

**Biomass Research and Development
Technical Advisory Committee**

August 27 and 28, 2015

Meeting Summary

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List of Acronyms

2014 Farm Bill – Agricultural Act of 2014
ARPA-E - Advanced Research Projects Agency-
Energy)
ARS – Agricultural Research Service
BAP – Biorefinery Assistance Program
BCAP – Biomass Crop Assistance Program
BETO – Bioenergy Technologies Office
BIP – Biofuels Infrastructure Partnership
Board – Biomass Research and Development Board
BRDI – Biomass Research and Development
Initiative
CAFE – corporate average fuel economy
CapEx – capital expenses
CBES – Center for BioEnergy Sustainability
Committee – Biomass Research & Development
Technical Advisory Committee
CSP – Conservation Stewardship Program
DoD – U.S. Department of Defense
DOE – U.S. Department of Energy
EIA – Energy Information Administration
EPA – Environmental Protection Agency
GSA – General Services Administration
NSF – National Science Foundation
OPEC – Organization of the Petroleum Exporting
Countries
OpEx – operating expenses
R&D – research and development
RFI – request for information
RFS – renewable fuel standard
RIN – Renewable Identification Number
RMA – USDA Risk Management Agency
USDA – U.S. Department of Agriculture

I. Purpose

On August 27 and 28, 2015, the Biomass Research and Development Technical Advisory Committee (Committee) held its third quarterly meeting of 2015. The Committee received updates from the U.S. Department of Energy's (DOE's) Bioenergy Technologies Office (BETO), and U.S. Department of Agriculture (USDA) representatives delivered presentations about current USDA activities. The Committee heard from experts from three topic panels: (1) Assessment Tools and Measuring Environmental Externalities, (2) Biomass Resource Development and National Security Considerations, and (3) Bioeconomy Market Development and Economic Impact. James Meade from the Agricultural Fuels Corporation also provided public comment.

See Attachment A for a list of meeting attendees. See Attachment B to review the meeting agenda. Meeting presentations can be viewed on the Biomass Research and Development Initiative (BRDI) website at the following link:

Background: The Committee was established by the *Biomass Research and Development Act of 2000*, which was later repealed and replaced by Section 9008 of the *Food, Conservation, and Energy Act of 2008*.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 federal agencies. The Act has recently been amended by the *Agricultural Act of 2014*. 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

Kevin Kephart, Committee Co-Chair
Paul Bryan, Committee Co-Chair

Dr. Kephart and Dr. Bryan welcomed the Committee to the third meeting of the year and called the meeting to order.

III. How do RINS Work?

Sandra Dunphy, Director, Energy Compliance, Weaver and Tidwell, L.L.P.

Ms. Dunphy provided a brief history of the Renewable Fuel Standard (RFS) program, an overview of Renewable Identification Number (RIN) basics, the impacts of feedstocks, and the status of the RFS program. *The Energy Policy Act (2005)* required the Environmental Protection Agency (EPA) to implement a renewable fuel standards program. The first program—RFS1—became effective on September 1, 2007. Congress enacted a major overhaul under the *Energy Independence and Security Act* that included an expansion of the overall volume and scope of the RFS program and four interrelated annual renewable fuel mandates. Ms. Dunphy then provided an overview of RINS—what they are and how they are generated, transferred, and used— and detailed the requirements of qualifying feedstock.

IV. Assessment Tools and Measuring Environmental Externalities

Virginia Dale, Oak Ridge National Laboratory

Jennifer Dunn, Argonne National Laboratory

Environmental Sustainability Indicators

Ms. Dale, from the Center for BioEnergy Sustainability (CBES) at Oak Ridge National Laboratory, provided an overview of environmental sustainability indicators. CBES looks to advance common definitions of the environmental and socioeconomic costs and benefits of bioenergy systems and quantify opportunities, risks, and tradeoffs associated with sustainable bioenergy production in specific contexts. The environmental suite of indicators is organized according to six categories: soil quality, water quality and quantity, greenhouse gases, biodiversity, air quality, and productivity. Socioeconomic indicators include social well-being, external trade, energy security, profitability, resource conservation, and social acceptability.

Quantifying Energy and Environmental Effects of Biofuels

Ms. Dunn, Biofuel Analysis Team Lead from Argonne National Laboratory, gave a presentation on quantifying energy and the environmental effects of biofuels. She discussed how biofuel life-cycle analysis can address key biofuel sustainability questions, and explained how the GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) model incorporates many biofuel production pathways.

Maureen McCann stated that we should be developing environmental indicators because they are public goods, but as a pragmatic approach to being able to sell to Congress and stakeholders, is there a way of translating them into an economic saving or metric? She said that she kept thinking of soil quality—whether we could put a value on what is lost if we don't incorporate those practices.

Ms. Dale replied that EPA studies dealt with chemicals in the environment. In the end, because a human life was given a certain value, it overrode everything. A final report was always evaluated on human life, and that is not the best way to report it. What bioenergy has done from economic perspective is make information about jobs, air quality, and biodiversity available to discuss. We need to present it in a way that it is not too complicated for people to understand. That is a challenge.

V. Biomass Resource Development and National Security Considerations

Doug Karlen, USDA Agricultural Research Center

Chris Tindal, U.S. Navy

Bryce Stokes, CNJV

Landscape Agriculture, Strategic Biomass Resource

Mr. Karlen provided an overview of how landscape agriculture can be a strategic biomass resource strategy. He shared a vision of a trans-disciplinary public-private partnership for continual improvement of bioenergy enterprises, how landscape agriculture provides sustainable biomass supplies and protects ecosystem services, why landscape agriculture does not threaten food security, and whether landscape

agriculture will help ensure national security. Mr. Karlen concluded that landscape agriculture will help protect national security by providing food, feed, fiber, and fuel resources for a global population projected to reach 9.5 billion by 2050, while also protecting ecosystem services by addressing sub-field variability, replacing environmentally leaky annual crops with perennial crops, and increasing profit.

Strengthening National Security

Mr. Tindal provided an overview of how renewables help to strengthen our national security. He stated that energy security leads to sufficiency, surety, and sustainability through assured access to reliable supplies, and the ability to protect and deliver sufficient energy for operational needs. Increased energy efficiency in maritime, aviation, and expeditionary systems increases the combat effectiveness of Naval forces through extended reach, more time on-station, and more time between refuelings. Alternative energy offers more supply options and diversification of energy sources, which can improve freedom of action. He then provided an overview of programs and initiatives that are working to address these needs, such as the Farm-to-Fleet program, The Great Green Fleet, and the *Defense Production Act* to advance drop-in biofuels.

Billion-Ton 2016 Preview

Mr. Stokes provided an update on work leading to the 2016 update of the Billion-Ton study. He first reviewed the 2005 report and the 2011 update. The goals of the 2016 report will be to assess current demand on commercial biomass-to-energy feedstocks, state-of-science biomass, potential supply to 2040, and the environmental sustainability analysis of potential supply. The 2016 report will include such additional feedstocks as algae and municipal solid waste.

VI. Bioeconomy Market Development and Economic Impact

Tony Radich, Energy Information Administration

Katina Hanson, USDA

Ken Meardon, USDA

Robert Handfield, North Carolina State University

The Committee heard from a panel on biomass resource development and national security considerations.

What Does the Future Fuels Market Look Like and How Do Biofuels Fit?

Mr. Radich provided a presentation on what the future fuels market could look like and how biofuels fit. He discussed ways in which biomass competes with other energy sources; quantified the competition among ethanol, biodiesel, and conventional fuels over the past three years; and discussed the results of EIA Annual Energy Outlook 2015.

USDA Biofuels Infrastructure Partnership

Ms. Hanson then provided an overview of the Biofuels Infrastructure Partnership (BIP), which offers competitive USDA grants to state-led efforts to test and evaluate innovative and comprehensive

approaches to marketing higher biofuel blends, such as E15 (15% ethanol, 85% gasoline) and E85 (85% ethanol, 15% gasoline). Up to \$100 million will be available to states (including state-private partnerships) based on the quality and innovation demonstrated in the proposals. Final awards will be announced and funds awarded in September 2015.

USDA Biorefinery Assistance Program

Mr. Meardon discussed the Biorefinery Assistance Program (BAP), which provides guarantees on loans up to \$250 million for projects that assist in the development of biorefineries and biobased product manufacturing facilities. Passage of the *Agricultural Act of 2014* (2014 Farm Bill) required that the Agency promulgate a new regulation that added renewable chemicals and biobased product manufacturing to the program's scope, and mandates that the Agency ensure diversity of project technologies, products, and approaches. He then provided details on the application process. A Notice of Solicitation for Applications was published on July 6, 2015.

An Economic Impact Analysis of the U.S. Biobased Products Industry

Finally, Mr. Handfield provided an overview of the report, *An Economic Impact Analysis of the U.S. Biobased Products Industry*. The report was prepared for the USDA BioPreferred® program and Congress (as mandated in Section 9002 of the 2014 Farm Bill) to determine the quantity of biobased products sold, value of biobased products, quantity of jobs created, amount of petroleum displaced, and other environmental benefits. The report also identified areas in which the use or manufacturing of biobased products could be more effectively used, and technical and economic obstacles, and recommended ways to overcome those obstacles. The study concluded that the bioproducts industry is not isolated to just a few states in the Midwest, but is clearly a national program that adds value and creates jobs all across the United States. The BioPreferred program—and, specifically, the label—are serving to create greater consumer and retailer awareness and interest in biobased products. The bioproducts industry continues to gain momentum, in large part due to the pull of major retailers and brands that seek consumer goods manufactured with lower environmental impacts.

Attendee, Mr. Colman Jones, asked Mr. Radich about EIA forecasts of increased use of E85 under existing law.

Mr. Radich replied that automakers are required to build a certain percentage of flexible-fuel vehicles now, but the corporate average fuel economy (CAFE) law eliminates that requirement in 2019. Another law requires CO₂ intensity to drop apart from CAFE. The CAFE benefits of flexible-fuel vehicles could still be obtained if it can demonstrated that the vehicles can run on alternative fuel. Still, there is a possibility vehicles using E-85 will be built.

Dean Benjamin asked Mr. Handfield: During the industry discussions, were they aware of the BioPreferred program? Were they looking to incentivize?

Mr. Handfield replied that there is some awareness.

Marina Moses stated that the General Services Administration (GSA) was interested in certification programs for sustainability and the BioPreferred program could be an opportunity.

Mr. Handfield stated that they are actually working with GSA on another project and have discussed the opportunity. There are some challenges, including being able to track purchases of BioPreferred products. Developing unique codes around these products is the only way to meet target.

VII. Subcommittee Summaries

The Committee spent considerable time hearing from experts on measuring environmental, national security, market, economic, and societal benefits related to an enhanced bioeconomy. The Committee developed key themes (below) to present their recommendations. These themes apply to all stakeholders of the bioeconomy, including federal R&D agencies, as well as private industry. The key themes are:

- **Improve Profitability of Bioeconomy Industries**
 - Establish the government's role in mitigating economic risks and hastening development of technologies that reduce costs and enhance efficiencies, with an emphasis on leapfrogging advancements.
 - Quantify the values of ameliorating extreme and catastrophic global climate change and enhancing national security to be provided by the bioeconomy.
 - Develop advanced decision-support tools or mechanisms needed to determine economic value derived from societal benefits associated with the bioeconomy.
- **Bioeconomy Policy Drivers**
 - Support policies that enhance the growth of the bioeconomy.
 - Foster public-private partnerships for ongoing, essential R&D.
- **Stimulate Public Awareness and Acceptance**
 - Prioritize product performance and unique market niches.
 - Enhance market demand for bioproducts.
 - Demonstrate and communicate the benefits of the bioeconomy.

Improve Profitability of Bioeconomy Industries

Problem Statement: Feedstocks are not likely to be continuously available to processors at cost-effective unit costs. Feedstock producers must have sufficient confidence that economic returns will be realized, and that they have access to risk-mitigation tools, before they will make commitments to establish new feedstock production systems. Feedstock costs in the bioeconomy value chain are too high, quality is too variable, and supplies are inconsistent for biorefinery operations.

Feedstocks and Logistics Recommendations:

- Decrease production costs and increase feedstock yields.

- Better utilize and maximize the use of existing low-cost feedstock resources (waste streams and consolidated agricultural residuals).
- Focus public R&D on feedstocks that require minimal inputs (e.g., water, nutrients, chemicals, energy) to achieve socially, economically, and environmentally sustainable yields.
- Encourage farming systems that optimize biomass productivity throughout the year.
- Specifications, standards, metrics, and technologies are required to commoditize biomass feedstocks by quality of finished products used by the consumer. Specifications should include water concentration, chemical composition, and purity. Inexpensive tools need to be developed for high-throughput, rapid-screening technologies that measure specifications related to quality assurance. Loan Guarantee Program recipients should be required to report cost data on feedstocks quantity, quality, and relationship to a finished product.
- Develop production systems that continuously provide feedstocks to processors. For example, develop and demonstrate improved feedstock logistics by improved approaches to aggregating, processing, blending, and storage.
- Establish processes that increase energy density, remove oxygen, improve handling, and reduce post-harvest losses.

Problem Statement: Capital and operating expenses (CapEx/OpEx, respectively) continue to be major issues limiting the growth of biofuels and commodity bioproducts. Biomass conversion plants require substantially higher CapEx per gallon of capacity than starch/sugar ethanol plants, first-generation biodiesel plants, or conventional petroleum refineries. This is because of the complexity of biomass processing (all pathways), including pretreatment of feedstocks, which currently requires much less efficient unit operations than conventional refining. The common solution for reducing high CapEx is to increase scale by building larger facilities. In the case of biomass processing plants and biorefineries, the costs of transporting biomass over greater distances rises rapidly and can offset savings from reductions in per-gallon CapEx. Furthermore, higher capital costs increase project-completion risk, reducing the likelihood of obtaining investment funding from the private sector.

Conversion Recommendations:

Reducing CapEx/OpEx

- The government should encourage technologies and pathways that use as much of the infrastructure already in the ground (e.g., existing refineries, filling stations, and storage and distribution infrastructure) as possible. As bioproducts displace petroleum products, an effort should be made to convert existing jobs and economic development.
 - Expanded research is needed to better integrate biomass processing with the petroleum industry, and to incentivize petroleum companies to make investments in biofuels and bioproducts.

- There is a concern about large petroleum companies pulling out of biofuels investment;. The federal government should incentivize the large, established companies to invest through focused efforts to build demand for biofuels/products.
 - DoD and GSA should explore an increase in the amount and length of contracts or purchasing agreements for biofuels products.
 - Federally-funded R&D should focus on technologies that integrate with the petroleum industry and show value to petroleum stakeholders.
- More R&D is needed to develop fuel products that are compatible with the existing infrastructure. For example, develop new technologies that focus on alignment with existing petroleum infrastructure, such as for renewable diesel and jet fuels. Biomass technologies should take advantage of the underutilized/idle infrastructure and established facilities. For example, the government should look more deeply into co-locating biomass facilities with existing pulp and paper plants, coal mines, and power plants.
- USDA and DOE should match the investment made with BIP's retrofitting and/or blending program to increase compatibility on the processing side for renewable fuels to increase drop-ins in existing refineries.

R&D Pipeline:

A greater number of smaller R&D projects should be funded, and priority should go to disruptive technologies. More partnerships with the Advanced Research Projects Agency-Energy (ARPA-E) and NSF should be explored.

- Focus funds on innovative technologies only.
 - Increase the funding for incubator-type projects that have strong success metrics to balance risks with innovative technologies.
- Integrated processes should only be funded when **all** of the components have been proven at a scale at which there is confidence that the integrated process will work, and only when process integration issues are the **final** major risks to commercialization.
 - Individual unit operations should be demonstrated at the smallest scale necessary to predictably scale up for commercial purposes.
 - Fund technologies at appropriate scale. Large-scale demonstrations and pioneer plants should only be funded if early indicators show that costs and integration risks need to be established. Integrated demonstrations should only be scaled up if all components are known and proven for scale-up.
 - Advanced manufacturing innovation centers should be established and funded. Emphasize centers where individual applicants/researchers/projects can be coordinated for further testing in an integrated process context.

- Allocate R&D funding to ensure that **all** knowledge in the industry is captured, and broaden the net to look at components that would impact the technology required in the bioeconomy.

Bioeconomy Policy Drivers

Problem Statement: Feedstock value must be sufficient to convince producers to dedicate production acres relative to existing crops in rotations and justify financial risks associated with new feedstocks.

Feedstocks and Logistics Recommendations:

- Address the risk premium for producers associated with switching or rotating to new, dedicated bioeconomy feedstocks. The risks associated with perennial small-seeded species are often high relative to existing commodity crops that benefit from many decades of R&D investment. There are existing federal programs that help to cross that divide (e.g., the Biomass Crop Assistance Program [BCAP] and Section 508(h) of the USDA Risk Management Agency [RMA] process); however, additional effort is needed. A suite of risk-management tools and insurance programs is needed, to include bioenergy crops (as specified by Title 1 of the 2014 Farm Bill).
- Conduct nationally coordinated research that generates the high-quality production data necessary for USDA RMA to implement new, actuarially sound policies that aid feedstock producers.
- Develop trading rules and mechanisms (e.g., long-term contracts) for new (commoditized) bioenergy feedstocks, including both annual and perennial crops.
- Leverage existing state and federal conservation programs (e.g., Conservation Stewardship Program [CSP], EQIP, etc.) and encourage development of enhancement practices that promote renewable energy feedstocks ; for example, determining the utility of using biomass feedstock crops to remediate excess phosphorous in soils.

Analysis Recommendations:

- Conduct research on socioeconomic drivers that influence producer decisions regarding production of cellulosic feedstocks.
- Develop better decision-support tools for landscape design, incorporating the ability to customize for regional approaches, farming systems, and crop rotations, for example. In addition to local/regional tools development, analysis is needed to understand the national impacts to optimize land and resource use for farm sustainability.
- Incentivize land management best practices. For example, use third-party auditing to assure implementation of best practices and measure progress toward goals.

Problem Statement: Costs of externalities are not clearly known or visible to consumers.

- Analysis is needed to ascribe an economic value to externalities. For example, what is the socioeconomic value derived from reduced fertilizer applications for a bioenergy crop that therefore minimizes runoff into watersheds? Although this is an inherently difficult problem for economists, it must be addressed to develop policies that incentivize producers.
- Utilize state and federal programs that provide a benefit for farmers who adopt best practices. Early incentives could be used to stimulate best practices, with transition to such sustainable incentives as market access.
- Develop a framework for trading nutrients that accumulate in watersheds.
- Re-establish the petroleum baseline for life-cycle analysis efforts to represent marginal petroleum production (e.g., tar sands production).

Problem Statement: There are regulatory and fuel standards that result in the so-called ethanol blend wall. Regulatory reform is needed to break the blend wall, increase bioproduct market share, and grow the bioeconomy.

Conversion Recommendations:

- More economic and risk-mitigation innovations for biorefineries are required.
 - Establish policy that mitigates risk for capital investment; for example, by ensuring a minimum market for biofuels. Establish a price floor that biofuel producers can rely on to secure the growth of the industry and stabilize the market. When petroleum prices are high, there is no need to provide a floor price for biofuels; but if petroleum prices drop below some threshold, taxes could be used at the federal level to increase revenue and stabilize the biofuel industry. Because petroleum prices are usually artificially high due to the actions of the Organization of the Petroleum Exporting Countries (OPEC) cartel, petroleum producers can easily survive occasional periods of low prices. Biofuels are becoming price-competitive versus long-term petroleum price trends, but if producers can be bankrupted by a brief downturn in prices, it will be very difficult to attract private-sector investment to the bioeconomy.
 - The U.S. government, as well as states and municipalities, should explore regulations or programs that encourage public bond funding as an option to get additional funding for biorefineries (as an alternative to large private investments from single companies). This could be a new option for funding alongside traditional funding mechanisms for first plants, and could include, for example, loan guarantees from USDA or DOE to reduce risk.
 - Climate change and energy security are global in nature, so improvements outside of U.S. borders can benefit the nation. The U.S. government should investigate ways to encourage non-governmental organizations to help support bioenergy breakthroughs as a humanitarian mission, especially for developing nations facing severe climate change impacts.
 - Develop innovative financing opportunities, such as a publically-traded master limited partnerships, and create a system wherein many of the partners could come from the public and private companies.

Products, Markets, and Systems Recommendations:

- Within six months, USDA and DOE should move to create a public-private consortium composed of CEO-level industry partners and the Secretaries of participating biomass R&D board departments/agencies who will identify priority regulatory and standards fixes that would advance the bioeconomy.
 - Identify problem and missing regulations. These could include:
 - Undefined pathways
 - Issues in simultaneous compliance that hinder biofuels production
 - Standards that unnecessarily exclude biofuels and bioproducts
 - The consortium could develop a list of key items (e.g., a 10-point list) and disseminate.
- Submit a request for information (RFI) asking for identification of regulations and standards that are obstacles to biofuel and bioproduct development.

Stimulate Public Awareness and Acceptance

Problem Statement: Falling petroleum prices are making fuel replacement less of a cost-based justification for a bioeconomy. There are many other benefits to the bioeconomy beyond competitive replacement in petroleum markets, however. Information about the broad benefits of biofuels and bioproducts should be developed. Also, some bioproducts need further development to before we can fully understand their applications and benefits. The benefits of the bioeconomy should be made evident to the public, elected officials, and policy makers.

Committee Recommendations:

- Develop a public outreach program to identify the benefits of biofuels and bioproducts. The program should be objective, based on science, and should highlight research that has improved understanding of biofuel benefits and impacts and how R&D has improved biofuel processes, reduced potential impacts, and increased benefits. This program should address a diverse audience, including intermediate buyers, end users, industry participants, policy makers, and the general public.
- Add environmental considerations to the public value proposition and better communicate them to the public to drive market demand. Develop a clear value proposition for the public as it relates to bioeconomy.
 - Present a value proposition to decision makers and capitalize on the fact that bioenergy helps the environment, the economy, and national security.
 - Market the advancements in science and technology as a whole through the breakthroughs made in bioenergy, and show the importance of foundational science learnings (e.g., in biotechnology for human health, agriculture, etc.).

VIII. Public Comment

James Meade, Chief Technical Officer, Agricultural Fuels Corp.

Nineteen years ago, our facility located in Orlando, Florida, began accepting and recycling biogenic materials—specifically, wood and wood residuals harvested from the waste stream. We are located at the entrance to the Orange County Landfill, the second largest in the Southeast. We began our business by making landscape materials, such as red mulch. Six years ago, with the passage of the Farm to Fuel Act in Florida, we shifted to only inventorying agricultural fuels. In the future, we intend to provide a market for farmers growing agricultural fuels that we will be able to cost-effectively blend into our existing feedstock.

The following are the main issues for this type of business:

1. Competing with your regulator, the local government for market share. (e.g. harvesting from the waste stream).
2. Defining what is an agricultural fuel, versus solid waste. Current law in Florida makes fuels such as camelina, switch grass, or bagasse indistinguishable from the definition of yard waste.
3. The high cost of processing equipment.
4. The high cost of transporting of materials.
5. The cost of growing and harvesting fuel crops, and the difficulty in finding a buyer who will pay enough for these crops.

We offer the following solutions:

1. Most states have “Right to Farm” acts in their statutes. These acts were written to protect farmers from duplicity of local laws, and laws written by local governments that unfairly restrict farmers. USDA should embrace the idea of harvesting from the waste stream, with the ultimate goal of zero waste. For example, all consumer packaging should ultimately be mandated to be produced from non-fossil fuel, agriculturally produced materials.
2. Any biogenic material harvested from the waste stream and used as a traditional fuel should be defined as an agricultural product, thereby affording it all of the legal protections of any other farm product. Furthermore, these materials should be entitled to the same incentives as other farm fuels.
3. Continue to provide grants, incentives, and loan guarantees for innovative and cost-effective equipment that processes and/or utilizes biogenic fuel or biogenic raw materials.
4. Quit hamstringing the BCAP program, and expand eligible biomass materials to include those harvested from the waste stream, and eligible locations to include state forests and state water-management districts.

5. Encourage the planting of high-value crops, the chaff from which can serve as biogenic or agricultural feedstock that can be profitably sold or blended.

Any or all of these changes could have a tremendous impact on the biomass and agricultural fuel industries, and help these renewable energy businesses to grow and thrive.

Sincerely,

James Meade, Chief Technical Officer

Agricultural Fuels Corporation

IX. Closing Comments

The meeting was adjourned.

Attachment A: Committee Member Attendance—August 27–28, 2015

Co-Chairs	Affiliation	Attended?
Kevin Kephart	South Dakota State University	Yes
Paul Bryan	University of California-Berkeley	Yes

Members	Affiliation	Attended?
Dean Benjamin	Verso Corporation	Yes
Steve Csonka	Commercial Aviation Alt. Fuels Initiative	No
Claus Crone Fuglsang	Novozymes North America, Inc.	No
Joseph James	Agri-Tech Producers, LLC	Yes
Randy Jennings	Tennessee Department of Agriculture	No
Coleman Jones	General Motors Corp.	Yes
Man Kit Lau	BioAmber Inc.	Yes
Johannes Lehmann	Cornell University	Yes
Stephen Long	University of Illinois	No
Maureen McCann	Purdue University	Yes
Bruce McCarl	Texas A&M University	Yes
Christine McKiernan	BIOFerm Energy Systems	Yes
Ray Miller	Michigan State University	Yes
Shelie Miller	University of Michigan	Yes
Marina Moses	American Academy of Microbiology	Yes
Neil Murphy	State University of New York	Yes
David Nothmann	Battelle	No
Kimberly Ogden	University of Arizona	Yes
Manuel García Pèrez	Washington State University	No
William Provine	Dupont	No
Anna Rath	NexSteppe	No
Patricia Scanlan	Black & Veatch	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
Kelly Tiller	Genera Energy, Inc.	Yes
Valerie Thomas	Georgia Tech.	Yes
Alan Weber	MARC-IV Consulting/Weber Farms	Yes
Todd Werpy	Archer Daniels Midland Company	No

Total: 22 of 32 members attended

Attachment B: Agenda—August 27 and 28, 2015

Day 1: Technical Advisory Committee Meeting

August 27, 2015

- 8:00 a.m. – 8:30 a.m. *Breakfast (to be provided for Committee)*
- 8:30 a.m. – 9:00 a.m. Welcome, Meeting Direction, and Agency Updates
Committee Co-Chairs
Elliott Levine, Bioenergy Technologies Office, U.S. Department of Energy
Todd Campbell, U.S. Department of Agriculture
- 9:00 am – 9:30 am How do RINS work?
Sandra Dunphy, Director-Energy Compliance, Weaver
- 9:30 am – 10:30 am Panel: Assessment Tools and Measuring Environmental Externalities
Environmental Sustainability Indicators, Virginia Dale, ORNL
Environmental Assessment Tools and How Are They Used?
Jennifer Dunn, Argonne National Laboratory
- 10:30 a.m. – 10:45 a.m. *Break*
- 10:45 a.m. – 12:15 p.m. Panel: Biomass Resource Development and National Security
Considerations
Landscape Agriculture, Strategic Biomass Resource Utilization
Doug Karlen, USDA ARS
Strengthening National Security, Chris Tindal, U.S. Navy
Billion Ton 2016 Preview, Bryce Stokes, CNJV
- 12:15 p.m. – 1:15 p.m. *Lunch (to be provided for Committee)*
- 1:15 p.m. – 2:45 p.m. Panel: Bioeconomy Market Development and Economic Impact
What Does the Future Fuels Market Look Like and How Do Biofuels Fit?
Tony Radich, EIA
USDA Biofuels Infrastructure Partnership, Katina Hanson, USDA
Biorefinery Assistance Program, Ken Meardon, USDA
An Economic Impact Analysis of the U.S. Biobased Products Industry,
Robert Handfield, North Carolina State University
- 2:45 p.m. – 3:00 p.m. Public Comment
James Meade, Agricultural Fuels Corp.
- 3:00 p.m. – 3:15 p.m. *Break*
- 3:15 p.m. – 5:30 p.m. Subcommittee Breakouts: (closed session)

Day 2: Technical Advisory Committee Meeting

August 28, 2015

8:00 a.m. – 8:30 a.m.	<i>Breakfast (to be provided for Committee)</i>
8:30 a.m. – 11:30 a.m.	<u>Subcommittee Breakouts: (closed session)</u> <i>Break at 9:45 a.m.</i>
11:30 a.m. – 12:30 p.m.	<u>Subcommittee Report Outs</u>
12:30 p.m. – 1:00 p.m.	<u>Discussion: Q4 Meeting Logistics</u>
1:00 p.m. – 2:00 p.m.	<i>Lunch (to be provided for Committee)</i>
2:00 p.m.	<i>Meeting Adjourn</i>