe cannot be resolved by the private sector acting on its own. Even in good times—when lending standards are most flexible—banks and other financial institutions are simply not structurally positioned to back large-scale projects deploying new technology.

The Committee asked about the technical data on the projects' progress. Mr. Duff stated that all demonstration projects get an annual review consisting of proprietary, confidential, or otherwise restricted information. The review process is between the principal investigator, project manager, and other partners present to the independent engineer, DOE review panel, and Independent Project Analysis (IPA) analyst (when applicable). The review template includes three key review areas, including company structure and project team, technical performance, and financial health and market approval/commercialization plans. The review concludes with an open discussion between the review panel and project team. A report is generated, consolidating reviewers' comments, and delivered to the project team.

VII. "New" Missions for Agriculture According to Carver and Ford

Lonnie Ingram, Distinguished Professor, University of Florida

Dr. Ingram started his presentation providing a history lesson. George Washington Carver and Henry Ford shared a vision of a future in which agricultural products would be put to new uses: fuels, plastics,

solvents, and paints. Dr. Ingram's work focuses on the genetic engineering of novel bacterial biocatalyst for the conversion of lignocellulosic biomass into ethanol fuels and other fermentation products, which can replace imported petroleum. This work involves cloning and moving genes between bacteria to add new and useful traits to ethanol producing organisms, designing of novel engineering processes for the production of ethanol (and other chemicals), nutritional investigations, and the identification of genes that contribute to ethanol tolerance. Global gene analysis is being used to investigate fundamental processes in metabolically engineered bacteria.

VIII. A Review of the Recent Pilot-Scale Demonstration and Its Implication of Commercial-Scale Economics

Adam Bratis, National Renewable Energy Laboratory

Dr. Bratis gave a presetntion on the recent Pilot-Scale Cellulosic Ethanol Demonstrations. He started with the drivers behind the demonstrations, citing the 2006 and 2007 State of the Union Addresses by President Bush. The original 2012 cost target ($2002) was based on competitiveness with corn ethanol (2006 time frame). Historic corn prices were about $2–$3/bushel, giving an initial target of $1.07 that eventually inflated ($2007) to $1.33/gallon ethanol. This is roughly equivalent to gasoline production at $65/barrel crude. The updated 2012 cost target ($2007) was based on competitiveness with gasoline (2009 time frame). The wholesale gasoline price projected for 2012 using the Annual Energy Outlook 2009 reference oil case was $1.76/gallon ethanol (year $2007) equivalent to $2.62/gallon (GGE). This is roughly equivalent to gasoline production at $95/barrel crude. The original design reports were updated to about $2.00/gallon target (2011 time frame). This was done through a total bottoms-up approach with no end cost target in mind. It incorporated state-of-the-art knowledge on capital costs, financing assumptions, and process design, resulting in rough equivalent to gasoline production at $110/barrel crude.

Dr. Bratis provided an overview of the biochemical conversion pathways to cellulosic ethanol they analyzied. The biochemical converison of corn stover resulted in production cost improvements from 2001 = $9.16 to 2012 = $2.15. Some of the major technical accomplishments that lead to this cost reduction were improved sugar yields from both pretreatment and enzyme advances as well as improved ethanol yields from advances in micro-organisms.

He then provided an overview of the thermochemical conversion pathways to cellulosic ethanol they analyzed. The thermochemical conversion of wood biomass results in production cost improvements of 2007 = $4.75 to 2012 = $2.05. Technology advances in the areas of syngas cleanup, methane and tar reforming and fuels synthesis were critical to these cost reductions.

IX. Subcommittee Breakout Summaries

The Committee organized its discussion into four areas:

- The development of sustainable feedstock production, logistics, and management systems
- Cost-effective conversion processes to hydrocarbon fuels and bioproducts

- Production, implementation, and systems integration
- Effective policy analysis and decision support tools
- Crosscutting.

The development of sustainable feedstock production, logistics, and management systems

- *Transportation: Shorten the road from farm to fuel*
- *Maximize yield per acre*
- *Grand challenge around balance of feedstock; increase focus on oil seeds and lipids*
- *Current use of American wood for Europe (e.g., woody biomass market for overseas biopower pellets)*
- *Focus on small-scale production facilities and logistics systems*

Cost-effective conversion processes to hydrocarbon fuels and bioproducts

- *More efforts need to be directed at large-scale production and commercialization*
    - *Enable proven technologies and identify successful technologies in order to further the industry as a whole*
    - *Identify and understand gaps and weaknesses in technology to avoid past mistakes*
- *Methanol*
    - *A number of platforms are already under review; perhaps there needs to be more inclusion of methanol technology*
- *Down select from various platforms and recommend successful pathways—similar to how BETO has recently completed its pathway selection effort—but in a more open process*
        - *A single technology won't be able to take advantage of the 'billion tons' of available biomass*
    - *Identify and enable successful technology*
    - *Identify and understand gaps in technology*
        - *Pathway selection from National Renewable Energy Laboratory to identify pathways:*
            - *Both the technical pathways selection at BETO and National Advanced Biofuels Consortium selection has already proven some success; there is potential carry-over for scale-up and commercialization*

Production, implementation, and systems integration

- *By 2023, establish 1,500 dispersed, demonstration-scale biorefineries that are richly embellished with a variety of technical, operational, and financing enhancements. Initiatives could include:*
    - *Take advantage of existing or former industrial sites, such as pulp and paper mills*
    - *Support through biorefinery-focused funding programs*
    - *Provide engineering technical assistance*
    - *Deploy the modular replication of successful projects*
    - *Link to bio-crop producers*
    - *Carefully monitor projects to assure success*
    - *Replicate successful projects*
- *Small, modular units should be the focus of a new model, shifting away from large units that are hard to fund and sustain*
    - *Aim at producing fuels or high value intermediates and products (e.g., chemicals)*
    - *Co-location is key, especially at industrial sites (pulp and paper mills)*

    - *If a 'winner' was successful, could spend resources to focus on replicating the model and spend other funds, driving down cost*
    - *Easy for districts to imagine this as a solution; it fits into infrastructure*
    - *Consider incubator program to get first one, or few, in production*
    - *Consider framing "X" number of green jobs by a given date*
- *Need to do something in short term; consider pilot and demonstration (long process from R&D to scale-up and commercialization)*

Effective policy analysis and decision support tools

- *Systems integration and deployment at the modeling level*
- *Overcome the chicken and egg dilemma facing growers and refiners by moving toward co-located models and working to incentivize partnerships*
- *Feedstock production and biorefinery construction; small-scale operations could alleviate this challenge*
- *Overcome the economic constraints facing entrants into these new markets*
- *Cannot come up with a 'dollar a watt' similar challenge*
    - *Need to work more through policy; the expectation that the Environmental Protection Agency and Congress will keep the policy standard to encourage market investors is risky*
        - *If cost to produce biofuels was low enough, people would be investing; return on investment is not there, and capital costs are not there; they need to be reduced by half*
        - *Need to get cost per gallon down low enough to drive investment*
        - *Need to also enhance end-use consumer market*
- *No matter what technical advances we make, liquid transportation fuels from biomass will not be cost-competitive with the petroleum based equivalents (may be price competitive). We need to either reward biofuel producers for the non-economic benefits of biofuels, or penalize crude oil producers for indirect drawbacks. In other words, the U.S. government should promulgate regulations to:*
    - *Assess economic penalties to account for the indirect drawbacks of the use of crude oil and/or*
    - *Provide economic rewards to the <u>investors</u> to account for the indirect benefits of the use of renewable fuels*
- *These can <u>only</u> be achieved by a transfer of funds to biofuel investors from:*
    - *Crude oil producers (not refiners)*
    - *Liquid transportation fuel consumers*
- *Need to focus on the benefit of the outcome, such as energy security and reduced greenhouse gas emissions; a policy should tie in goals to the overall end purpose*
    - *Renewable Fuel Standard (aspirational goal)*
        - *Will the Renewable Fuel Standard remain the same for the next 10 years? If RINs will not continue to be the driver for the revenue stream, it is difficult to create confident business plans*
        - *Industry has to trust that the government will not change its policy, that new policies or regulations will not move the goal line so that the investments will be made and technology can succeed*
        - *Public relations should focus on winning back the environmentalists and showing hope for the future of the industry*

Crosscutting

- *Transportation: shorten the road from farm to fuel*
    - *Small-scale deployable units with more focus on preprocessing for transportation at farm gate*
    - *Addresses co-location issues*
- *Drive costs down throughout the supply and distribution chain*
- *The bioenergy grand challenges needs to have the same level of support as the "EV Everywhere" grand challenge; concentrate on distributed upgrading of commoditized feedstocks and developing n^{th} refinery capacity within this distributed feedstock landscape*
- *Replacing the barrel of oil as a grand challenge and refocusing the bioenergy message to target markets where biofuels represent the most practical solution*
    - *Focus on low-cost sugars*
    - *Jet fuels (con: the most stringent market in the world)*
    - *Heavy equipment (pro: marine is the least stringent market)*
    - *"Blue Ocean Strategy" – convince the 'millennials' of the need for biofuels; take on responsibility of education*
- *Deliver an additional 1 trillion pounds per year of industrial sugars derived from:*
    - *Enhanced yields for conventional sugar and starch crops*
    - *Conversion of existing cellulosic waste materials*
    - *Sugar, starch, or cellulosic crops that can be grown on currently unused or under-utilized lands*
- *All from domestic sources at a cost of less than 10 cents per pound; this supports the explosion of new products that can be produced by fermentation, based on the rapidly developing field of biological engineering*
    - *Trillion pounds of non-food industrial sugar at 10 cents a pound*

X. Public Comment

None

XI. Closing Comments

Meeting was adjourned.

Attachment A: Committee Member Attendance – June 5-6, 2013, Meeting

Co- Chairs	Affiliation	Attended?
Ronnie Musgrove	Former Governor, MS	Yes
Kevin Kephart	South Dakota State University	Yes

Members	Affiliation	Attended?
Dean Benjamin	NewPage Corporation	Yes
David Bransby	Auburn University	Yes
Paul Bryan	UC-Berkeley	Yes
Pamela Reilly Contag	Cygnet Biofuels	Yes
Steve Csonka	Commercial Aviation Alt. Fuels Initiative	No
Harrison Dillon	Solazyme	No
Claus Crone Fuglsang	Novozymes North America, Inc.	No
Neal Gutterson	Mendel Biotechnology	No
Huey-Min Hwang	Jackson State University	No
Joseph James	Agri-Tech Producers, LLC	Yes
Coleman Jones	General Motors	Yes
Craig Kvien	University of Georgia	Yes
Kit Lau	BioAmber Inc.	No
Johannes Lehmann	Cornell University	No
Jay Levenstein	FL Dept. of Ag. and Consumer Services	Yes
Stephen Long	University of Illinois	No
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,	No
David Nothmann	Battelle	No
Jimmie Powell	The Nature Conservancy	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	No
John Tao	O-Innovation Advisors LLC	Yes
Alan Weber	MARC-IV Consulting / Weber Farms	Yes
Todd Werpy	Archer Daniels Midland Company	Yes

Total: 18 of 32 members attended

Attachment B: Agenda – June 5-6, 2013

Day 1: Technical Advisory Committee Meeting: June 5, 2013

7:30 a.m. – 8:00 a.m	*Breakfast (to be provided for Committee)*
8:00 a.m. – 8:30 a.m.	SGE Ethics Training for New Members *Melinda Comfort, General Counsel, U.S. Department of Energy*
8:30 a.m. – 8:40 a.m.	Introduction and Welcome to New Committee Members *Committee Co-Chairs*
8:40 a.m. – 9:00 a.m.	Presentation: Committee Overview *Elliott Levine, DFO, U.S. Department of Energy*
9:00 a.m. – 9:20 a.m.	Presentation: DOE Updates on Biomass R&D Activities *Elliott Levine, DFO, U.S. Department of Energy*
9:20 a.m. – 9:40 a.m.	Presentation: USDA Update on Biomass R&D Activities *Todd Campbell, U.S. Department of Agriculture*
9:40 a.m. – 10:00 a.m.	*Break*
10:00 a.m. – 10:10 a.m.	Presentation: Updates from the Board Operations Committee *Todd Campbell, U.S. Department of Agriculture*
10:10 a.m – 11:00 a.m.	Discussion: Implementing Guidance from the Biomass R&D Board *Committee Co-Chairs*
11:00 a.m. – 11:15 a.m.	Presentation: Overview of EV Everywhere Grand Challenge *David Howell, Team Lead, Hybrid and Electric Systems, Vehicle Technologies Program, U.S. Department of Energy*
11:15 a.m. – 12:00 p.m.	Presentation: DOE IBR Portfolio – Lessons Learned *Brian Duff, U.S. Department of Energy*
12:00 p.m. – 1:00 p.m.	*Lunch (to be provided for Committee only)*

1:00 p.m. – 2:15 p.m.	Presentation: Food, Feed, Fiber & Fuel (Plastics-Chemicals) "New" Missions for Agriculture According to Carver and Ford *Lonnie Ingram, Distinguished Professor, University of Florida*
2:15 p.m. – 2:45 p.m.	Presentation: A Review of the Recent Pilot Scale Demonstration and its Implication on Commercial Scale Economics *Adam Bratis, NREL*
2:45 p.m. – 3:00 p.m.	Public Comment
3:00 p.m. – 5:45 p.m.	Committee Discussion
5:45 p.m.	Adjourn Day One

Day 2: Technical Advisory Committee Meeting: June 6, 2013

8:00 a.m.	*Breakfast (to be provided for Committee)*
8:30 a.m. – 10:00 a.m.	Committee Discussion
10:00 a.m – 10:15 a.m.	*Break*
10:15 a.m. – 11:30 a.m.	Subcommittee Report-Outs
11:30 a.m. – 11:45 a.m.	Public Comment
11:45 a.m. – 12:00 p.m.	Closing Comments and Next Steps *Committee Co-Chairs*
12:00 p.m.	Adjourn