

**Biomass Research and Development
Technical Advisory Committee**

August 22–23, 2012

Meeting Summary

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List of Acronyms

BCAP – Biomass Crop Assistance Program

Biomass Act – Biomass R&D Act of 2000

Board – Biomass Research and Development Board

BRDI – Biomass Research and Development Initiative

Committee – Biomass Research and Development Technical Advisory Committee

Council – Forestry Research Advisory Council

DOE – U.S. Department of Energy

DPA – Defense Production Act

EPA – Environmental Protection Agency

FOA – Funding Opportunity Announcement

MOU – Memorandum of Understanding

NIFA – National Institute for Food and Agriculture

R&D – Research and Development

REAP – Rural Energy for America Program

RFS – Renewable Fuel Standard

USDA– U.S. Department of Agriculture

I. Purpose

On August 22–23, 2012, the Biomass Research and Development Technical Advisory Committee (Committee) held its third quarterly meeting of 2012. The purpose of the meeting was to discuss and receive updates about the recent activities of the U.S. Department of Energy (DOE) and U.S. Department of Agriculture (USDA). DOE representatives delivered presentations about the Biomass Program, and USDA representatives delivered presentations about current Agency activities, as well as the Biomass Research and Development Initiative (BRDI). In addition, presenters from the Congressional Research Services provided an update and overview of biomass federal research and development (R&D). Also, the Biomass Thermal Energy Council and North American Biomass provided public comments. The Committee then broke out into subcommittees to discuss their 2012 recommendations.

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Background: The Committee was established by the Biomass R&D Act of 2000 (Biomass Act), which was repealed and replaced by Section 9008 of the Food, Conservation, and Energy Act of 2008.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

II. Introduction and Welcome to New Committee Members

Steve Briggs and Ronnie Musgrove, Committee Co-Chairs

Steve Briggs and Ronnie Musgrove welcomed the new Committee members who were able to attend the meeting. New members in attendance include the following:

- Jimmie Powell, The Nature Conservancy
- Neil Murphy, State University of New York.

III. DOE Updates on Biomass R&D Activities

Elliott Levine, Designated Federal Officer, U.S. Department of Energy Biomass Program

Elliott Levine provided an overview on Committee business and DOE's Biomass Program activities. Mr. Levine presented a summary of the successful DOE Biomass 2012 conference. There were 750 participants from 46 states and 17 countries who attended the conference. Biomass 2012 focused on key policy issues—such as the future of the Renewable Fuel Standard (RFS) and federal spending on bioenergy—and the status of several high-profile advanced bioenergy projects that broke ground in 2012. Presentations from the conference are available on the Biomass Program's website: www.eere.energy.gov/biomass/biomass_2012.html. Mr. Levine also noted that the Biomass Program is preparing the 2013 Program and Platform Reviews for March and April 2013. He announced that USDA has made five BRDI awards from the 2011 solicitation. DOE is expected to make its announcement of awards in September. The Biomass Program has released five funding opportunity announcements

(FOAs) in fiscal year (FY) 2012. Initial application dates have passed, and the Program is expecting to make award announcements in fall 2012 for the following FOAs:

- *Bio-Oil Stabilization and Commoditization*
 - Award announcement targeted for October 2012
- *Technology Research, Development, and Tools for Clean Biomass Cookstoves*
 - Award announcement targeted for October–November 2012
- *Biomass Advancements in Sustainable Algal Production*
 - Award Announcement: <http://www1.eere.energy.gov/biomass/algae.html>
- *Innovative Pilot and Demonstration Scale Production of Advanced Biofuels*
 - Award announcement targeted for November–December 2012
- *Innovative Biosynthetic Pathways to Advanced Biofuels*
 - Award announcement targeted for November–December 2012.

Further, DOE and USDA announced \$10 million for eight research projects aimed at applying biomass genomics to improve promising biofuel feedstocks and drive more efficient, cost-effective energy production. More information can be found on the Genomic Science website:

<http://genomicscience.energy.gov/research/DOEUSDA/index.shtml>.

Mr. Levine provided an update on the Defense Production Act (DPA), stating that President Obama's FY 2013 budget request includes an additional \$110 million to support the DPA initiative. In May, the Senate Armed Services Committee voted to prevent the Department of Defense from purchasing alternative fuels if those costs were higher than that of traditional fuels.

Mr. Levine concluded his presentation stating that the next Committee meeting will take place on November 14–15, 2012.

IV. U.S. Department of Agriculture Update

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

Todd Campbell updated the Committee on various topics, including the Energy website Farm Bill Section 9000, BioPreferred Program Seminar, and Business and Industry Loan Program. The Energy website has more than 14,000 energy projects shown from across USDA mission areas and can be sorted by state/county/district, with aggregate and specific project information (www.usda.gov/energy). Mr. Campbell also discussed the Biomass Crop Assistance Program (BCAP), which has two additional approved project areas in New York and North Carolina. In total, BCAP project areas span 188 counties across 12 states, with 880 contracts and more than 59,000 acres enrolled or in the sign-up process. Also mentioned was the Biorefinery Assistance Program, which currently has 9 active projects in the portfolio across 9 states, with \$771 million in guaranteed loans approved, which accounts for 135.3 million metric gallons per year and a power capacity of more than 14 megawatts. The Rural Energy for America Program (REAP) has announced 21 biomass projects in FY 2012, with \$5 million in guaranteed loans and \$637,226 in grants. Additional awards will be announced soon.

Mr. Campbell provided further detail on the five BRDI awards announced by USDA, which are as follows:

- **Quad County Corn Cooperative** – \$4.25 million for cellulosic ethanol
- **ARS National Center for Agricultural Utilization Research** – \$7 million for oilseed for renewable diesel and jet fuel in the Western United States
- **Cooper Tire & Rubber Company** – \$6.85 million for rubber-producing shrub in the Southwest for biobased tires, jet fuel
- **University of Wisconsin** – \$7 million for closed-loop systems on dairy farms for cellulosic ethanol, oilseed
- **University of Hawaii** – \$6 million to optimize production of grasses in Hawaii for renewable jet and diesel.

The BioPreferred Program is holding an upcoming seminar on cultivating opportunities in the biobased marketplace on September 27, 2012. For more information, visit the BioPreferred Program website:

http://www.biopreferred.gov/files/BioP_Seminar2_flyer_v11.pdf.

Mr. Campbell also highlighted the Great Green Fleet, the U.S. Navy's Carrier Strike Group, and its demonstration at the 2012 Rim of the Pacific Exercise. The Navy surface ships were powered using 350,000 gallons of hydroprocessed renewable diesel (HRD-76) blended with marine diesel (F-76); the Navy aircraft used 100,000 gallons of hydroprocessed renewable jet fuel (HRJ-5) blended with aviation fuel (JP-5)

V. Forestry Research Advisory Council Update

Dr. Jason Grabosky, Committee Chair

Dr. Jason Grabosky, the Committee Chair for the Forestry Research Advisory Council (Council), provided an overview and update on the Council's 2012 activities. The Forestry Council advises the Secretary of Agriculture in accordance with the McIntire-Stennis Act of 1962, which authorizes the Secretary to encourage and assist forestry research through land-grant colleges, agricultural experiment stations, and forestry-related programs. The Council also provides advice related to the Forest Service Research Program, which was authorized by the Forest and Rangeland Renewable Resources Research Act of 1978. Council responsibilities cover regional and national forestry research planning and coordination within the federal and state agencies, forestry schools, forest industries, and non-governmental organizations. The Council convenes annually and presents recommendations directly to the Secretary of Agriculture. The Council is composed of 16-20 appointed members. The current letter with 2012 recommendations was submitted to the Secretary of Agriculture on August 20, 2012. Currently, there will be a comment and response development period, after which, the Council will schedule a briefing.

Joe James asked if there is a need to provide better data on resource availability. Dr. Grabosky felt that this would be complicated and potentially slow to advance the issue through the Council, but data may be available by each state. Mr. James expressed the need for a more regional approach. Dr. Grabosky suggested looking further into the USDA regional offices that may have some solutions.

Steve Long asked about the rise in wood chip consumption for heat and how it impacts the Northeast. Dr. Grabosky personally saw wood pellet cost rise four times in the past 5 years. With the current market in the United States, it is cheaper to export the wood pellets to Europe. Dr. Grabosky suggested the need for mobile equipment that could ship the resources, as needed, to help reduce the distance from feedstocks to process facility as well as market-consumer. David Nothmann felt a mobile approach was more practical, but storage of chips could still be an issue. Steve Long stated that the high price of chips would help to focus on developing solutions.

Joe James asked if there are ways to add value to chips to make them more stable and easier to transport. Dr. Grabosky felt that forest lands would provide dirty feedstocks, and consumers will need to be less selective of the quality of the feedstock. He proposed requiring robust systems rather than genetically manipulated or species-specific feed stocks with 80% efficiency for 80% of the species-stocks available rather than 95% efficiency for one segment of one species while the rest is wasted.

VI. Congressional Update and Overview of Biomass Federal R&D

Brent Yacobucci, Congressional Research Service

Kelsi Bracmort, Congressional Research Service

Brent Yacobucci and Kelsi Bracmort from the Congressional Research Service (CRS) presented updates and overviews of federal biomass R&D programs. CRS provides authoritative, confidential, non-partisan, objective research and analysis for members of Congress and their staff. Their presentation and remarks to the Committee were solely their own and do not necessarily represent those of CRS.

There are at least 17 committees involved in the biomass R&D debate. Not much is expected in policy changes this year due to the election. Ms. Bracmort started with the R&D programs at DOE and USDA. DOE's Office of Energy Efficiency and Renewable Energy (EERE) have seen reductions from Congress in the last 2 years. The House passed FY2013 appropriation bill and the Senate committee reported FY2013 appropriation bill find common ground with regards to funding for 1 of the 6 renewables funded under EERE—the biomass and biorefinery program—suggesting legislative support within the two chambers for FY13 R&D funding for biomass is stronger than for the other renewables. Language in the Senate report that accompanies the Senate appropriations bill encourages DOE to expand its definition of biomass to include algae.

For USDA, the Farm Bill is set to expire in FY 2012. The bill is a priority for Congress. All of the major Title IX energy programs—which are of key importance to the biofuels sector—in the Farm Bill expire at the end of FY2012 and lack baseline funding going forward. The Senate approved its version of the bill; however, the House vote is not expected until late September or October. One key difference between the House and Senate bills is the source of funding. The Senate bill contains \$800 million in new mandatory funding and authorizes \$1.140 billion in total appropriations over the five years between FY2013 and FY2017 for the various Title IX programs. The House version contains no mandatory funding for the Title IX programs in the bill, while authorizing \$1.355 billion subject to appropriations. Other

potential bioenergy R&D funding issues associated with the 2012 Farm Bill debate include possible redundancy across USDA and DOE energy programs, and slow development of cellulosic biofuels.

Steve Briggs asked what the impact would be if there is a continuing resolution for the FY 2013 budget. Ms. Bracmort replied that existing programs under the Farm Bill would continue at a certain percentage to be determined by Congress.

The U.S. Navy, DOE, and USDA signed a Memorandum of Understanding (MOU) to "assist the development and support of a sustainable commercial biofuels industry." This MOU is unique because it focuses solely on commercial-scale development of advanced biofuels and brings in the primary federal agencies involved in advanced biofuel development along with a customer for the biofuel produced. The Department of Defense (DOD) is a large consumer of oil—particularly the Navy. The House did not approve a \$100 million request from DOE to support the MOU, but the Senate did support it. The House appears to focus primarily on the cost of biofuels in its decision to justify why it will not support the DPA MOU. In general terms, with some exceptions, both the Senate and the House Armed Forces Committees have language in the FY13 national defense authorization act that would prohibit the use of funds to produce or purchase alternative fuels if the costs for those fuels is more than the cost traditional fossil fuels used for the same purpose. Potential Reasons for general DOD funding opposition include whether the Navy should be the testing ground for advanced biofuels that at present cost significantly more than conventional fuels, that there are presently no operating domestic commercial-scale production facilities for advanced biofuel (except for biodiesel, which is technically an advanced biofuel, but does not meet DOD performance requirements and is not expected to be produced at the scale needed), and the competition for resources to cultivate the feedstock. Another driver in the debate is the Energy Independence and Security Act of 2007, which states, generally, that no federal agency shall enter into a contract to purchase alternative fuels, for any mobility-related use, other than for research or testing, unless the contract specifies that the lifecycle greenhouse gas emissions associated with the production and combustion of the fuel is less than or equal to such emissions from conventional fuel.

Elliott Levine brought up a Committee recommendation from last year that addressed the need for a baseline with conventional fuels and asked if Ms. Bracmort was familiar with a baseline. Ms. Bracmort stated that she was not aware of a baseline for biofuels versus oil or gas. Mr. Yacobucci stated that the Energy Independence and Security Act defines the baseline for the RFS, but that for other policies (e.g., restrictions on federal procurement of high-lifecycle-greenhouse gas fuels) the baseline is undefined. He also noted that heavier oils entering the market are, in some cases, raising the baseline.

Brent Yacobucci provided an update on the RFS. The current drought has caused corn production to decrease, but it is expected that there will be enough production to meet targets. There have been requests to reduce standards this year due to the drought and economic hardship. In 2008, a similar request was made, but was denied. The ruling was that the RFS was not the main contributor to any economic hardship felt by Texas in 2008, and that it was unclear that waiving the RFS would have any beneficial economic effect. The cellulosic target was waived for 2012, as it was in 2010 and 2011.

Currently, there are many hearings on RFS, but not enough support to change it. There are also bills to reduce or eliminate it, but not much activity supporting them.

Neil Murphy asked if there is any discussion occurring on biobutanol. Mr. Yacobucci stated that the assumption is that it is likely to be corn based in the near term. However, biobutanol could have less infrastructure needs. There is a need for better education on advanced biofuels and biobutanol needs.

Elliott Levine asked about federal R&D programs other than DOE and USDA. Mr. Yacobucci stated that other agencies, such as EPA or the Department of Transpiration, have very small programs relative to DOE and USDA.

Alan Weber asked when EPA's 90-day public comment period would be closed on the RFS reduction request. Mr. Yacobucci said that it was assumed the 90-day period began when the request was made.

Todd Werpy stated that is difficult for industry to justify capital in biofuels without consistency in policy.

VII. BRDI Update

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

Carmela Bailey provided an update on the FY 2011 BRDI awards. As stated earlier by Mr. Campbell, five awards have been made by USDA. Ms. Bailey also provided a status update on the FY 2012 BRDI. For FY 2012, 178 Pre-applications were reviewed, and 42 were invited to submit full applications. The review process was just completed, and they expect to make awards by the end of September. Nineteen site visits to evaluate current projects are completed, and the next rounds of visits are in the planning process. Committee members are welcome to participate in site visits. Congress has asked for a program performance analysis on BRDI, and the draft report is being finalized. The report includes summaries of review panelist expertise, trends in technical area investment, geographic diversity of awards, and quantifiable project output measures. When completed, the site visit reports will be added as an appendix to the report. BRDI is in question beyond 2012, as the Farm Bill is under debate in Congress.

Steve Long asked about the Agricultural Research Service award and its use of camelina as a feedstock. He expressed concern that camelina has too low of yield to be economical. Ms. Bailey stated that the project was working to maximize cropping systems to improve the yield.

Via conference call, Bruce Dale expressed concerns with the BRDI proposal review process, stating that reviewers often struggle to balance the novelty of what is being proposed with the likelihood of full commercialization within the timeframe of the grant (3 or 4 years). This leads to confusion as applicants design their projects. Ms. Bailey stated that BRDI does not support fundamental research. The research addressed in the Initiative is applied/developmental research focused on commercialization. She stated that you could have established processes/technologies linked differently to create a novel approach.

David Bransby asked if there are enough true research projects. With the requirement for proposals to include all three elements (technical areas) — involving a consortium, integration of disciplines, and geographic diversity—his concern is that some strong projects might not get considered because they are weak in one of the elements. Ms. Bailey stated a project can be strong in one element, but that all 3 elements must be addressed as appropriate for the project, to encourage projects with stronger likelihood of commercialization.

Bruce Dale expressed a second concern with the inconsistency in resubmitting proposals in following years. Some proposers may have submitted full applications one year, but were not awarded. The next solicitation process, they resubmit after addressing the concerns of the prior year’s reviewers, but the proposal is not asked to submit a full application during the pre-solicitation processes. Proposals take much effort to develop, and a system should be in place for proposers to have a simpler process to resubmit in future years. He suggested that returning reviewers be assigned the same proposals that are resubmitted from the previous year or including reviewer comments from previous years and how the proposers plan to address them. Ms. Bailey replied that there is a new pool of reviewers each year, so the same reviewers may not necessarily review the same proposal. Resubmissions are also reviewed alongside a new set of proposals that could be more competitive than previous years. Daniel Cassidy from USDA expressed concern that putting in a statement regarding resubmitting proposals could give the impression of bias to reviewers, but there may be language used in other USDA solicitations that could help to address this concern. Ms. Bailey suggested looking at the National Institute for Food and Agriculture (NIFA) Agricultural and Food Research Initiative solicitation, which allows resubmitted proposals an additional two pages to address previous reviewer comments. John Tao stated that as a past reviewer of proposals, he would start with a clean slate on proposals and not put much emphasis on comments from previous reviewers.

A final concern from Bruce Dale involved addressing incorrect reviews of factual information. Ms. Bailey stated that the review process in place makes every effort to get multiple experts to review proposals. Ms. Bailey has never received a comment from proposers that a factual error has been made on a review, but she acknowledges that misunderstandings are common.

VIII. Subcommittee Breakout Summaries

Feedstock Subcommittee: Information Requests and Recommendations 2012

1. Were funds distributed and used consistent with the Initiative’s objectives, purposes, and considerations?

Generally, yes; the selected projects appropriately address the objectives and the defined technical areas.

Limited waste feedstocks are utilized. , and BRDI should expand feedstock types to include others waste residues, such as animal waste, crop residues, municipal solid waste, and food waste.

Throughout the last 3 years, BRDI has addressed more than 15 types of feedstocks.

2. Were the solicitations open and competitive with awards made annually?

Yes, the solicitations were made available through grants.gov and were announced through social media and other routine means. The joint agencies shared in the workload with the Biomass Program leading the review process for pre-applications. This process pre-screened applications and was used to identify the most promising projects that would be invited to submit full proposals. Evaluation and selection of full proposals was led by NIFA.

The BRDI merit review process appears to be in line with other federal R&D programs and appears to be effective and efficient. We commend the pre-proposal process, which avoids putting an unnecessary burden on the applicant community.

3. Were the objectives and evaluation criteria for each solicitation clearly stated, minimally prescriptive, and aimed toward no special interests?

The Initiative objectives were clearly presented in each solicitation and were consistent with §(e)(2). The solicitations also presented the Initiative technical areas that were consistent with §(e)(3).

The pre-application criteria in FY 2009 and FY 2010 included a statement that implied a preference toward industry-academia collaborations. In FY 2011, however, consortia were specifically allowed and encouraged in §(3)(5). Such collaborations are no longer limited to industrial and academic participants; we commend this expansion.

4. Were proposals evaluated and selected on merit by use of independent panels predominantly composed of experts outside of USDA and DOE?

Evaluation criteria and procedures were clearly presented in each solicitation and adhered to established merit review guidelines and procedures for both agencies. The Initiative is conducted through a two-phase submission process, with pre-applications serving as a screening process prior to invitations for full applications' final merit review.

Review panels were gathered for both processes. During 2010 and 2011, a total of 107 panelists were involved, with most members having expertise in engineering, cropping systems, agronomy, and business. Section (d)(3)(B)(iv) instructs that the independent panels are to be predominantly composed of individuals outside of the Departments of Agriculture and Energy. For the pre-application process, the percentage of reviewers coming from industry and academia was 80% and 87% for FY 2010 and FY 2011, respectively. Only 21% and 13% for FY 2010 and FY 2011, respectively, were from the federal government and there were no reviewers

from state agencies. For the NIFA-led full proposal process, industrial and academic reviewers made up 93% and 87% of the panels for FY 2010 and FY 2011, respectively. Only 7% were from the federal government for both years, and 4% were from state agencies in FY 2011 only.

RECOMMENDATIONS

The Feedstocks Subcommittee expressed that without the ability to review DOE and USDA responses to 2011 recommendations, the Subcommittee reviewed the 2011 recommendations and would like to acknowledge that the 2011 recommendations are still relevant and supported by this Subcommittee.

BRDI Process

1. *Problem Statement:* The Committee needs a better understanding on how the awarded projects are meeting expectations toward the commercialization of technologies and creation of new industries.

Recommendation: Implement an analysis on commercialization and technology transfer resulting from federally funded research programs. , and identify what led to successes and its ability to replicate. . Key metrics are needed.

2. *Problem Statement:* The Committee wishes to have a better understanding of other significant federal research programs being conducted, particularly in agencies that are represented in the interagency Biomass R&D Board [§(c)].

Recommendation: Obtain program summaries for significant programs that are presented—similarly to the BRDI program update that was provided by NIFA.

3. *Problem Statement:* The Committee does not have a complete picture of the types of proposals submitted in the pre-application and proposal process.

Recommendation: Develop a checklist for proposers to complete that will provide data that can be tracked. (See NSF example.) Better match the reviewers to proposals.

Feedstock Sustainability

4. *Problem Statement:* Actual measurements on GHG exchange are needed for more accurate life-cycle assessments.

Recommendation: Build on the success of the DOE Great Lakes Regional Center that is making actual measurements. Issue a proposal to make these measurements.

Improving Biomass Logistical Systems

5. *Problem Statement:* Feedstock production is very distributed and low density. Design and implementation of logistical systems that densify feedstocks and deliver to processing nodes is a limiting factor to creating a lignocellulosic-based biofuels industry.

Recommendation: Need more emphasis to ensure a balance of feedstocks production with logistics and energy density. Suggest one master recommendation. (Note: Check with Infrastructure Subcommittee.)

System Optimization

6. *Problem Statement:* A systems approach is lacking to maximize efficiency or yield of bioenergy crops.

Recommendation: Implement a growth system approach to maximize land use, i.e., modifying growing seasons to maximize land use throughout the entire year. Feedstocks Subcommittee should research best options.

7. *Problem Statement:* Lack of understanding on the market impacts and opportunities of the widespread adoption of bioenergy crops.

Recommendation: Federal agencies should conduct analyses that utilize pilot-scale projects to develop better market forecasting models that show impacts and opportunities to other markets to justify future R&D decisions.

Logistics, Storage, and Infrastructure Subcommittee:

In support of GHG emissions reductions, the unique issues related to bioenergy and bioproducts, creating new jobs, reducing fossil fuel use, and improving rural economies, we recommend the following:

1. Densify and preprocess to improve logistics and facilitate storage.

Problem statement: Biomass—the raw material for production of biofuels, biopower, and bioproducts—has many serious logistical disadvantages as an industrial feedstock. Compared to fossil feedstocks, biomass is much less dense per unit of energy; is more heterogeneous; more spatially dispersed; less stable; more difficult to handle, store, and transport; more variable in year-to-year yields and chemical properties; and presents some additional safety challenges (e.g., dust explosions and spontaneous combustion). Most forms of biomass pose cost, logistical, and processing challenges. It seems very unlikely that very large-scale commodity industries can be built up around biomass feedstocks until these disadvantages are overcome.

Recommendations: To overcome these serious disadvantages with biomass, we recommend research in the following areas:

- Development of relatively low capital/operating cost, distributed processes that can increase the energy and physical density of biomass near where the biomass is produced. Emphasis should focus on overcoming heterogeneity and the removal of moisture and other problematic substances.
- Development of integrated land use, harvesting, handling, transport, processing, and blending methods that can improve logistics and storage stability of biomass feedstocks, plus manage availability uncertainties.
- Development of strategies on how more distributed biomass production and processing can promote rural communities and accelerate industry emergence.

2. Mitigate seasonality concerns and associated problems.

Problem Statement: Typically, biomass has seasonal growth and harvest patterns that impact supply, storage, and use. Bioenergy production generally requires year-round feedstock supplies—sometimes with peak demands at times very different from peak feedstock supply seasons. Storage often leads to feedstock losses along with moisture and combustion issues. Matching seasonal supplies with year-round or seasonal demands requires the development of extensive storage, multiple feedstocks, altered harvesting practices, and various forms of preprocessing and/or densification. This can be both expensive and challenging in terms of implementation.

Recommendation: Ways need to be developed for field-to-user systems to accommodate seasonality.

- Research projects need to develop low-cost preprocessing or multi-feedstock provisions, logistics, and storage system designed to accommodate seasonality.
- Develop mobile feedstock processing operations to accommodate seasonality issues, as well as unexpected changes in weather, beetle kill, etc.

3. Increase biopower/bioproducts R&D.

Problem Statement: Electric generation faces issues of GHG emissions in addition to a number of unique issues related to biomass densification, handling, storage, and other logistical matters. At the same time, some companies are looking for alternatives to fossil material in their manufacturing processes.

Forests in several U.S. regions are in severe need of fuel reduction to reduce the likelihood of catastrophic fires or may be in areas with little demand for forest products. There is land available upon which a variety of feedstock can be grown. And opportunities are available to convert these feedstocks into low-net GHG fuels or bioproducts.

At the same time, European utilities have fast-growing demand for renewable alternatives to coal due to mandates, and they are able to pay substantial prices for such fuels due to government incentives. New technologies are needed to sustainably convert wood and plant biomass into advanced solid fuels and advanced bioproducts.

The Biomass Act, which created the BRDI and the Committee, clearly lists bioproducts and biopower as areas in which research should be conducted. Unfortunately, relatively little research has been funded in recent years on these topics.

Recommendation (Biopower): Conduct more BRDI-funded biopower R&D projects, as described below:

- BRDI projects should support the commercialization of new technologies and processes that improve the energy and physical density (pelletization and briquetting); handling characteristics; and logistics and storage features of plant and woody biomass, so that they may be better used for biopower and electric generation.
- Projects should support co-firing demonstrations in coal-fired utilities.
- Projects should help U.S. companies and biomass surplus areas compete in export markets by producing a superior biomass-based solid fuel for biopower.

Recommendation (Bioproducts): In addition, research is needed to develop biomass-based feedstock and bioproducts that manufacturers can utilize in place of fossil materials. Projects to demonstrate this substitution should be encouraged.

Information Requests

The Committee would like to request additional information on the following:

- 1) Results of completed BRDI projects related to the successes, long-lasting impacts, etc.
- 2) Other funding awards germane to the subject of the Committee (if this exists), including USDA awards, EPA, DOE Labs – INL, and Small Business Innovation Research
- 3) BRDI awards related to feedstock logistics, including the 2010 Awards for Metabolix; University of Kentucky and U.S. Forest Service awards; the 2009 University of Tennessee awards; and the 2007 Kansas State University awards.
- 4) 2009 DOE FOA on large-scale feedstock logistics handling systems.

Conversion Subcommittee

General Recommendations

1. *Problem Statement:* While BRDI has met the overall objectives of the Biomass Act (Section 9008 of FCEA of 2008), the portfolio of awards do not show clear technology progression, nor is there a link from one year to the next or to the larger goals of the USDA or DOE programs. BRDI awards should be in support of wider USDA/DOE biomass-related goals and portfolios.

Recommendation: The Committee believes that the value of BRDI can be significantly enhanced by implementing a five-year technology roadmap with goals, objectives, and metrics (and follows existing USDA and DOE roadmaps).

2. *Problem Statement:* BRDI solicitations are very broad, which is partly due to requiring all projects to include feedstock, conversion, and systems analysis components. The integrated systems approach does not address specific gaps in knowledge that we know exist.

Recommendation: For the next solicitation consider including R&D-specific efforts. A percentage of funds should be reserved for grants to address these gaps. Consider a two-tiered approach—one a systems level and one a systems component level.

3. *Problem Statement:* Awards to-date do not seem to be related to availability of feedstocks.

Recommendation: Current and future availability of feedstocks should be an important selection criterion for awards.

4. *Problem Statement:* The time—from releasing the BRDI solicitation to the deadline for proposal submission—was too short, and BRDI draft solicitations have never been made available for public comment prior to releasing the final draft, which is done by some other federal grant programs.

Recommendation: In order to ensure high-quality proposals, adequate time should be allowed between the pre-proposal and full proposal. BRDI programs should make available a draft FOA to allow for public comment and revisions.

5. *Problem Statement:* BRDI review and site visit panels seem to have a limited number of representatives from the private sector.

Recommendation: Develop larger network of reviewers, and inform them of the scope/areas for review. Consider drawing reviewers from previous or current applicants or using a finalist peer review system. Qualifications should be previously demonstrated. Reviewers should be drawn from industry, academia, government, and other groups to create a diverse pool.

6. *Problem Statement:* BRDI does not seem to have a method of evaluating the success of awards, and results from past awards have not been shared with the Committee.

Recommendation: Measureable outputs of awards should be established; results should be recorded and shared. Success of the funded technologies should be shared and reviewed by the Committee. Funded projects should present at the Committee's Quarterly meetings on substantive challenges and milestones.

7. *Problem Statement:* \$15 million of the \$40 million available for BRDI funding was held over in 2012 for continuation of previous year projects, limiting the amount of funding for new awards.

Recommendation: Inform the Committee of the decision-making process for how additional funds are allocated for continuing projects and how it impacts the new award cycle.

Conversion Recommendations

1. *Problem:* Conversion—pretreatment through fuel production—is the major barrier to bringing down costs.

Recommendation: Some funds should be reserved for funding-focused grants for research in this area.

1A. Problem: There is a critical gap in the existing solicitations portfolio on separations technology. Improved separations technology can significantly reduce capital and operating requirements, as well as life-cycle emissions.

Recommendation: Conduct a review of the status of chemical and physical separations R&D with the goal of identifying gaps and opportunities in product purification (e.g., alcohol and water). R&D should focus on reducing capital expenses, operating expenses, energy intensity, etc. for separations technology.

2. *Problem:* Some bioenergy grants outside BRDI (for example, DPA) programs restrict eligibility to 'commercial-scale' projects, defined as those that use at least 700 tons per day of biomass or produce 10 million gallons per year of biofuel.

Recommendation: What constitutes 'commercial scale' should be based on profitability and commercial impact rather than size or production capacity. Small-scale systems can be commercially viable and still generate profits. Any minimum size requirements should be explained in the FOA. Biomass scale-up requirements are different than those for petroleum refineries and need to be better understood.

IX. Public Comment

Christian Bach, North American Biomass

Christian Bach from North American Biomass provided a statement during the public comment period on the first day of the Committee meeting. Mr. Bach informed the Committee that the exports of biomass pellets to Europe are increasing. Currently, there is no use for low-grade biomass. He suggested the need for R&D to develop and demonstrate a mobile technology to utilize waste wood.

Todd Campbell from USDA noted that the Rural Energy for American Program and Forest Service solicitations may have opportunities. Also, the USDA Biorefinery Assistance Program could include wood waste.

Elliott Levine stated that Idaho National Laboratory is doing work on feedstock densification. He stated that torrefied biomass has similar issues. Currently, there are no torrefied plants in the United States. There are co-fire plants that show a 10%–15% reduction in greenhouse gas emissions and 10% increase in electricity generation. However, feedstock exports to Europe are due to the price of electricity there. Mr. Bach stated that the destination of the use of the biomass is not important if the production of biomass is making profits and generating jobs in the United States.

Coleman Jones shared two issues with wood and wood waste: (1) the British thermal unit per lb. competing with coal and the need to remove oxygen, and (2) lb. per cubic foot where densification needs to occur close to the resource site to reduce costs.

Jimmie Powell asked why Europe is a more attractive market for this biomass. Mr. Bach explained the energy policies in Europe make these resources more viable. Mr. Powell asked about the number of State Renewable Energy Standards in place. Mr. Bach stated that many are inconsistent, and some, like California, exclude waste wood as a resource.

Joseph Seymour, Biomass Thermal Energy Council

Joseph Seymour from the Biomass Thermal Energy Council provided a statement during the public comment period on the second day of the Committee Meeting :

“Thank you for the opportunity to address the Biomass Research and Development Technical Advisory Committee. I’m Joseph Seymour, Executive Director of the Biomass Thermal Energy Council (BTEC). BTEC is a nationwide industry association representing the views of nearly 100 biomass feedstock producers, fuel refiners, appliance manufacturers, vendors, non-profits, and end users. Through consumer education and industry outreach, BTEC seeks to advance the market for biomass thermal energy and promote the use of high efficiency products and locally produced

BRDI is an important program with a critical focus on new and emerging technologies and processes that will help deliver new sources of renewable energy to American consumers.

While focusing on new technologies, feedstock delivery systems and processes is important, BTEC would like to see the program place more emphasis on proven energy systems. . The primary pathways that appear to be the focus of BRDI grants are biomass to electric and biomass to liquid transportation fuels.

What we believe is largely overlooked not only in BRDI but in our overall federal energy policy is the third pathway—thermal—which comprises a third of our nation’s energy use. . As the Committee well knows, capturing and using useful thermal energy from biomass combustion delivers benefits across the economic and environmental spectrum. In fact, during the 2011 winter season, biomass heating fuels such as pellets and wood chips were approximately half the cost of heating oil per unit of energy.

Biomass thermal energy systems are grounded in a proven technology that exists today. What’s keeping these systems from further penetrating the marketplace and realizing their full potential-and replacing high cost fossil fuels now used to heat homes and businesses—is lack of awareness and upfront cost of conversion.

We believe that strategic investment in BRDI grant dollars in a community scale biomass heating cluster, for example, would serve to raise awareness of the tremendous cost and efficiency benefits of biomass thermal technologies. This investment would be a critical first step. . Coupling BRDI with investment in a demonstration project with investment tax credits, which we are now pursuing in Congress, would push us through to the next level where bulk biomass feedstock delivery infrastructure would take shape and proliferate to serve the increasing number of biomass thermal system users.

Thank you for your consideration. Should you have any comments or clarifying questions, please contact me with the information provided below.

Joseph Seymour
Executive Director
Biomass Thermal Energy Council
Tel: 202-596-3974 ext. 302
joseph.seymour@biomassthermal.org
www.biomassthermal.org”

The following public comments were received via email prior to the August Committee meeting:

From: Anonymous
Sent: Wednesday, July 18, 2012
Subject: public comment on Federal Register

Please cut the budget to zero for this biomass research council. I don’t think we need more members unless you start making 51% of the members people from the general American public. I am sick and tired of the fat cat Washington bureaucrat Washington insiders making our laws. We need more ordinary people to call a halt to the crap going on in the do nothing Washington agencies. This agency gave us ethanol, which takes more energy to make than it gives us at the end. How stupid and what a

scam that is. Obviously this group of alleged self appointed "experts" are giving the American public crap energy that takes more energy to make than you have at the end. That is stupid spending of American tax dollars. Such results show that this committee instead of being enlarged needs to be shut down. Alleged experts have very very narrow views which can dangerously run the use off course. The public should always have 51% of the seats on any Washington fat cat bureaucracy. To bring you down to reality. the public is very very disappointed with the quality of the work of this agency. This comment is for the public record.

From: Anonymous

Sent: Tuesday, August 07, 2012

Subject: PUBLIC COMMENT ON FEDERAL REGISTER: using any biomass is a stupid idea - burn up garbage for energy- find a way to do that - we have a terrible garbage problem in America

There is no biomass we can grow in sufficient quantity to burn biomass. It is clear that we need to find a way to get energy from burning garbage. There is nothing we have more of in America. Your failure to find a way to do that without polluting shows a real commitment to avoiding real help for America. This comment is for the public record.

X. Closing Comments

Ronnie Musgrove, Co-Chairs

Ronnie Musgrove asked the Committee members to provide information regarding the following topics:

- Potential Speakers for next meeting
- Potential site visits for next year
- Dates for next year's meetings.

Attachment A: Committee Member Attendance – August 22–23, 2012, Meeting

Co- Chairs	Affiliation	Attended?
Steve Briggs	University of California	Yes
Ronnie Musgrove	Former Governor, MS	Yes

Members	Affiliation	Attended?
Bob Ames	Solazyme	No
Dean Benjamin	NewPage Corporation	Yes
William Berg	Dairyland Power	Yes
David Bransby	Auburn University	Yes
Pamela Reilly	Contag Cygnet Biofuels	Yes
Bruce Dale	Michigan State University	Yes
Harrison Dillon	Solazyme	No
Joseph Ecker	Salk Institute for Biological Studies	No
Neal Gutterson	Mendel Biotechnology	No
Jennifer Holmgren	LanzaTech Limited	No
Huey-Min Hwang	Jackson State University	Yes
Joseph James	Agri-Tech Producers, LLC	Yes
Coleman Jones	General Motors	Yes
Kevin Kephart	South Dakota State University	No
Craig Kvien	University of Georgia	No
Jay Levenstein	FL Dept. of Ag. and Consumer Services	Yes
Stephen Long	University of Illinois	Yes
David Nothmann	Battelle	Yes
Mary McBride	CoBank	No
Maureen McCann	Purdue University	Yes
Bruce McCarl	Texas A&M	Yes
Neil Murphy	State University of New York,	Yes
Jimmie Powell	The Nature Conservancy	Yes
William Provine	Dupont	Yes
James Seiber	University of California	Yes
Abolghasem Shahbazi	North Carolina A&T State University	Yes
John Tao	O-Innovation Advisors LLC	Yes
Alan Weber	MARC-IV Consulting / Weber Farms	Yes
Todd Werpy	Archer Daniels Midland Company	Yes

Total: 23 of 31 members attended

Attachment B: Agenda – August 22–23, 2012, Meeting

Day 1: Technical Advisory Committee Meeting

August 22, 2012

1:30 p.m.–1:45 p.m.	Welcome <i>Co-Chair – Steve Briggs</i> <i>Co-Chair – Ronnie Musgrove</i>	<i>New Hampshire Room</i>
1:45 p.m.–2:05 p.m.	<u>Presentation</u> : Committee Business and U.S. DOE Updates <i>Elliott Levine, DFO, U.S. Department of Energy</i>	
2:05 p.m.–2:25 p.m.	<u>Presentation</u> : USDA Update on Biomass R&D Activities <i>Todd Campbell, U.S. Department of Agriculture</i>	
2:25 p.m.–2:55 p.m.	<u>Presentation</u> : Forestry Research Advisory Council Update <i>Jason Grabosky, Committee Chair</i>	
2:55 p.m.–3:10 p.m.	<i>Break</i>	
3:10 p.m.–4:00 p.m.	<u>Presentation</u> : Congressional Update and Overview of Biomass Federal R&D <i>Brent Yacobucci, Congressional Research Service</i> <i>Kelsi Bracmort, Congressional Research Service</i>	
4:00 p.m.–4:45 p.m.	<u>Presentation</u> : BRDI Solicitation and New Awards Update <i>Carmela Bailey, NIFA, U.S. Department of Agriculture</i>	
4:45 p.m.–5:15 p.m.	<u>Discussion</u> : BRDI Solicitation	
5:15 p.m.–5:30 p.m.	Public Comment	

Day 2: Technical Advisory Committee Meeting

August 23, 2012

8:00 a.m.–8:30 a.m.	<i>Breakfast (to be provided for Committee)</i>	<i>New Hampshire Room</i>
8:30 a.m.–9:00 a.m.	<u>2012 Committee Work Plan and Subcommittee Objectives</u> <i>Steve Briggs and Ronnie Musgrove, Co-Chairs</i>	
9:00 a.m.–12:00 p.m.	<u>Breakout</u> : Subcommittees	<i>(Not Open to the Public)</i>
12:00 p.m.–1:00 p.m.	<i>Lunch (to be provided for Committee)</i>	
1:00 p.m.–3:00 p.m.	<u>Breakout</u> : Subcommittees	<i>(Not Open to the Public)</i>
3:00 p.m.–3:15 p.m.	<i>Break</i>	

3:15 p.m.–4:30 p.m.	<u>Presentations</u> : Subcommittee Reports and Discussion of Recommendations
4:30 p.m.–4:45 p.m.	<u>Public Comment</u> :
4:45 p.m.–5:15 p.m.	Closing Comments <i>Co-Chair – Steve Briggs</i> <i>Co-Chair – Ronnie Musgrove</i>
5:15 p.m.	Adjourn