

**Summary:**

**Biomass Research & Development  
Technical Advisory Committee  
Meeting**

**March 11, 2004**

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# Meeting Summary

## A. Purpose

On March 11, 2004, a Biomass Research and Development Technical Advisory Committee (Committee) meeting was held at the Hilton Crystal City Hotel in Arlington, Virginia. The Committee was established by the Biomass R&D Act of 2000 (Biomass Act). The Committee's mandates under the Biomass Act include advising the Secretary of Energy and the Secretary of Agriculture, facilitating consultations and partnerships, and evaluating and performing strategic planning. This meeting was the first Committee meeting held during the 2004 calendar year. The Committee members came to the meeting to discuss the progress of federal procurement of biobased products. The Committee also met to receive reports on the history of efforts in major biomass technology areas, and to review and refine the research and development matrix and *Vision* goals tracker.

## B. Introduction

Thomas Ewing, Committee Chair, opened the meeting and introduced Rachel Samuel and Gloria Sulton from the Department of Energy (DOE).

## C. Presentation on Federal Advisory Committee Management and Conflicts on Interest

Rachel Samuel, the DOE's Federal Advisory Committee Manager gave a brief presentation to the Committee on Federal Advisory Committee Management (*Attachment A*). In her presentation, Ms. Samuel discussed the roles and responsibilities of those involved in Federal Advisory Committees, the legal requirements of Committees, the purpose of DOE Advisory Committees, concerns and sensitivities that can arise in Committees, at the Department's expectations of Committee members.

Gloria Sulton, from the DOE Office of General Counsel gave a brief presentation on Conflicts of Interest. Ms. Sulton discussed the criminal conflict of interest statute that DOE places on Federal Advisory Committee members and referred to the Ethics and Conflicts of Interest Guidance handout (*Attachment B*). Ms. Sulton explained that members cannot participate in a manner that would have a direct effect on the organization they represent and that members should not use their position on the Committee for private gain. The Departments do not want the integrity of the Committee's findings or advise to be compromised or challenged. She explained that if members ever have questions or concerns, they can seek guidance from the Departments.

Kim Kristoff asked whether or not a Committee member's ability to testify in front of Congress was affected by conflict of interest issues. Gloria Sulton replied that a Committee member may not represent the Committee before Congress unless authorized by the Committee and Committee Chair to do so. She did specify that any member can address Congress as an individual.

David Morris pointed out that former Chairman English testified before Congress and introduced himself as a member of the Biomass R&D Technical Advisory Committee. Gloria Sulton responded that it is appropriate for a Committee member to identify him or herself as a member, but must also specify that he or she is not speaking on behalf of the Committee.

Chairman Ewing thanked Rachel Samuel and Gloria Sulton, and advised the Committee to consider the issues discussed.

#### **D. Welcome and Overview of Agenda**

Chairman Ewing introduced Terry Jaffoni as the new Vice Chair for the Committee. Ms. Jaffoni stated that she looks forward to her new position and hopes that the Committee continues to work well together.

David Morris questioned whether Terry Jaffoni's title is vice or co chair and what exactly her responsibility would be. Chairman Ewing stated that Ms. Jaffoni was appointed by the Points of Contact as the vice chair, that it is a new office, and that her role will be to support the Chair in conducting Committee meetings.

Chairman Ewing welcomed the four new committee members, Jerrel Branson, Ralph Cavalieri, Roger Fragua, and Delmar Raymond. Chairman Ewing also introduced Gary Pearl, who was attending his first meeting. Mr. Branson and Mr. Pearl discussed their backgrounds with the committee. Chairman Ewing gave brief descriptions of the three new members who were not present. The entire Committee introduced themselves and their backgrounds.

Chairman Ewing reviewed the Committee's 2003 accomplishments including evaluating the R&D portfolios of DOE and USDA as well as providing recommendations to the Board and providing recommendations to the Points of Contact regarding the joint solicitation.

Chairman Ewing asked for comments on the agenda. None were received.

#### **E. Presentation on the Status of the FY 2004 Joint Solicitation and Update of USDA Activities to Promote Federal Procurement of Biobased Products**

Merlin Bartz of the United States Department of Agriculture (USDA) gave an update on the status of the FY 2004 USDA/DOE Biomass Research and Development Joint Solicitation (*Attachment C*). Over 400 pre-proposals were received. They underwent a technical merit review and 93 were selected to request a full proposal. USDA and DOE hope to have the solicitation and selection process complete by the end of June 2004.

Larry Walker asked why bioconversion was not highlighted in this year's Solicitation. John Ferrell answered that the DOE tried to focus on the thermochemical conversion

issues rather than bioconversion issues this year. Merlin Bartz replied that there was also an effort this year to be sure the DOE and USDA proposal categories did not overlap.

William Guyker asked how the reviewers of proposals were selected and how someone can become a reviewer. Merlin Bartz replied that USDA agencies were asked to submit names. He also pointed out that USDA provided a number of reviewers from USDA offices from around the country and that they involved other federal agencies, including the Environmental Protection Agency (EPA) and the Department of Interior (DOI). John Ferrell added that the DOE's reviewers included three private industry representatives as well. He recommended that anyone interested in participating as a reviewer be forwarded to Don Richardson.

Terry Jaffoni asked whether or not the Committee's suggestions regarding the weight of various criteria and cost shares on the Joint Solicitation process were implemented. Merlin Bartz said that he knew the cost share recommendations were made. John Ferrell explained that Committee's recommendations were based on the weighting of three criteria, whereas the 2004 joint solicitation review included four criteria. He added that although a fourth criterion was added, the weighting reflected the Committee's recommendation to increase emphasis on certain criteria.

Marv Duncan from the USDA gave an update on the development of guidelines for the Federal Biobased Products Preferred Procurement Program (*Attachment D*). The proposed rule was issued and USDA is currently reviewing public comments. Over 200 public comments were received. Mr. Duncan's presentation reviewed the status of the proposed rule and briefly described how manufacturers would participate and how items would be designated.

Several Committee members, including William Nicholson, Jack Huttner, Bill Horan, and David Morris, expressed concern over how long the process of designating biobased items has taken. Marv Duncan responded by stating that the USDA plans to have the final rule in place by the end of this fiscal year. He also explained that this process has taken longer than expected due to the USDA's efforts to engage several agencies in the process. Mr. Duncan also reminded members that the USDA must work within statutory law, acquiring appropriate clearances during the process, which requires time.

David Morris and Bill Horan asked if the proposed rule immediately would designate items as biobased. Marv Duncan explained that the current rule will only set up program parameters, and that, once the guidelines are in place, separate regulations will be designed to designate products.

William Guyker and Jack Huttner both asked whether or not a labeling program will be put in place to identify biobased products. Marv Duncan stated that the law will only designate generic groups of items, not individual items. He did say that a voluntary labeling program is currently in place, and that the Office of General Counsel is currently reviewing a biobased label.

Kim Kristoff and Terry Jaffoni expressed concerns about the ability to track government purchases and enforce biobased buying due to the large number of purchases made with credit cards. Marv Duncan stated that there is a current effort to develop an educational effort to assist agencies in tracking the purchase of biobased products. He also stated that Congress requires a report be made every other year on the status of biobased products bought by the agencies and that the Office of Federal Procurement will be monitoring the program.

Robert Boeding questioned in what cases would the agencies be exempt from buying biobased products. Marv Duncan responded that the only exclusions would be excessive cost, unavailability, or poor performance of biobased products.

Chairman Ewing asked if the program would expire with the Farm Bill with which it was created. Marv Duncan replied that the program would exist until ordered by Congress to cease. The Chairman then thanked Mr. Duncan for his presentation.

#### **F. Introduction of the new Designated Federal Officer and Review of the Work Plan**

Chairman Ewing announced that John Ferrell would be stepping down from his role as Designated Federal Officer to the Committee. Chairman Ewing thanked Mr. Ferrell for his work with the committee. The Committee applauded.

John Ferrell explained the changes that have occurred in the Office of the Biomass Program. He announced that he would be the technical lead for biomass feedstocks and conversion core R&D. Mr. Ferrell introduced Larry Russo as the technical lead of the program R&D, Valerie Reed as the technical lead for biorefinery and products core R&D, and Doug Kaempf as the Program Manager.

John Ferrell then introduced Don Richardson as the new Designated Federal Officer and provided a brief overview of Mr. Richardson's background and experience in the field of bioenergy.

Don Richardson announced that he was pleased to accept his new responsibility as the Designated Federal Officer. He then reviewed the 2004 Committee Work Plan.

Several questions were asked regarding the end of Committee membership terms and reappointment processes. Chairman Ewing explained that some members are up for reappointment after November 2004, that reappointment is up to the administration, and members being asked to return will be notified in advance so that they may decline if they choose to do so.

## **G. Open Committee Discussion on Goals for the Next Meeting and Clarification of the Committee's Position on Biomass-to-Hydrogen**

Chairman Ewing stated that the purpose of this particular discussion was to determine the Committee's focus for the hydrogen portion of June Committee meeting, and not to enter into a lengthy discussion on the Committee's position on biomass-to-hydrogen.

John Ferrell suggested that the Committee should identify the areas of the issue that it would like to have discussed at the June meeting and who it would like to have come and speak on the issues.

Jack Huttner inquired about the National Research Council's (NRC) report on hydrogen. David Morris informed the committee that it is available through the National Academy of Sciences. After some discussion about the report the Committee concluded it is a good piece of information to have for the June meeting discussion.

Robert Dorsch suggested that it would be helpful to begin the meeting with presentations on various perspectives surrounding the hydrogen issue rather than just have emailed printed reports. David Morris agreed. John Wooten stated that the current Administration has released a hydrogen implementation plan and that it would therefore be helpful to have a presentation on it from the Administration. This was discussed and the Committee agreed.

Bill Horan suggested that information on bridging technologies would be helpful. William Guyker agreed. Mr. Horan also emphasized the importance of focusing on near term solutions. William Nicholson suggested that background information on the economic issues surrounding hydrogen and its alternatives would be useful. The Committee concurred. Jack Huttner suggested that the discussion on hydrogen fits with the Committee's goals as described in the *Vision*.

Jack Huttner raised the issue that the R&D agenda has not focused heavily on hydrogen. Don Richardson replied that there is not currently a lot of biomass-to-hydrogen research being conducted, but that advice on it would be useful. Doug Kaempf added that the Office of the Biomass Program will examine hydrogen in the biorefinery process, but that the production of hydrogen is within the jurisdiction of the DOE's Hydrogen Program.

David Morris emphasized the importance of noting that the Committee has not yet declared a position on hydrogen, and that he would like to see the June meeting used to create that position. Chairman Ewing concurred, stating that the Committee has no stand on hydrogen. The Committee also agreed to clarify the Coordination Office newsletter article regarding the Committee's position on hydrogen.

Chairman Ewing ended the discussion and the Committee broke for 15 minutes. After the break, Chairman Ewing introduced Frank Flora of the USDA. Mr. Flora announced the USDA's Biobased Products and Bioenergy Coordination Council Stakeholders



Workshop being held on April 13-14, 2004 at the Greenbelt Marriott (*Attachment E*). Mr. Flora invited the Committee to attend.

#### **H. Presentation on the Historical Perspective of the Biomass Program and Ethanol and the Sugar Platform**

John Ferrell gave a presentation about the Historical Perspective of the Biomass Program (*Attachment F*). Mr. Ferrell discussed the ways in which R&D on biomass has changed through past and current administrations, availability of funds, and research foci.

Jack Huttner asked if congressionally directed funds were increasing across all technologies, or were specific to biomass. John Ferrell responded that congressionally directed funds were up across all technologies, but that biomass had the highest amount.

Larry Walker asked for clarification on whether or not the Strategic Plan discussed in the presentation referred to all of DOE. John Ferrell replied that the Plan was only for the Office of Energy Efficiency and Renewable Energy. Mr. Walker also asked if the program review held in November would be made available and Mr. Ferrell replied that it would be.

John Ferrell also gave a presentation on Ethanol and the Sugar Platform (*Attachment G*). Mr. Ferrell discussed how the ethanol and sugar platform's planning, evaluation, and partnerships have changed over the years and the lessons that have been learned. The presentation also focused on the practice of stage gate management and the enzyme technology behind the program.

David Morris questioned why the current estimates on the cost of ethanol per gallon differ so drastically from those of past years and asked for verification of those numbers. John Ferrell announced that the numbers can be verified and that he will try to provide that for the Committee. Robert Dorsch stated that it is understandable that estimates would change because the government is not always privy to information that industry may have.

The Committee broke for lunch.

#### **I. Presentation on Gasification and Cofiring**

Paul Grabowski of DOE gave a presentation on gasification (*Attachment H*). Mr. Grabowski discussed various aspects of gasification technology, including its problems and benefits, feeding and handling systems, and conversion systems. The presentation also included a discussion of EERE and OBP's strategic direction for gasification technology. A large portion of the presentation focused on the barriers to accomplishing gasification goals and the management approach to achieving those goals.

Thomas Binder asked whether or not a comparison of the cost of producing ethanol from corn stover through gasification and from other methods had been conducted. Paul

Grabowski replied that such comparisons had been conducted but that more research on the matter is still needed.

William Guyker asked if there were size limitations to the gasification process. Paul Grabowski stated that there were size limitations, but that they depend upon the specific system being discussed.

Merlin Bartz asked whether or not the list of products from gasification in the presentation was all-inclusive. Paul Grabowski responded that it was only a representative list and that several other products could be included.

Terry Jaffoni asked if Fisher Tropsch technologies were complimentary or competitive. Paul Grabowski stated that they were complementary. Robert Dorsch clarified that the technology was complimentary but that the products created from them were competitive.

Robert Boeding asked about the difference in energy densities of biomass and coal. Ralph Overend responded that biomass is bulky and therefore comparison by volume would be in favor of coal, largely due to the high moisture content of biomass feedstocks. Where the heat content of coal ranges from 8,000-13,500 Btu/lb, biomass ranges from 2,500-4,000 Btu/lb on a wet basis.

Bill Horan asked if the 20% increase in cost of gasified biomass was due to insertion equipment, procurement, and storage. Paul Grabowski responded that the increase in cost was due to institutional issues such as funding, congressionally directed funds, and budget constraints.

Kim Kristoff began a discussion of landfill garbage to gas. Larry Walker stated that a large percentage of energy in the northeastern U.S. came from landfills. Paul Grabowski replied that the Program has stayed away from the garbage to gas issue thus far. Also, EPA has a very active Landfill Gas Outreach Program.

William Guyker asked if gasification technology was ready for a commercial launch. Paul Grabowski replied that the goal was to incorporate industry involvement from the beginning. William Nicholson stated that a vendor to build the system and a company to fund the system would be needed to commercialize the technology. Mr. Grabowski agreed.

Additional discussion on gasification technology occurred.

Paul Grabowski also gave a presentation on Cofiring (*Attachment I*). Mr. Grabowski began with the history of cofiring technology and definitions of terms associated with cofiring. He then discussed the benefits that result from the cofiring of biomass, and explained the Cofiring Programs goals and barriers. Mr. Grabowski concluded with a description of projects and tests that relate to cofiring.

Merlin Bartz asked if cofiring could be used to reduce the amount of energy used in a given process. Paul Grabowski responded that biomass can be burned to produce heat to use in a separate process.

Kim Kristoff asked how remaining charcoal is being removed in plants. William Guyker replied that it is oxidized.

William Guyker questioned whether or not DOE had done combustion equations with different fuel sources. Paul Grabowski responded that DOE has examined various feedstocks for cofiring.

#### **J. Open Committee Discussion on R&D Presentations**

Terry Jaffoni asked for any questions or comments from the Committee on the presentations given during the meeting.

Thomas Binder asked if a cost analysis was available of gasification and the sugar platform so that the Committee could decide to give priority to one or the other. DOE would investigate.

Gary Pearl asked where the reports referenced in the presentations could be found. Paul Grabowski replied that they are available online.

Kim Kristoff questioned whether or not one means of generating ethanol would improve its use as an energy source. Ralph Overend responded that gasification and fermentation are essentially the same. He stated that gasification converts all materials into energy but requires a power source, whereas fermentation does not require a power source but does not convert all materials into energy.

#### **K. Presentation on the Matrix for Tracking the Progress of Joint Biomass Research/Open Discussion and Feedback on the Tracking Matrix**

Melissa Klembara of BCS gave a presentation on the Matrix for Tracking the Progress of Joint Biomass Research (*Attachment J*).

Jim Spaeth informed the Committee that some of the information surrounding Joint Solicitation proposals is proprietary and cannot be shared. He said that the 2002 solicitation resulted in 6 DOE awards and 2 USDA awards; the 2003 solicitation resulted in 4 DOE awards and 15 USDA awards; and that the agencies plan on issuing approximately 20 awards combined for the 2004 solicitation.

Chairman Ewing raised the issue of the types of entities being awarded requests for full proposals and funding. He was concerned that awards were being granted to larger corporations and that there was little to no involvement from small companies and universities. A debate amongst several Committee members and government representatives ensued. Kim Kristoff agreed with Chairman Ewing that the average

award amount should come down and that smaller entities should be considered. Mr. Spaeth responded that there is no bias in the decision-making process and that applicants are selected based solely on their ability to fulfill the goals outlined in the solicitation. Merlin Bartz commented that demonstration projects require more sophisticated capabilities and larger amounts of money, both of which are usually found in larger corporations. Don Richardson and Robert Dorsch concurred. Robert Boeding and William Guyker agreed that what is important is the value of the contribution the project will make and that the intellectual property result in the public domain, not the size of the entity that the award goes to.

William Guyker suggested that the goal to increase the market share in biopower is not being met by the projects chosen in the solicitation. John Ferrell responded that an increase in market share must be achieved through policy incentives, not through R&D alone. Merlin Bartz stated that two USDA proposal categories, Environmental and Economic Performance and Incentives, attempted to address this issue and asked that the Committee give additional guidance on how to better achieve this. Kim Kristoff suggested that an outside entrepreneur be included in the review process. Carolyn Fritz suggested that this discussion focus on the market goals laid out in the *Vision* and the technical barriers and strategies outlined in the *Roadmap*. She suggested that the joint solicitation projects be evaluated in terms of their progress in overcoming those technical barriers and helping to achieve the Committee's *Vision* goals. Bill Horan and other members concurred.

Terry Jaffoni stated that it would be helpful to see the proposals submitted in this year's solicitation, not just those who were awarded funding. Merlin Bartz, Jim Spaeth, and John Ferrell said that this may be a possibility after the final awards are granted. It was suggested that the June 2004 meeting be moved to July 2004 so that the results of the solicitation could be made available during the meeting. The Committee concurred and the June 17, 2004 was officially moved to July 13-14, 2004.

The Committee discussed an agenda for the July meeting. It was decided that the Committee's position on hydrogen and solicitation criteria would be the two major topics for the meeting. It was decided that the meeting would take place on the 13<sup>th</sup> and until approximately noon on the 14<sup>th</sup>. The Committee requested the solicitation criteria and background information on the hydrogen issue, including the NRC report and a report from the Administration.

Kim Kristoff asked whether or not members who have not attended any meetings should be allowed to continue serving on the Committee. John Ferrell responded that the new members should be excused from missing the first meeting due to short notice and that he would check the expiration date of other members' terms and decide from there.

Chairman Ewing excused himself.

Terry Jaffoni asked for other comments or new items for discussion. There was no response.

## **L. Presentation on Bioindicators: Tracking the Status of Vision Goals**

Melissa Klembara gave a presentation on Bioindicators: Tracking the Status of Vision Goals (*Attachment K*).

Jack Huttner asked if bioproduct had been defined. Kim Kristoff asked about available indicators. Melissa Klembara answered that the definition of bioproducts used for tracking of the Committee's goals was in line with the Committee's original baseline data. The data was gathered by following the original sources used to develop the baseline. Specific articles, however, which were found in journals or industry magazine sources such as *Chemical Market Weekly*, are not always available on an annual basis, if at all. The data sources, therefore, are not consistent from year to year. The data is also subjective to interpretation because it is unclear for certain chemicals the amount actually derived from biomass. The only true bioproducts indicator currently available would be to gather the information on a company-by-company volunteer basis. Terry Jaffoni asked if bioproducts were defined in the *Vision*, and if the Committee should develop a definition. Mr. Huttner responded that only biochemicals have been identified and that a baseline could be how much of a particular biochemical has gone towards the creation of bioproducts. It was decided that an ongoing discussion of the definition of a bioproduct and creation of economic indicators should ensue, but that it would not yet be an action item.

## **M. Meeting Adjournment**

Terry Jaffoni asked for other comments or questions. None were received. Ms. Jaffoni adjourned the meeting.

**ADDENDUM A**

**Biomass Research and Development Technical Advisory Committee Meeting  
November 6, 2002**

**ATTENDEES**

**Committee Members Present**

Tom Ewing	Bill Horan
Terry Jaffoni	Jack Huttner
Tom Binder	Kim Kristoff
Robert Boeding	David Morris
Jerrel Branson	Bill Nicholson
William Carlson	Gary Pearl
Robert Dorsch	Bill Richards
Carolyn Fritz	Larry Walker
William Guyker	John Wooten
John Hickman	

**Committee Members Not Present**

Wayne Barrier	Charles Goodman
Roger Beachy	Brian Griffin
Dale Bryk	Pat Gruber
Ralph Cavaliere	Delmar Raymond
Joseph Chapman	Philip Shane
Roger Fragua	

**Federal Employees Present**

Sharon Ashurst - USDA	Doug Kaempf – DOE
Merlin Bartz – USDA	Mike Kossey – USDA
Stan Bower – NREL/DOE	Amy Miranda – DOE
Roger Conway – USDA	Ralph Overend – NREL
Marv Duncan – USDA	Larry Russo – DOE
Don Erbach – USDA	Rachel Samuel – DOE
Frank Flora – USDA	Jim Spaeth – GFO
John Ferrell – DOE	Gloria Sulton – DOE
Paul Grabowski – DOE	Todd Werpy – DOE
Nancy Jeffery – DOE	

Total Public Attendees – 12

Total Attendees – 51

Designated Federal Officer – Don Richardson

## ADDENDUM B

**Public Meeting of the  
Biomass Research and Development Technical Advisory Committee  
March 11, 2004  
Hilton Hotel, Dewey Room  
Crystal City, VA  
Discussion Agenda**

### **Description of subjects of this meeting:**

The Biomass R&D Technical Advisory Committee will meet to obtain an overview of progress and the history of research efforts in major biomass technology areas. The Committee also will receive updates on the status of the USDA – DOE joint solicitation for biomass R&D, activities to promote federal procurement of biobased products, and method for tracking progress of research awards under the joint solicitation.

### **Previous decisions or actions related to this agenda:**

During the Biomass R&D Technical Advisory Committee's October meeting, the Committee finalized its recommendations to the Secretaries of Energy and Agriculture concerning the federal biomass R&D portfolio and the joint solicitation. The Committee requested that DOE and USDA develop a method for tracking the progress of research projects awarded under the joint solicitation to facilitate future Committee evaluation. Committee members also requested a presentation on historical progress of research in major biomass technology areas.

### **Agenda**

#### **March 9<sup>th</sup>**

Orientation meeting for new members. Current members do not need to participate. This meeting will take place via conference call at 3:00pm EST.

#### **March 11<sup>th</sup> Biomass R&D Technical Advisory Committee Meeting**

8:00 – 8:30 Continental Breakfast

8:30 – 9:00 Federal Advisory Committee Conflict of Interests Briefing –*Gloria Sulton, Attorney-Advisor, Department of Energy and Rachel Samuel, Federal Advisory Committee Manager, Department of Energy*

9:00 – 9:15 Welcome and Overview of Agenda – *Thomas Ewing, Committee Chair*  
- Special Welcome to Terry Jaffoni Committee Vice Chair and New Committee Members; Roundtable Introductions  
- Committee Accomplishments  
- Overview of Agenda

9:15 – 9:45 *Merlin Bartz, U.S. Department of Agriculture, Marv Duncan, U.S. Department of Agriculture, and Roger Conway, U.S. Department of Agriculture*  
- Status of FY 2004 Joint Solicitation  
- Update of USDA Activities to Promote Federal Procurement of Biobased Products

9:45 –10::00 *John Ferrell, Former Designated Federal Officer, Department of Energy*  
- Introduction of Don Richardson as the New Designated Federal Officer  
- 2004 Committee Work Plan (Don Richardson)

10:00 – 10:45 Open Committee Discussion on Goals for June meeting and Clarification of Committee’s position on Biomass-to-Hydrogen – *Committee Chair, Thomas Ewing*

10:45 – 11:00 Break

### **Past Research in Major Biomass Technology Areas**

11:00 –12:15 Cellulosic Ethanol – *John Ferrell, U.S. Department of Energy and Cindy Riley, National Renewable Energy Laboratory*

12:15 – 1:15 Lunch

### **Past Research in Major Biomass Technology Areas**

1:15 – 2:00 Gasification – *Paul Grabowski, U.S. Department of Energy and Kevin Craig, National Renewable Energy Laboratory, Paul Grabowski presenting*

2:00 – 2:15 Break

### **Past Research in Major Biomass Technology Areas**

2:15 – 3:00 Cofiring – *Paul Grabowski, U.S. Department of Energy and Sean Plasynski, National Energy Technology Laboratory, Paul Grabowski presenting*

3:00 – 3:30 Open Committee Discussion on R&D presentations – *Committee Vice Chair, Terry Jaffoni*

3:30 – 4:00 Presentation on 1) Matrix for Tracking Progress of Joint Biomass Research, and 2) Bioindicators: Tracking the Status of Vision Goals - *Jim Spaeth, Golden Field Office, Glenn Carpenter, USDA/NRCS, and Melissa Klembara, BCS, Incorporated*

4:00 – 4:15 Open Committee Discussion and Feedback on R&D Tracking Matrix and Tracking of Vision Goals – *Committee Vice Chair, Terry Jaffoni*

4:15 – 4:45 Closing Committee Comments and Next Steps – *Committee Chair, Thomas Ewing*

4:45 – 5:00 Public Comment

5:00 Adjourn



