

Meeting Summary:

**Biomass Research & Development
Technical Advisory Committee**

December 2-3, 2008

TABLE OF CONTENTS

I. Purpose.....	1
II. Meeting with Biomass R&D Board.....	1
III. Subcommittee Report Outs.....	2
A. Feedstocks	2
B. Conversion.....	3
C. Infrastructure and End Use	3
D. Sustainability, Environment, Health and Safety	3
IV. USDA Update.....	3
V. DOE Update.....	4
VI. Office of Basic Energy Science Biofuels Activities and Budget.....	5
VII. National Science Foundation Biofuels Activities and Budget.....	6
VIII. FY 2009 Work Plan	6
IX. Public Comment	7
Attachment A: List of Attendees	8
Attachment B: Agenda.....	11

I. Purpose

On December 2-3, 2008, the Biomass Research and Development Technical Advisory Committee (Committee) held its final quarterly meeting of calendar year 2008. The purpose of the meeting was to receive updates and discuss recent activities of the Biomass Research and Development Board (Board), the U.S. Department of Energy (DOE), and the U.S. Department of Agriculture (USDA). The Committee also heard presentations on biofuels activities and budget from the DOE Office of Basic Energy Science and the National Science Foundation. In addition, the Technical Advisory Committee Subcommittees provided report-outs from each of their meetings. The Subcommittee focused on feedstocks; conversion; infrastructure and end use; and environment, health and safety. The Committee members also discussed the FY 2009 Committee Work Plan. The one and a half-day meeting was held in Washington, D.C.

Background: The Committee was established by the Biomass R&D Act of 2000 (Biomass Act) which was revised by the Food, Conservation, and Energy Act of 2008. The Biomass R&D Board was established under the same act to conduct Federal strategic planning and coordinate activities across the Federal agencies. The Committee is tasked with advising the Secretary of Energy and the Secretary of Agriculture on the direction of biomass research, and evaluating and engaging in strategic planning.

A list of attendees is provided in Attachment A. The agenda is provided in Attachment B.

II. Meeting with Biomass R&D Board

Gale Buchanan, Under Secretary of the Office of Research, Education, and Economics of the U.S. Department of Agriculture and the new co-chairman of the Biomass Research and Development Board, addressed the meeting participants by first re-instating the importance of the overall task at hand, which is improving the energy security of the United States. Dr. Buchanan stated that in order to do so, a smooth transition into the new administration is needed. The Committee and Board need to work together to continue pursuing the goals of the initiative, particularly cellulosic ethanol and other advanced biofuels. Dr. Buchanan also said that there should be an awareness of bio-based products and their potential, and addressed the efforts of the Bioenergy Awareness Program to promote R&D within industry and universities. Dr. Buchanan concluded by saying that he was very impressed by the efforts of the Biomass Research and Development Initiative participants, both from the Federal government and industry.

Following Under Secretary Buchanan's opening, Committee Member Sharlene Weatherwax of the DOE Office of Science opened discussion by expressing her interest in woody biomass feedstocks. Edwin White of the Technical Advisory Committee responded by claiming that there has been difficulty in the forest products industry with much of the pulp industry has going offshore. This affords an opportunity to use that

feedstock resource for the production of fuel, power or other products. Dr. White continued by claiming that there has not been enough emphasis on bioenergy policy. This point was reiterated by claiming this was especially true in the realm of sustainability, health, and safety policy. Meanwhile, Mark Maher of General Motors stated that the lack of infrastructure policy is an impediment to investment. DOE Office of the Biomass Program Manager, Jacques Beaudry-Losique claimed that there is a definite need to diversify the nation's energy portfolio. It takes a long time to initiate policy change within the government.

Jacques Beaudry-Losique affirmed there is a need to improve feedstock yield. This means that there needs to be a framework in place that certifies the yield potential of plants, and reinforces the importance of understanding water and nutrient needs for these feedstocks.

Henson Moore, co-chair of the Committee then asked Board members when there might be a change in the direction of biomass policy. Gale Buchanan answered this question by explaining that this is up to Congress, and indicated the budget development process is very complex.

John McKenna stated that from the earlier subcommittee meetings, it seems that the Technical Advisory Committee and the Board are in-sync, but the deadlines that are in place are unrealistic. He posed a question to the group, asking how goals can be met. Valri Lightner responded by stating that the Biomass R&D Initiative Annual Report to Congress will be released and it respond to all Committee recommendations.

Everyone in the meeting seemed to come to the consensus that continued interaction between the Technical Advisory Committee and the Board would be beneficial to the overall goals of the initiative.

III. Subcommittee Report Outs

A. Feedstocks

Rodney Williamson of the Iowa Corn Promotion Board provided the report out for the Feedstocks Subcommittee. He reported that the main issues addressed within the meeting were improved management, and enhanced conservation and decision making tools for feedstocks. In addition, the USDA Economic Research Service presented an economic modeling system that will help in making logistical decisions for feedstocks, thus improving production. The idea of using transgenic energy crops to improve feedstock yield was widely accepted. The report out also included the fact that the Billion Ton Study was in the process of being updated.

B. Conversion

David Anton of Codexis provided the report out for the Conversion Subcommittee. Anton reported that the subcommittee recognized that cost effective conversion technologies must be developed for biofuels to emerge as a viable alternative to petroleum based fuels. There is also a need for realistic cost projections, because the amount of reduction in cost over the next few years is too optimistic.

C. Infrastructure and End Use

Doug Hawkins of Rohm and Haas provided the report out for the Infrastructure and End Use Subcommittee. He reported that the infrastructure to support movement of biofuels from biorefinery to terminal facilities is making progress. Two issues that need to be addressed are blend strategy impacts infrastructure, and fuel ethanol standards.

The subcommittee applauded the efforts to address the technical issues associated with biofuels infrastructure and expressed concern that the infrastructure economics needs to be addressed.

D. Sustainability, Environment, Health and Safety

Eric Larson of Princeton University gave the report out for the Sustainability, Environment, Health and Safety Subcommittee. He reported that the recommendations from 2008 seem to be being pursued by the agencies, which is important to continue under the new administration. The Subcommittee divided sustainability issues into four main categories; environmental, social, economic, and energy security. The method behind these categories is to separate them in a way that captures direct and indirect indicators of bioenergy production.

Tim Maker stated that it was important that the U.S. play a prominent role with the international community when developing sustainability criteria.

IV. USDA Update

Bill Hagy of the U.S. Department of Agriculture Rural Development Office provided an update on USDA biofuels activities. Hagy began by informing the Committee that this will be his final meeting as the USDA Liaison for the Biomass R&D Technical Advisory Committee given that the co-lead for the initiative has changed from the Rural Development Office to the Research, Education, and Economics Office.

Mr. Hagy went on to explain to the Committee that there are several areas of the Food, Conservation and Energy Act of 2008 that need to be addressed. Section 9004 addresses the issue of Repowering Assistance. Its purpose is to provide payments to replace fossil fuel used to produce heat or power to operate existing biorefineries with renewable resources. Section 9005 is titled Bioenergy Program for Advanced Biofuels. It provides payments to eligible producers to support and ensure expanded production of advanced biofuels. Section 9007 is titled Rural Energy for America Program. It establishes a grant program for energy audits, technical assistance and feasibility studies. The final section of the Food, Conservation and Energy Act of 2008 discussed by Mr. Hagy was 9011, titled The Biomass Crop Assistance Program. This program allows for the establishment and production of renewable biomass crops for conversion to bioenergy, and the collection, harvest, storage, and transportation of biomass crops for use in biomass conversion facilities.

Mr. Hagy then went on to discuss the USDA Energy Cross-Cut and the initiatives implemented through its establishment. These initiatives include an Energy Council Working Group whose purpose is to show deficits in the areas needed to be addressed.

Mr. Hagy's final area of the presentation focused on the National Academy of Sciences biofuels study, which will combine mandated biofuel studies from the Energy Independence and Security Act (EISA) and the Food, Conservation, and Energy Act and include impacts on rural communities and analysis reflecting future prices and technology changes. The contract award is to be signed on December 31, 2008, and will be co-funded by the USDA and DOE.

Committee members expressed that there seems to be a shift in funding priorities from agricultural research of biofuels, to biofuels development through these Farm Bill provisions. Mr. Hagy responded that this shift in priorities is likely due to budget constraints.

V. DOE Update

Valri Lightner, the Designated Federal Officer for the Biomass R&D Technical Advisory Committee, gave an update on the DOE office of the Biomass Program's activities since the May meeting. Ms. Lightner explained that the DOE is continuing its focus on cellulosic ethanol and advanced cellulosic biofuels. The Program's short-term goal is to foster breakthrough technologies needed to make cellulosic ethanol cost-competitive by 2012. In the mid-term, OBP will help to create an environment conducive to maximizing the sustainable production of biofuels by 2017, including cost-effective technology, sufficient infrastructure, appropriate policies, and educated consumers. In the long term, OBP is working to increase the supply of renewable fuels to 36 billion gallons by 2022, especially contributing to the 21 billion gallons of cellulosic and advanced biofuels (per the Renewable Fuel Standard as outlined in the Energy Independence and Security Act of 2007).

Several solicitations have been awarded that will increase research and development in OBP priority areas. These areas include ethanologen, enzyme, thermochemical, pyrolysis oil, and a joint DOE-USDA solicitation. There has also been a notice of intent issued for a \$200 million DOE cost share of an integrated pilot scale or demonstration scale biorefinery that will be announced in the near future. In all cases, funding has increased significantly from prior years.

In regards to the National Biofuels Action Plan, seven action areas have been identified, including sustainability, feedstock production, feedstock logistics, conversion science and technology, distribution infrastructure, blending, and environment, health and safety. The Biomass R&D Board's Interagency Working Groups have mapped appropriate courses of action for each area.

VI. Office of Basic Energy Science Biofuels Activities and Budget

Richard Greene of the Office of Basic Energy Science of the U.S. Department of Energy gave a presentation of the Office of Basic Energy Science structure and goals. The mission of the Office of Basic Energy Science is to foster and support fundamental research to provide the basis for new, improved, and environmentally conscientious energy technologies. In addition, it is to plan, construct, and operate major scientific user facilities for materials sciences and related disciplines to serve researchers from academia, federal laboratories, and industry.

Mr. Greene went on to explain that the goal of the Office of Basic Energy Science is to foster development of new energy technology. Mr. Greene explained that the Office of Basic Energy Science operates under the belief that the nation's energy challenges cannot be met with current technology. New innovations must be developed to provide reliable, economic, solutions for the nation's future energy security.

Mr. Greene then explained the Office of Basic Energy Science, Energy Frontier Research Centers (EFRC) program. Pending appropriations, up to \$100 million will be available in FY2009 for EFRC awards that are \$2–5 million/year for an initial 5-year period. Universities, labs, nonprofits, and for-profit entities are eligible to apply.

In addition, Mr. Greene explained the specific technologies being investigated and developed to improve energy security, as well as the major impacts of the Office of Basic Energy Science in the biosciences field. The origins of the basic bioscience technology development were then explained, as well as the path of development of the basic bioscience. This technology development begins with discovery research, followed by use-inspired basic research, applied research, and finally technology maturation and deployment.

VII. National Science Foundation Biofuels Activities and Budget

John Regalbuto of the National Science Foundation (NSF) began his presentation by explaining the structure, budget, and goals of the NSF. The mission of the NSF is to promote the progress of science; to advance national health, prosperity, and welfare; to secure the national defense; and other purposes.

Dr. Regalbuto explained that NSF has many longstanding programs with fundamental research relative to biofuels: Plant Genomics (interagency), Metabolic Engineering (interagency), Materials Use: Science, Engineering, and Society (MUSES), and Integrative Graduate Education and Research Traineeships (IGERT).

Recent biofuels developments at NSF include the following: active participation in the Biomass R&D Board, Emerging Frontiers in Research and Innovation (Hydrocarbons from Biomass), Engineering Research Center (Center for BioRenewable Chemicals), and helping to push the “green gasoline” paradigm.

Dr. Regalbuto went on to explain many of the biofuel production alternatives that should be explored, and expressed that catalytic pathways have not been funded to their potential.

Mark Maher inquired about green gasoline and its market potential. Dr. Regalbuto said there are several companies that could move green gasoline into the marketplace within a few years.

A question was raised regarding the communication strategies used between NSF and DOE. The two agencies generally communicate informally. Dr. Regalbuto went on to explain that he feels that a key difference between the two agencies’ biofuels research is that DOE funds more technologies and projects that require long-term commitment and less risk, while NSF funds more projects that have high risk associated with them. In addition, Dr. Regalbuto explained that NSF programs have two cycles per year for unsolicited proposals.

VIII. FY 2009 Work Plan

Several issues were discussed regarding the Committee FY 2009 work plan. The next quarterly meeting will be held in San Antonio, Texas following the Renewable Fuels Association National Ethanol Conference on February 25 and 26, 2009. Areas that the Committee would like to see addressed include the total USDA and DOE R&D budget for biomass, a presentation on sustainability criteria in order to clarify GHG emissions standards, and a presentation from a representative from the new administration regarding the future direction of biomass. The Committee also expressed that they would like to hold Subcommittee break out meetings during each quarterly meeting.

IX. Public Comment

Carol Keiser, the National Agricultural Research, Extension, Education, and Economics (NAREEE) committee chair explained the scope of work that her committee was tasked with by Congress. Specifically, NAREEE is a committee formed by Congress to report on the scope and effectiveness of the renewable energy industry. Their mission is to educate on the promise of advanced biofuels. Ms. Kaiser thinks that there should be more positive publicity regarding the potential of advanced biofuels. The four main goals Ms. Keiser identified for the industry include sustainable agriculture, sustainable biorefineries, efficient use of energy, and workforce development.

Bob Kozak of Atlantic Biomass addressed the Committee with several specific items of interest. Mr. Kozak feels that more research should be directed toward high risk ideas, state programs, geographical aspects of future infrastructure, educational outreach, and more incentives for small businesses to participate in the biomass industry through joint solicitations. Mr. Kozak also feels that a DARPA representative should present at a future meeting.

Nate Brown of the U.S. Department of Transportation explained that the Federal Aviation Administration is concerned about the status of aviation and the environment in addition to their interest in deploying environmentally friendly jet fuels. Mr. Brown expressed that jet fuel is good for biofuels because of the broad customer base when there is a universal standard.

Attachment A: List of Attendees

Committee Members Present (19)

Gil Gutknecht (co-chair)
Henson Moore (co-chair)
Robert Ames
David Anton
William Berg
Ralph Cavalieri
Doug Hawkins
Lou Honary
Charles Kinoshita
Eric Larson

Jay Levenstein
Mark Maher
Mary McBride
Tim Maker
Jim Martin
John McKenna
Jeff Serfass
Ed White
Rodney Williamson

Committee Members Not Present (11)

Thomas Binder
Bob Dinneen
Scott Faber
Richard Hamilton
E. Alan Kennett
Shirley Neff

Mitchell Peele
Robert Sharp
Tom Simpson
J. Read Smith
Richard Timmons

Biomass R&D Board Members Present (2)

Gale Buchanan (co-chair), U.S. Department of Agriculture
Doug Faulkner, U.S. Department of Agriculture

Federal Employees Present (18)

William Hagy, U.S. Department of
Agriculture
Jacques Beaudry-Losique, U.S. Department
of Energy
John Houghton, U.S. Department of Energy
Richard Greene, U.S. Department of Energy
Sharlene Weatherwax, U.S. Department of
Energy
Valri Lightner, U.S. Department of Energy
Zia Haq, U.S. Department of Energy
Brenda Aird, U.S. Department of Interior
Nate Brown, FAA – U.S. Department of
Transportation
Karen Hunter, U.S. Department of
Agriculture
John Regalbuto, National Science
Foundation

Kevin Hurst, Office of Science and
Technology Policy
Bryce Stokes, U.S. Department of
Agriculture
Carmela Bailey, U.S. Department of
Agriculture
Jim Fischer, U.S. Department of Agriculture
Joseph Dunn, U.S. Department of
Agriculture
Richard Hegg, U.S. Department of
Agriculture
Ron Buckhalt, U.S. Department of
Agriculture

Other Attendees (17)

Chris Bordeaux, Bordeaux International
Carolyn Clark, BCS, Incorporated
Ken Green, BCS, Incorporated
Brenda Haendler, Booz Allen Hamilton
Jill Hamilton, National Biodiesel Board
Joanne Ivancic, Advanced Biofuels USA
Carole Keiser-Long, REE Committee
Jill Kempenaar, Booz Allen Hamilton
Robert Kozak, Atlantic Biomass Inc
Kathryn McGann, NASF
Carole McGuire, Lewis-Burke Associates
Michael Miller, Booz Allen Hamilton
Samantha Slater, Renewable Fuels Association
Nick Tindall, AEM
Robert Walker, Bixby Energy
Joel Widder, Proteus
Carl Wolf, BCS, Incorporated

Designated Federal Officer - Valri Lightner, U.S. Department of Energy

Total Public Attendees – 17

Total Attendees - 57

Attachment B: Agenda

Agenda
Public Meeting of the Biomass Research and Development
Technical Advisory Committee
December 2-3, 2008

Day 1:

December 2, 2008

- | | |
|-------------------------|--|
| 7:30 a.m. – 8:00 a.m. | <i>Breakfast (to be provided)</i> |
| 8:00 a.m. – 12:00 p.m. | Subcommittee/Interagency Working Group Break Out Meetings |
| 12:00 p.m. – 12:45 p.m. | <i>Lunch (to be provided)</i> |
| 12:45 p.m. – 1:00 p.m. | Welcome
<i>Co-Chairs: Gil Gutknecht and Henson Moore</i> |
| 1:00 p.m. – 3:00 p.m. | Meeting with Biomass R&D Board <ul style="list-style-type: none">• Discuss FY2008 Recommendations to the Secretaries• Update on Board Activities and National Biofuels Action Plan |
| 3:00 p.m. – 3:15 p.m. | <i>Break</i> |
| 3:15 p.m. – 4:45 p.m. | Presentation: Subcommittee/Interagency Working Group Report-Outs <ul style="list-style-type: none">• Feedstocks• Conversion• Infrastructure and End Use• Sustainability, Environment, Health and Safety |
| 4:45 p.m. – 5:00 p.m. | <i>Public Comment/Adjourn</i> |

- 8:00 a.m. – 8:30 a.m. *Breakfast (to be provided)*
- 8:30 a.m. – 9:15 a.m. Presentation: USDA Update
*Bill Hagy, Rural Development,
U.S. Department of Agriculture
TBD, Research, Education and Economics, U.S.
Department of Agriculture*
- 9:15 a.m. – 10:00 a.m. Presentation: DOE Update
*Valri Lightner, Biomass Program,
U.S. Department of Energy*
- DOE Biomass Program Updates
 - FY2009 Joint Solicitation
- 10:00 a.m. – 10:15 a.m. *Break*
- 10:15 a.m. – 10:45 a.m. Office of Basic Energy Science Biofuels Activities and
Budget
*Richard Greene, Office of Basic Energy Science,
U.S. Department of Energy*
- 10:45 a.m. – 11:15 a.m. National Science Foundation Biofuels Activities and
Budget
John Regalbuto, National Science Foundation
- 11:15 a.m. – 12:15 p.m. Discussion: 2009 Work Plan
- 2009 Meeting Dates
 - Improved FY2009 Recommendations Generation
Process
 - Committee Charter
- 12:15 p.m. – 12:30 p.m. *Public Comment/Adjourn*