

Summary:

**Biomass Research & Development
Technical Advisory Committee
Meeting
November 29-30, 2005**

January 16, 2006

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Meeting Summary

Day One: November 29, 2005

A. Purpose

On November 29-30, 2005, a Biomass Research and Development Technical Advisory Committee (Committee) quarterly meeting was held at the Washington Marriott in Washington, DC. 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 fourth Committee meeting held during the 2005 calendar year. The Committee members came to the meeting to review its *Vision* and *Roadmap* subcommittee's work revising the *Vision* document; to compile and vote on annual recommendations to the Secretaries of Energy and Agriculture; to hold a joint meeting with the Interagency Biomass R&D Board; and to discuss its 2006 Work Plan, future subcommittees, and membership. A list of attendees is provided in Addendum A.

B. Welcome and Overview of the Agenda

The meeting was chaired by Terry Jaffoni. Chairman Thomas Ewing's Committee membership is temporarily in advisory status only, pending correct renewal of current members. Chairwoman Jaffoni called the meeting to order, and gave an overview of the agenda (Addendum B).

Chairwoman Jaffoni distributed a copy of a letter from Committee member David Morris to Secretary of Agriculture Michael Johanns and Senators Harkin and Lugar on the Committee's behalf. The letter concerns the USDA Biobased Procurement program, and its definition of biobased materials (Attachment A). Chairwoman Jaffoni asked whether there were any questions. There were none.

C. Presentation from Designated Federal Officer Neil Rossmeissl

Neil Rossmeissl of the Department of Energy (DOE) Office of the Biomass Program (OBP) gave a presentation (Attachment B). As Designated Federal Officer (DFO) to the Committee, Mr. Rossmeissl provided an update on general Committee matters. This included a discussion of the November 9, 2005 *Vision* Update Workshop at Argonne National Laboratory in Argonne, Illinois. In addition, Mr. Rossmeissl gave an overview of the annual recommendation process, recommended a revision to the Committee's statement on the net energy balance of ethanol, and recommended the addition of subcommittees for policy and analysis. Mr. Rossmeissl passed on two requests: that the Committee refer a member to attend the December 6-8 Office of Science – Office of the Biomass Program workshop as an observer, and that the members review the Office of the Biomass Program Multi-Year Program Plan and provide comments and feedback.

Neil Rossmeissl suggested that the Committee use the joint meeting with the Interagency Biomass Board, scheduled for later in the afternoon, as an opportunity to get their questions addressed. In particular, the outcome of the *Vision* Update Workshop, and the Committee's plans for further review of the outcome, should be discussed. Experts selected by the Committee and BCS, Incorporated could provide independent feedback on the goals selected. Though the workshop provided for many perspectives, DOE and USDA management have questioned whether the targets are aggressive enough. Therefore, the final summary of the workshop's outcome should be further reviewed. Mr. Rossmeissl said that Tom Binder, *Vision* and *Roadmap* subcommittee chair, was presenting the revised goals to the Board members later in the day. Before this joint meeting, Mr. Rossmeissl wanted the Committee to agree on the update process, and on a plan for three regional *Roadmap* update workshops in 2006.

Mr. Rossmeissl hoped that the Committee would generate all its annual recommendations to the Secretaries of Agriculture and Energy during the quarterly meeting. These recommendations should consider Committee member David Morris's letter, as well as a possible update to the ethanol statement recommended at the last Committee meeting on October 3-4, 2005. Mr. Rossmeissl recommended the addition of a paragraph for a more forceful statement (Attachment C).

Because the *Vision* and *Roadmap* subcommittee has been successful, Mr. Rossmeissl recommends policy and analysis subcommittees to guide further work in those areas.

The Office of Science and the Office of the Biomass Program will hold a joint workshop December 6-8, 2005. A member of the Committee has been invited to attend the closed-door event as an observer, to report back to the Committee at its next quarterly meeting.

The Office of the Biomass Program provided its Multi-Year Program Plan to the Committee, and would like comments on the document as part of an external review submitted prior to December 31, 2005.

Biomass Committee Membership for 2004 is still in approval, requiring a signature from both the Department of Energy and Agriculture. The 2005 package has been provided to senior staff at both DOE and USDA, and will soon enter the approval process.

William Carlson asked whether the 2004 package was still being approved. Neil Rossmeissl responded that it was. Chairwoman Terry Jaffoni asked whether new members could be considered available for subcommittee membership prior to their approval. Mr. Rossmeissl said they could. Mr. Carlson asked when members with terms expiring in 2005 actually expire. Mr. Rossmeissl responded this would take effect at the end of the meeting. He intends to inform the members concerned when the 2005 process is final.

D. *Vision* Document Update

Tom Binder, *Vision* and *Roadmap* subcommittee chairman, gave a presentation on the *Vision* document update process, and the outcome of the subcommittee's *Vision* Update Workshop (Attachment D). Dr. Binder discussed some of the major *Vision* changes suggested at the Workshop, including the addition of 2015 goals; a revised and more detailed definition of biobased products; and the need to recognize other benefits of an biomass industry, including domestic job creation and the revitalization of the domestic chemical industry. Dr. Binder said that one weakness of the update process is that no representative from the petroleum industry was in attendance at the Workshop.

Neil Rossmeissl added that there are several needs regarding the revised *Vision* document:

- quantifiable metrics for biobased products;
- a plan for achieving the biobased power goal;
- a concise statement on the *Vision* update from the Committee to report to the Board; and
- a *Vision* document for the Committee and Board to accept, on which to base the planned *Roadmap* workshops.

Tom Binder stated that, in order to address the biopower issue, the Committee needs information on black liquor from DOE.

Terry Jaffoni asked for comments on the Executive Summary (Attachment E). William Carlson asked Tom Binder whether any 2050 goals had yet been set, as outlined in the summary. Dr. Binder answered that ranges for 2050 goals in biofuels, biopower, and bioproducts had been discussed, but not finalized. Neil Rossmeissl added that range goals were hard to solidify. Dr. Binder clarified that there had been debate about the types of fuel included, and the delineation of a future path for biopower. Ralph Cavalieri asked why the Committee had been previously provided both three- and six-page summary documents. Michael Manella of BCS, Incorporated responded that the two were subsequent revisions of the same document.

Tom Binder noted that a biofuel goal had been removed, which was necessary for defining an agricultural product. Philip Shane thought that the definition of agricultural products as those coming from wheat and corn, rather than cellulose, and used as petroleum replacements in chemical production, was lacking. Research with both cellulose and grain should be funded. Neil Rossmeissl asked the Committee to consider the definition of bioproducts. Originally, only certain targeted only chemicals and materials were involved in the measurement, but their terminology is vague. Neil Rossmeissl also suggested that data is needed on the sustainable production of ethanol from grain feedstocks alone, including the full potential of corn ethanol, with current estimates at twelve to eighteen billion gallons. At this time, industry estimates for future ethanol production are based on lignocellulosic production, because funding exists in that area. Tom Binder responded that it is unknown which R&D areas will be funded to increase ethanol production from certain biomass feedstocks, and that uncertainty then affects growers' crop choices. Mr. Rossmeissl suggested that the updated *Vision* should include such assumptions. Tom Binder stated that radical document updates for the year

2010 would cause a bioproducts price increase. Chairwoman Terry Jaffoni agreed that ethanol would also see this price increase. Philip Shane was satisfied with the goal of twelve billion gallons of ethanol, which he believes is easily achievable with current soybean crops. However, an increase in natural gas pricing would negatively affect this.

Gary Pearl asked the Committee to consider that corn and soy byproducts are also used in livestock production. Fats and oils from animal production then constitute one-quarter of the oil produced in the United States, and are heavily involved in biodiesel production. He noted that current tax incentives are not available for the production of biodiesel from certain feedstocks. Great opportunity for biodiesel markets exists because poultry production, and corresponding fat production, has increased.

Dr. Binder stated that cotton and sugar programs will not lose support. While corn growers currently enjoy a profit with ethanol, that difference is made up with a loan payment. Dr. Binder asked how that difference was accounted for on the Federal side. William Carlson noted that grain-based research and development is not currently federally supported. When attempting to increase production from eight to twelve billion gallons, it is only appropriate for research to focus on cellulosic production if it supports the long-term *Vision* goals. Dr. Binder stated that when the net price of corn for ethanol production changes, the price of co-products change, and Chairwoman Jaffoni said that corn price increases can shut down ethanol plants. Merlin Bartz said that the Loan Differential Payout is approximated fifty-one cents per gallon and that co-op members, or ethanol stock owners, could hedge bets on the price of ethanol.

Tom Binder stated that by 2030, most starch and oil crops would need to be used for biofuel and bioproduct production. Philip Shane responded that crops used as animal feed are not subject to technical information tracking and are not used in research. Neil Rossmeissl stated Dr. Binder would have to report to the Committee on future decisions regarding the definition and measurement of bioproducts. Further analysis is also necessary for the cost of producing power from biomass versus coal, and the funding necessary to make biomass technology geographically available. The analysis could take place at the upcoming 2006 regional meetings, which are a follow-on to the USDA-DOE *Study for a Billion-Ton Biomass Feedstock Supply (Billion-Ton study)* document.

Chairwoman Terry Jaffoni asked the Committee whether they thought the Executive Summary should emphasize certain areas for research funding. Tom Binder responded that the four percent biopower goal would not be achievable without the use of black liquor. Kim Kristoff added that current information on bioproducts is not available, and that freight for biofuels and bioproducts should be considered. Chairwoman Jaffoni said crops used in biofuels production could sometimes be more expensive locally. Wayne Barrier suggested setting the biofuels goal high enough to force the use of cellulosic feedstocks.

Chairwoman Terry Jaffoni asked whether the new goals needed to be raised. The Energy Policy Act of 2005 (EPAAct) set a biofuels mandate of seven and a half billion gallons by 2012. She felt that six percent is reasonable for 2015, but would like to see a higher

number. William Carlson thought that the biopower goal was very aggressive, and approved this approach. Philip Shane felt the goals were achievable and sensible. Robert Boeding advocated a funding increase. Ralph Cavalieri agreed, and thought a policy subcommittee would aid in focusing the Committee's advice externally. Tom Binder felt the goals could be raised during the review process, as well.

Chairwoman Terry Jaffoni asked whether the Committee was ultimately comfortable with the targets set in the Executive Summary. Kim Kristoff responded that industry will achieve what is necessary, and that consumer education is paramount. Ralph Cavalieri stated that industry is less than halfway to some of the goals. Chairwoman Jaffoni noted that limited funding forces some areas to the forefront. She asked who would be involved in a peer review of the Executive Summary. Tom Binder responded that independent experts are necessary, but that selection has not begun. He said he would like an analysis of the energy available for biomass fuels, power and products, based on the *Billion-Ton* study assumption that 1.3 billion tons of biomass are available.

Gary Pearl asked how a negative study of net energy balance would influence the goals. Ralph Cavalieri felt that regardless, the fossil fuel supply will run out, and that only cutting-edge research will profit when it does. At this time, education of students in biochemistry will aid future research significantly. Neil Rossmeissl responded that in discussion with the National Science Foundation, he has found that they are not aware of this specific issue, because industry has not expressed the need. This could influence school curriculums. Dr. Cavalieri thought that curriculum is not directly affected, but that faculty expertise and research is. Tom Binder added that chemical companies such as DuPont and Dow are investing overseas, while only domestic crop production can increase the incentives for the education of chemical engineers in the U.S. Terry Jaffoni agreed that much has changed since the creation of the original *Vision* document, and that the oil supply has changed concurrently. Kim Kristoff said that chemistry curricula should focus on alternatives. Robert Boeding noted that three years ago, Douglas Faulkner of DOE endorsed a hybrid education program in Iowa, and it has since come to fruition. Dr. Cavalieri appreciated this example, and noted that grant opportunities for faculty researchers in plant science has decreased in this time. National Institutes of Health grant opportunities have increased.

Chairwoman Terry Jaffoni asked Neil Rossmeissl to discuss the process for the full *Vision* update. Mr. Rossmeissl responded that, prior to creation of a new *Vision* document, the Committee members should individually submit any points valuable to the document to Mike Manella with BCS, Incorporated over the next two weeks. That input will be reviewed by the *Vision* and *Roadmap* subcommittee to determine what will be included in the document, and what is more appropriate for the *Roadmap* update. Input provided at today's meeting has been captured. The Committee voted to accept the revised *Vision* targets as they are for presentation to the Board.

Chairwoman Terry Jaffoni commended the work of the *Vision* and *Roadmap* subcommittee, and chairman Tom Binder. With Committee concurrence on the

document, it would be presented to the full Board. Tom Binder thanked the subcommittee, and the experts who attended the *Vision* Update Workshop.

The Committee broke for ten minutes.

E. Generation of Annual Recommendations to the Secretaries

Chairwoman Terry Jaffoni directed the Committee to review recommendation suggestions submitted by members of the Committee prior to today's meeting. (Attachment F). The Committee was asked to add recommendations according to the Biomass R&D Act of 2000, EPAct, and future issues.

As one of the draft recommendations recommended resubmitting items from last year that the Committee feels were not adequately addressed, William Carlson suggested reviewing each fiscal year (FY) 2004 recommendation to determine whether or not there is a need to resubmit each. This activity was conducted prior to the generation of new recommendations.

The Committee took a working lunch, and continued discussion of annual recommendations. The recommendations were compiled into major points for discussion with the Board, in the categories of Joint Solicitation, Research and Development, and Overall Recommendations.

The Committee broke for ten minutes.

F. Joint Meeting with the Interagency Biomass Research and Development Board

Chairwoman Terry Jaffoni welcomed the members of the Board and thanked them for their participation. She outlined three topics of discussion:

- Recommendations on the joint solicitation process
- Report on annual recommendations to the Secretaries
- Update of the *Vision* and *Roadmap* documents

Tom Binder, chair of the *Vision* and *Roadmap* subcommittee, described the outcome of the *Vision* update workshop, and the Committee's discussion, to the Board. Chairwoman Jaffoni welcomed any discussion throughout the joint meeting.

Chairwoman Terry Jaffoni began a review of the Committee's annual recommendations thus far (Attachment G) with the section regarding the joint solicitation:

1. **Where appropriate, projects should be incrementally funded.**

DOE Acting Assistant Secretary for Energy Efficiency and Renewable Energy, Douglas Faulkner asked whether the incremental funding process had been discussed with Federal representatives from the DOE or USDA. Neil Rossmeyssl responded it had. Merlin Bartz explained that USDA funds are usually set aside in one increment. USDA Under Secretary for Rural Development Thomas Dorr added that obligations funded according to milestones are not the norm, though DOE practices may differ.

2. **Reduce minimum amount of qualifying funds to \$150,000 for individual projects, allowing a greater number of awards in a wider topic range.**

Douglas Faulkner asked whether there was not a 20-80 percentage split in funding with industry projects. Neil Rossmeyssl responded this is true, but that the Committee's concern is with cost-share decreasing the overall amount of award funding available.

3. **Consider previous years' recommendations still applicable.**

Chairwoman Terry Jaffoni explained that the recommendations presented had included the previous years' recommendations that still applied.

4. **Announce the joint solicitation results earlier.**

Chairwoman Terry Jaffoni expressed the Committee's concern that joint solicitation award recipients were already known prior to the official award announcement. Douglas Faulkner asked how companies would get this information. Neil Rossmeyssl indicated the USDA process was different. Merlin Bartz corroborated that the USDA administration of the 2005 joint solicitation had involved a delay in Board approval of the awards. An announcement regarding the Secretary's schedule contained some awardees' information. He believes awardees would benefit from a timely disclosure. Mr. Rossmeyssl added that DOE administration of the joint solicitation in 2006 should minimize delays in the process.

Chairwoman Terry Jaffoni continued with discussion of the recommendations regarding research and development.

1. **Achievement of *Roadmap* goals will require more funding. Specific amounts for the funding will be outlined in future Committee reports. The consequences of under-funded research should be outlined for the Secretaries.**

It has been noted that funding for biomass R&D decreases annually, and Chairwoman Jaffoni is aware that the latest request for \$91 million will be significantly impacted by Congressionally-directed funds. Douglas Faulkner appreciated the emphasis on the impact of these funds.

2. **Define full research, development, and large-scale demonstration pathway when setting funding level.**

Douglas Faulkner noted that the joint solicitation process requires that projects lay out their complete pathway plans when submitting proposals.

3. **A subcommittee should meet with the Freedom Car program to exchange information regarding fuel and vehicle programs.**

Douglas Faulkner asked whether the Committee had ever received a briefing from the Hydrogen Programs. He advocated discussing research with both the Hydrogen and Freedom Car programs. The Committee had received updates from the Hydrogen Program when forming its recommendation on biomass as a transition fuel to the hydrogen economy. Chairwoman Jaffoni expressed that further communication with the Hydrogen and Freedom Car programs, and associated advisory committees, was a good idea.

4. **Channel R&D to address issues or new opportunities for the utility of biofuels.**

There was no discussion of this point.

5. **The Committee sees a need to further research on incentives programs and other vehicles to stimulate biobased products growth.**

Chairwoman Terry Jaffoni stated that the 2005 EPAct 2005 mandates an increase in biofuel consumption, but that improving engine technology and infrastructure for the increase are not addressed in the funding.

6. **Recognize the importance of basic sciences for the success of the biomass program.**

Douglas Faulkner asked what was meant by basic science education. Chairwoman Jaffoni explained that public education is important. Thomas Dorr suggested the program utilize studies of previous loan guarantee programs and incentives to analyze for their effect. Thomas Binder suggested that a program in South Africa also would produce important information. Chairwoman Jaffoni thought that the effect of prohibition on ethanol production was important to investigate. Chairwoman Jaffoni responded to Thomas Dorr's advocacy of using lessons learned by suggesting a future analysis subcommittee could use the opportunity. Neil Rossmeissl added that the type of hybrid science education previously advocated by Douglas Faulkner should be used as a good example for future higher education. Thomas Ewing said that university researchers are too petroleum-focused. OFEE representative Dana Arnold said that she knew that EPA had previously provided funding for curriculum generation and might be able to assist with the Biomass Program with this.

Chairwoman Terry Jaffoni moved on to the Committee's Overall Recommendations.

7. Continue funding for the thermochemical platform.

Funding for the thermochemical platform has varied in the past and the Committee emphasized the need to utilize lignin for power and/or products. This would reduce wet/dry corn mill reliance on costly natural gas, and make cellulosic ethanol more economically attractive. This includes biomass conversion technologies such as gasification and pyrolysis.

8. The Committee has lost the benefit of having the 2004 members' participation. Expedite the approval process for future membership packages.

The Committee's lack of some members due to delays in the approval process has negatively impacted the group's focus. Douglas Faulkner apologized for the delays, which have affected all DOE advisory committee membership packages.

9. To recognize the necessity and encourage an increase in the number of university faculty members involved in biomass R&D.

There was no discussion of this point

10. Renewed emphasis on public education and awareness. Educate not only politicians but undergraduate and graduate students.

Dana Arnold asked whether an inventory of current biomass R&D faculty exists. Ralph Cavalieri said that a funding report shows where faculty are, and that a low success rate in the biomass joint solicitation drives biomass research faculty elsewhere, such as to more numerous NIH grant opportunities. If faculty is not involved, then students and curriculum for biomass research will not follow.

Robert Boeding said that the National Association of State Land Grant Universities publishes information on its funding. Chairwoman Jaffoni said that community colleges also receive some biomass research funding. Thomas Dorr added that the University of Northern Iowa does biomass research, and is not a Land Grant school. NSF representative Bruce Hamilton contributed that NSF makes grants in biomass research, but that a systematic inventory does not exist for biomass there. Historically, biomass work has had a high success rate, but it competes generally for NSF funding. Thomas Ewing asked whether biomass or any other area is targeted specifically at NSF. Dr. Hamilton replied that nanotechnology and biocomplexity are specific targets at NSF, but that biomass does not have its own target area. Tom Binder stated that when industry is lacking in basic chemistry personnel, development in the field is non-existent. Ms. Arnold asked if other countries had advances in the field. Dr. Binder stated that Japan and Germany do. Dr. Hamilton said that basic chemistry is not targeted, but that new carbohydrate chemistry work does exist. Dr. Binder replied that with a focus on petrochemical work, all other areas are lacking in the U.S. Dr. Hamilton knew that an avenue exists for green chemistry, but it is not focused on biomass. Ms. Arnold asked whether industry approached biomass professors. Dr. Binder said that the organic chemistry focus is at NIH. Ralph Cavalieri said that NSF funding is basic, and the opportunity for applied grants for researchers very low there. Ms. Arnold asked Dr. Cavalieri whether he knew if advanced biomass projects were being funded while the Department of Commerce ran its advanced technologies funding. He did not know.

Chairwoman Terry Jaffoni further informed the Board that a letter from the Committee to Energy Secretary Bodman regarding the USDA's Biobased Procurement Program had been copied to Agriculture Secretary Johanns. The letter discusses the proposed rules excluding natural fibers from biobased procurement, and will be referenced in the annual report. Dana Arnold asked whether the exclusion is part of the mature market consideration. Chairwoman Jaffoni responded that it is.

Chairwoman Terry Jaffoni asked *Vision* and *Roadmap* subcommittee chair Tom Binder to describe the update process to the Board. Dr. Binder explained that at its July meeting, the Committee asked members to volunteer for a subcommittee to review the 2010 *Vision* goals. The subcommittee arranged for a November meeting with invited experts to do so. Most attendees at the November 9, 2005 *Vision* update workshop agreed that the original goals were valid targets. They felt that while biofuels could be achieved, biopower and bioproducts targets could not. In fact, biopower consumption has decreased, and the area needs focus. The biofuels goal for 2010 was four percent of the market, or twelve billion gallons. EPA sets a 2012 target of only eight billion. Dr. Binder feels that if twelve billion gallons are produced, it will be due to production from grain feedstocks. By 2015, industry will be forced to turn to cellulosic production of biofuels.

Tom Binder said the workshop participants experienced difficulty defining bioproducts. Douglas Faulkner asked whether the bioproducts goal was not clear enough when it defined bioproducts as those created with petroleum replacements. Dr. Binder felt that

eliminating traditional bioproducts is problematic, and that creating CO₂ tax credits for them would increase public use. Dana Arnold inquired whether the Committee sought a more specific definition than that in the USDA's Biobased Product Preferred Purchase Program (FB4P). Dr. Binder seeks only to remove the preference for new, costlier items. Ms. Arnold thought it would be hard to define this without enlarging the bioproducts definition. Dr. Binder agreed, but advocated a tax-credit incentive program, not actual dollars, which could be used to revitalize the domestic biochemistry industry. He advocated stretch goals to create industry momentum. Douglas Faulkner asked if the numbers would go higher. Dr. Binder said that 2050 ranges would be the higher numbers, and that biofuels and bioproducts goals may be changed, after a draft update has been independently reviewed in January 2006. Information about target achievability will help this revision. Douglas Faulkner asked why no market percentage goals were set with the new bioproducts targets. Dr. Binder replied that the empirical market depends on a revised definition of bioproducts. Neil Rossmeissl contributed that the DOE Office of the Biomass Program could do an accurate study for total bioproducts production data. Dana Arnold asked whether industry association data would be included. Mr. Rossmeissl said it would. Ms. Arnold said that the Department of Defense has the military using biofuels, and is examining available bioproducts as well. Chairwoman Terry Jaffoni said that a standard definition would help in quantifying production. Ms. Arnold replied that many definitions exist. Douglas Faulkner asked whether the subcommittee considered biomass-to-hydrogen energy production. Dr. Binder responded, saying it had been discussed in the 2015 and 2020 goal contexts, to be tied into R&D for that time.

Chairwoman Terry Jaffoni asked what recommendations the Board could give to facilitate Committee recommendations to the Secretaries, or improve the overall Committee process, considering EAct's prescription for the Committee's role.

Bruce Hamilton considered that communication regarding biomass across Federal agencies could be improved, either through the Board or a wider working group. In particular, the joint solicitation award information could be provided to all agencies, including Project Management contact information. Neil Rossmeissl answered that this information is included in the annual report, and its last meeting, the Committee tasked him with finding out in which biomass R&D NSF is currently involved.

OSTP representative Kevin Hurst asked whether the *Vision* goals, and Committee work, was considered in an international context. Chairwoman Terry Jaffoni responded that the Committee was created by Federal legislation, and may be more U.S.-focused. She felt that international biomass activity is important to consider, for example, in Brazil. Neil Rossmeissl added that biomass work is benchmarked against the International Energy Agency (IEA)'s goals. Douglas Faulkner stated that the Committee is on target to share its views externally, and endorse certain activities. Delmar Raymond said that budget restraints affect U.S. participation in IEA programs.

Douglas Faulkner asked when the Committee anticipated the release of its 2005 annual report, set in the context of *Vision* update and reducing the Nation's reliance on foreign oil. Chairwoman Terry Jaffoni responded that it would be timely, and that the Committee

felt its *Roadmap* workshop process in 2006 was an important undertaking, as well. Douglas Faulkner added that the context created an opportunity for both correct information and misinformation.

Thomas Dorr asked how the Committee differentiates between education and commercialization, when wind energy has approached its pricing strategies in a fundamental way to reach consumers. Kim Kristoff responded that consumers don't receive information about available renewable products and technology. Thomas Dorr considered that the term "renewable" may have an effect on consumer awareness. He recommended researching renewable energy lessons learned. Philip Shane contributed that consumers are willing to encourage tax spending for alternatives to fossil fuels but the cost-viability of renewables is not publicized, and perhaps lawmakers need to be educated as well. Tom Binder hoped R&D decisions would be made while the options are still available to the Committee and Congress. Douglas Faulkner said the DOE is hoping for help to accelerate E85 ethanol deployment. Dana Arnold noted that funding usually goes to R&D and not to deployment efforts, although the hydrogen program is an exception. Robert Boeding asked which demonstration centers are funded. Douglas Faulkner said hydrogen stations are available in Washington, DC. Dr. Binder asked whether programs for E85 pumps exist. Douglas Faulkner replied that Clean Cities has some Congressionally-directed funding. Mr. Boeding asked if the EPA cities program had experienced success. Chairwoman Terry Jaffoni clarified that the program fell under the Clean Air Act, and that most cities are in compliance, though some Ozone violation cities are not. She added that for E85 stations programs should consider that oil companies own gas stations and that car manufacturers do not educate consumers about flexible-fuel options in current vehicles. Dana Arnold contributed that car buyers are not told whether flexible-fuel options will void a vehicle's warranty.

DOI representative Peter Teensma advocated the inclusion of woody biomass and its link to biomass in the revised *Vision*. Delmar Raymond replied that along with the Healthy Forest Initiative, woody biomass has ongoing support. Mr. Teensma hoped that when 20-year land management contracts with the Department of the Interior (DOI) are updated the contracting industry would support woody biomass efforts. William Carlson said that stewardship contracts don't guarantee sufficient materials for biomass facilities. Thomas Dorr replied that facilities would be financed through the Loan Guarantee program. Mr. Carlson thought that with pricing incentives, a better fuel would be produced, and stated that stewardship contracts do not fall under Loan Guarantees. Tom Binder responded that the revised *Vision* and *Roadmap* documents will include all resources, such as woody biomass.

Robert Boeding asked whose idea the Iowa State hybrid biomass science training program had been. Douglas Faulkner responded that the idea came out of the biobased products *Vision* and *Roadmap*, which highlighted a need for cross-disciplinary personnel. He added that it was implemented with limited funding. Mr. Boeding informed the Committee that the practice has expanded to other universities and industry. Ralph Cavalieri considered that it is difficult to bring faculty across department lines for these collaborations. Delmar Raymond said that at the University of Maine, a resource

commission has proposed a cross-disciplinary approach, though facilities are necessary for future deployment.

Thomas Dorr stated that he remembers the organization of the original Biomass R&D Technical Advisory Committee, and that the group has made significant progress since then, approaching what he considers its own pre-commercialization stage. Douglas Faulkner agreed, and said that from this first Board meeting as co-chair with Thomas Dorr, he looks forward to their involvement together. Committee Chairwoman Terry Jaffoni believed the Committee, which has been making biomass recommendations for years, now has the energy to achieve external energy policy goals. She thanked the Board for their input.

G. Public Comment

Chairwoman Terry Jaffoni asked for any public comment. There was no public comment.

H. Adjournment of Day One

Delmar Raymond moved to adjourn the meeting. Ralph Cavalieri seconded the motion. Chairwoman Terry Jaffoni thanked the Committee for being present and adjourned the meeting.

Day Two: November 30, 2005

I. Discussion of the 2006 Work Plan

Chairwoman Terry Jaffoni referred the Committee to the suggested 2006 meeting dates provided in their briefing materials (Attachment H). Thomas Ewing considered that a meeting should be held in Chicago, possibly to coincide with the BIO 2006 conference, during April or May. He suggested the next meeting be held in July or August, and the Committee agreed that this meeting could also be a west-coast venue for the *Roadmap* workshop. With the updated *Vision* due for completion in March, a February or March meeting would not include a *Roadmap* workshop, and could be held concurrently with a site visit at the National Renewable Energy Laboratory in Golden, Colorado. The Committee agreed that the fourth quarterly meeting should be a regular meeting as well, and Neil Rossmeyssl advocated that at least one meeting should take place in Washington, DC. Ralph Cavalieri and others requested that suggested meeting dates be e-mailed with clarification regarding the time of day, in order to facilitate travel.

Neil Rossmeyssl asked that comments on the MYPP be an added item of business for the first 2006 meeting, in February or March. The *Vision* will also be finalized at the first meeting. Chairwoman Terry Jaffoni asked for further comment, and stated that the Committee approves the 2006 Work Plan (Attachment I).

J. Public Comment

Chairwoman Terry Jaffoni asked for any public comment. Jetta Wong of the Environmental Study Institute (ESI) requested speaking time, which was granted. As a policy analyst for the agricultural and environmental program, she helps stage twenty to thirty congressional briefings annually on related issues. Her colleague Carol Warner asked that certain points be conveyed the Committee. ESI feels that when the net energy balance of ethanol issue is discussed by the Committee, it unnecessarily emphasizes incorrect information. Ms. Wong hoped that any studies' peer review done according to Committee recommendations should have publicity matching that for Pimental's work. ESI would like to increase public awareness of biomass and environmental groups. Ms. Wong will be working on a hybrid vehicles initiative in January 2006, and will provide information to Committee members. Finally, in 2007 and 2008, ESI will be involved in discussion of the new Farm Bill, which could involve revised bioproducts language.

Robert Boeding asked how the positive net energy balance of ethanol is promoted by ESI. Jetta Wong responded that with plenty of positive energy balance studies, publicity for Michael Wang's work is the most effective at this time. Kim Kristoff hopes that the Committee will work with ESI to bring important issues to the Congressional forum. Ms. Wong replied that she endorsed cooperation between these groups. Neil Rossmeissl asked if there is any reason why ESI has not yet requested support from the Committee. Ms. Wong knew that individual Committee members have previously contacted ESI, and that there is no reason why the two groups can't be in more contact in the future.

Merlin Bartz of the USDA Natural Resources Conservation Service addressed the Committee. Since his first Committee involvement in 2002, the Biomass Initiative has conducted four successful joint solicitations. Resources pooled between DOE and USDA have enhanced interagency communication. Over this time, 40 proposals, totaling \$47 million have been funded via the USDA. Committee requests such as joint solicitation matrix tracking and better cooperation with the USDA on biomass issues have been fulfilled. Mr. Bartz presented William Hagy, of the Office of Rural Development at USDA, as the new point of contact to the Committee. Chairwoman Terry Jaffoni thanked Mr. Bartz and Mr. Hagy for their work.

K. Discussion of Policy and Analysis Subcommittees

Designated Federal Office Neil Rossmeissl reminded the Committee that while membership nominations are in process, members awaiting reappointment are still able to contribute to subcommittee projects. He asked for intended reappointees to help structure subcommittees for policy and analysis, developing the definition of these groups, and orienting incoming members to the tasks at hand. The subcommittee structure allows the production of multiple Committee products. With conference call meetings and work between the quarterly Committee meetings, the full meetings will become more meaningful interactions. He intends to suggest the distribution of new members at the next full Committee meeting.

Ralph Cavalieri asked what would be involved in the analysis group's work. Mr. Rossmeissl elaborated that scenario planning and validation of completed DOE and USDA biomass work are important factors in analysis. Delmar Raymond has been involved in many forestry roadmaps with the help of the Department of the Interior, and offered to be on the analysis subcommittee to provide input in that area. Mr. Rossmeissl welcomed his offer, and Dr. Raymond reminded him that his term expires in November 2006. Dr. Cavalieri, Terry Jaffoni, and Gary Pearl also volunteered to help with the analysis subcommittee.

William Carlson asked for a definition of policy. Mr. Rossmeissl hopes that Committee issues can be projected outward in a unified manner and that major issues can be evaluated with expert input prior to the development of a Committee stance. The analysis subcommittee will provide the framework for the policy subcommittee to project outward. Mr. Carlson, Ralph Cavalieri, Chairwoman Terry Jaffoni, and Kim Kristoff volunteered their input for the policy subcommittee. Carolyn Fritz indicated her preference for policy during a previous telephone conversation with Mr. Rossmeissl.

Ralph Cavalieri asked whether the *Vision* and *Roadmap* subcommittee would cease at the end of 2006. Neil Rossmeissl responded that the documents may still require revision to remain relevant. Chairwoman Terry Jaffoni asked whether the position of vice-chair still exists. Mr. Rossmeissl stated that it does, but that a future co-chair will be nominated to transition to the position of chair. Chairwoman Jaffoni asked who will chair the *Roadmap* workshops in 2006. Mr. Rossmeissl asked Tom Binder for recommendations for a Committee member to chair specific meetings. With three members remaining on the Committee until membership packages are approved, this transition will maintain Committee focus.

L. Adjournment of Day Two

Kim Kristoff made a motion to adjourn. Gary Pearl seconded the motion. Chairwoman Terry Jaffoni thanked the Committee for being present and adjourned the meeting.

ADDENDUM A

Biomass Research and Development Technical Advisory Committee Meeting November 29-30, 2005

ATTENDEES

Committee Members Present

Wayne Barrier
Thomas Binder
Robert Boeding
William Carlson
Ralph P. Cavaliere

Terry Jaffoni, Chairwoman
Kim Kristoff
Gary Pearl
Delmar Raymond
Philip Shane

Interim (Non-Voting) Committee Members Present

Thomas Ewing

John Hickman

Committee Members Not Present

Jerrel Branson
Carolyn Fritz
Charles Goodman
Jack Huttner
David Morris

Biomass Board Members Present

Douglas Faulkner - DOE
Thomas Dorr - USDA
Dana Arnold - OFEE
Bruce Hamilton - NSF

Biomass Board Representatives Present

Peter Teensma – DOI
Kevin Hurst - OSTP

Federal Employees Present

Merlin Bartz - USDA
Neil Rossmeissl – DOE
Melissa Klembara – DOE
Sharon Ashurst - USDA

William Hagy III – USDA
Valerie Sarisky-Reed – DOE
Georg Shultz - USDA
Bryce Stokes – USDA

Jim Spaeth – DOE
Joseph Ben-Israel – USDA
Don Erbach – USDA

Ross Davidson – USDA
Mike Kossey – USDA

Total Public Attendees – 10

Total Attendees – 41

Designated Federal Officer – Neil Rossmeissl

ADDENDUM B - AGENDA
Public Meeting of the
Biomass R&D Technical Advisory Committee
November 29-30, 2005
Washington Marriott
1221 22nd Street, N.W.
Washington, DC 20037
A & B Ballroom

Description of subjects for this meeting:

- *Vision* subcommittee's report to the Committee regarding an update to the document, followed by discussion
- Generation of Recommendations to the Secretaries of Agriculture and Energy
- Joint meeting with Interagency Biomass Advisory Board
- Discussion of topics for inclusion in 2006 Committee Work Plan
- Selection of additional subcommittees and membership

Agenda – DAY 1

November 29, 2005

8:00 – 8:30	Continental Breakfast
8:30 – 8:40	Welcome and Introduction – <i>Terry Jaffoni, Acting Committee Chair</i>
8:40 – 8:50	Update on Action Items from last meeting and other Committee business – <i>Neil Rossmeyssl, Designated Federal Officer, DOE</i> <ul style="list-style-type: none">▪ <i>Vision</i> subcommittee workshop▪ Committee Recommendation process▪ Ethanol Statement publication▪ Establishment of Policy & Analysis subcommittees▪ Invitation for Committee member to Office of Science Biomass Workshop▪ Review of MYPP
8:50 – 9:10	Review results of <i>Vision</i> update process, report on subcommittee workshop results – <i>Tom Binder, Vision and Roadmap Subcommittee Chair</i>
9:10 – 10:00	Open Discussion of <i>Vision</i> Update
10:00 – 10:30	Committee Concurrence on <i>Vision</i> goals (additional time may be allotted after the Board meeting, if necessary)
10:30 – 12:00	Selection of topics to discuss with Interagency Board and discussion of annual recommendations to Secretaries.

12:00 – 1:00	Working Lunch - Committee discussion of topics to discuss with Interagency Biomass R&D Board
1:00 – 2:00	Finalize topics for joint meeting with Interagency Board and continue discussion of recommendations to the Secretaries
2:00 – 4:30	Joint meeting with Interagency Biomass R&D Board <ul style="list-style-type: none"> ▪ Committee comments on FY 2005 joint solicitation results ▪ Committee recommendations to the Board on Biomass R&D Investment ▪ Committee recommendations for the <i>Vision</i> update ▪ Discussion of other topics
4:30 – 4:45	Public Comment
4:45	Adjourn

Agenda- DAY 2

November 30, 2005

9:30 – 10:30	Discussion of Committee and Subcommittee Membership - <i>Neil Rossmeissl, Designated Federal Officer</i> <ul style="list-style-type: none"> ▪ Identify members for Policy and Analysis subcommittees ▪ Identify incoming chairpersons ▪ Identify regional <i>Roadmap</i> chairs
10:30 – 10:45	Break
10:45 – 12:30	Develop 2006 Work Plan <ul style="list-style-type: none"> ▪ Set 2006 quarterly meeting dates ▪ Set tentative 2006 <i>Roadmap</i> regional workshop dates ▪ Select topics for meetings ▪ Set targets for subcommittee conference calls
12:30 – 12:45	Public Comment
12:45	Adjourn

Attachment A

October 6, 2005

Dear Secretary Mike Johannes, Senator Richard Lugar and Senator Tom Harkin,

We are writing to express our concern regarding a proposed rule issued by the USDA and to ask your assistance in helping the federal government avoid a potentially embarrassing situation.

Here's the background. Pursuant to section 9002 of the Farm Security and Rural Investment Act of 2002 (FSRIA), the USDA issued proposed rules on July 5, 2005.

The rules are intended to begin implementing the Congressionally mandated biobased product procurement program. Six item categories are covered. One is "bedding, bed linens and towels". Here, for the first time USDA makes explicit in rulemaking a distinction between natural fibers and biobased fibers. Although well-intended, we believe such a distinction could well burden federal efforts to substitute plant-derived materials for fossil fuel-derived materials.

The USDA maintains that the intent of section 9002, as noted in the Conference Report accompanying FSRIA "is to stimulate the production of new biobased products and energize emerging markets for those product." The agency adds, "Given that, USDA finds that it is entirely appropriate for the guidelines to exclude products having mature markets from the program..."

In the proposed rules, in the category "bedding, bed linens and towels", the agency makes this explicit, "because USDA considers wool and cotton products such as blankets to be mature products, the wool and cotton portion of these blankets is not considered to be qualifying biobased feedstock."

The USDA is also required by the to develop a voluntary labeling program for biobased products. The Agency indicated in regulation issued January 11, 2005, that the statute requires the label "to the maximum extent possible, be consistent with the guidelines in this final rule." Thus it is likely that if the distinction is in the final rules it will also be in the labeling program.

Congress clearly wanted to expand the markets for new types of plant based materials market. But our Committee believes it did not want to accomplish this at the expense of cannibalizing markets for existing types of plant based materials. The Congressional intent was to substitute plant matter for hydrocarbons as an industrial product and fuel, not to substitute one type of plant matter-derived product with another.

The argument in favor of excluding existing plant matter-derived products is to spur the commercialization of new products. That is a worthy goal. But if one plant matter-derived product substitutes for another, there is no overall economic benefit to agriculture or the nation. Nor is there, inherently, an overall environmental benefit. The benefit, both

economically and environmentally, comes from substituting an agricultural product for a fossil fuel product.

If the USDA makes a distinction between biobased and biological products then presumably, the country will begin to do the same. The sophisticated consumer would then define USDA Certified Biobased Product as meaning that it is a synthetic product, whereas a non certified product that is made of plant matter is a natural product. This itself could create massive confusion.

The Committee went on record at our recent meeting in Washington, D.C. on October 4, 2005 as opposed to the USDA discriminating against plant-derived products in its biobased procurement rules. Our concerns goes beyond the fiber designation issue to a more general unease if the interpretation means that traditional plant matter industrial products like linseed oil and linoleum would not be considered biobased.

It appears that USDA believes it has no leeway in this matter, given its interpretation of the Congressional intent. We believe the law can be interpreted as not requiring the executive branch to discriminate against existing plant matter derived products. However, given the ambiguity, we are sending this letter to both the Secretary of Agriculture and the Chairmen of the Senate Agricultural Committee.

One possible resolution would be for the USDA to delay a final decision on the question of existing products until a later date, while promulgating the uncontroversial aspects of the procurement rules.

Sincerely,

Attachment B

The Biomass R&D Technical Advisory Committee

November 29-30

Neil Rossmeissl

DOE Biomass Program

- Information provided prior to meeting
 - Status of Vision goals
 - State level incentives and mandates
 - Direction of R&D activities
- Workshop Discussion Points
 - Verified goal categories – fuels, power & products
 - Updated target years – added 2015 and 2050
 - Updated quantitative goals – minor changes from existing goals
 - Discussed whether targets will be met. Why or why not?
 - Discussed what needs to occur to reach these goals

- The Committee was asked to submit draft recommendations via email prior to today's meeting. Two Committee members responded.
- The Committee will review and add to the recommendations today and tomorrow. Recommendations may be used to generate discussion topics for the joint Board meeting.
- The Technical Advisory Committee will formulate recommendations to present to the Secretaries of Energy and Agriculture.

- (Formal Press release) – will include the original statement and discussion of the Committee – in an effort to definitively resolve the issue – and add to its recommendations on the Joint Solicitation funding that addresses the energy balance of ethanol.
- It is recommended that a non-governmental organization give the money for research.

Following the news release earlier this year regarding past studies of the net energy balance of ethanol by Patzik and Pimentel of Cornell University, the U.S. Department of Energy and U.S. Department of Agriculture have given a number of presentations on recent analyses by Sheehan and Wang of the Department of Energy, and Shapouri and Grabowski of the U.S. Department of Agriculture. These analyses demonstrated the positive net energy benefits of ethanol.

The Biomass Research and Technology Advisory Committee, upon review of the current studies and information available on the Net Energy Balance of Ethanol, would like to commend the U.S. Department of Energy and the U.S. Department of Agriculture for their study of, and work in, the net energy balance of ethanol debate.

Establishment of Policy & Analysis subcommittees

- At this meeting it is hoped that the Committee will establish Policy and Analysis subcommittees, as well as appoint points of contact for regional *Roadmap Workshops* to follow the *Vision* update.

- The Committee is being asked to provide a volunteer to participate in the Office of Science Biomass Workshop.

- The Technical Advisory Committee will receive hard and electronic copies of the MYPP at this meeting.
- Please provide feedback by December 31, 2005.
- A summary of the MYPP will be provided electronically as soon as possible.

Attachment C

Advisory Committee statement on Ethanol Net Energy Balance research

Following the news release earlier this year regarding past studies of the net energy balance of ethanol by Patzik and Pimentel of Cornell University, the U.S. Department of Energy and U.S. Department of Agriculture have given a number of presentations on recent analyses by Sheehan and Wang of the Department of Energy, and Shapouri and Graboski of the U.S. Department of Agriculture. These analyses demonstrated the positive net energy benefits of ethanol.

The Biomass Research and Technology Advisory Committee, upon review of the current studies and information available on the Net Energy Balance of Ethanol, would like to commend the U.S. Department of Energy and the U.S. Department of Agriculture for their study of, and work in, the net energy balance of ethanol debate.

The Committee recommends the agencies complete an independent peer review of the energy balance analysis funded by the Departments. If the results of this review support the positive net energy balance, the Committee will endorse these results and endeavor to have them widely disseminated to dispel all of the negative claims concerning the value of ethanol as a fuel.

Attachment D

The Biomass R&D Technical Advisory Committee's Vision: *Vision Update Workshop*

Argonne National Laboratory
November 9, 2005

David Canavera
Shulin Chen
Larry Drumm
Vernon R. Eidman
Tom Johnson
Lori Perine
Edan Prabhu
Gary Welch
Larry Walker
Mark Downing
Todd Werpy
Bryce Stokes
Roger Conway
Hossein Shapouri
Georg Shultz
Cindy Riley
Neil Rossmeissl
Melissa Klembara
Douglas Kaempf
Thomas Binder
Ralph Cavalieri
Philip Shane

MeadWestvaco
Washington State University
Biotechnology Group
University of Minnesota - St. Paul
Southern Company
AF&PA
Flex Energy
Aventine Renewable Energy, Inc.
Cornell University
Oak Ridge National Laboratory
Pacific Northwest National Laboratory
USDA - Forest Service
USDA - OCE - OE
USDA - OCE - OE
USDA - RD - BP
National Renewable Energy Laboratory
Office of the Biomass Program - Department of Energy
Office of the Biomass Program - Department of Energy
Office of the Biomass Program - Department of Energy
ADM
Washington State University
Illinois Corn Marketing Association

- Information provided prior to meeting
 - Status of Vision goals
 - State level incentives and mandates
 - Direction of R&D activities
- Workshop Discussion Points
 - Verified goal categories – fuels, power & products
 - Updated target years – added 2015 and 2050
 - Updated quantitative goals – minor changes from existing goals
 - Discussed whether targets will be met. Why or why not?
 - Discussed what needs to occur to reach these goals

- Obtain Technical Advisory Committee input on Vision Executive Summary.
- Follow-up analysis and peer review to ensure targets are valid in relation to available feedstocks, conversion technologies, etc.
- Develop draft Vision by December 31, 2005.
- Final Vision will be submitted by April 2006.

Attachment E

DRAFT
EXECUTIVE SUMMARY
VISION FOR BIOENERGY AND BIOBASED PRODUCTS
IN THE UNITED STATES

Vision Statement - "By 2030, a well established, economically viable, bioenergy and biobased products industry will create new economic opportunities for rural America, protect and enhance our environment, strengthen U.S. energy independence, provide economic security, and deliver improved products to consumers ."

Foreword - The Vision for Bioenergy and Biobased Products in the United States was created in 2002 to establish far-reaching goals to increase the role of biobased energy and products in our nation's economy. It represented the collective Vision of the Biomass Research and Development Technical Advisory Committee established by the Biomass R&D Act of 2000. The Vision update is an appraisal of our nation's progress towards the original targets and is a mandate from Congress under the U.S. Energy Policy Act of 2005.

Because the Vision is intended to represent where the Nation can and should be in achieving a biobased economy the long term goals in the Vision should be aggressive and challenging. However, a peer review of Vision goals will be conducted to analyze the viability of the Committee's goals, particularly near and mid-term goals from a resource, technological and market perspective.

In addition, to compliment the Vision, the Committee recommends the agencies conduct a longer-term analysis to benchmark current markets for biomass and opportunities for those markets under various market and policy scenarios.

Vision update process:

- One-day workshop held November 9, 2005 consisting of 20 individuals from industry, academia, and government whom provided expertise on evaluating progress towards the original goals, if and how they should be updated, and what is needed to achieve these goals.
- Review workshop results with full Biomass R&D Technical Advisory Committee November 29, 2005.
- Discuss Vision update with Interagency Biomass R&D Board November 29, 2005.
- Develop draft Vision December 31, 2005
- Limited distribution of draft Vision for peer review January – February 2006.
- Evaluate need for second *Vision* Workshop to refine goals.
- Finalize Vision April 2006

EXECUTIVE SUMMARY

The United States is quickly approaching a crucible; testing the limits of U.S. economic, environmental, and national security. The United States is faced with escalating demand for petroleum and natural gas and an even sharper increase in dependence on foreign imports. Volatile prices for petroleum and natural gas are exacting high costs for consumers, industry, and the nation. A more diverse portfolio of feedstocks for our nation's economy must be found. Biomass is a naturally occurring, sustainable, and environmentally friendly feedstock which can contribute to this diverse portfolio. Realizing the *Vision* of a viable bioenergy and biobased products industry will help address the following issues:

- Balance of Trade Deficit
- Rural Economic Growth
- Diversity and Security
- Environmental Issues
- Looking to the Future

Currently, biomass represents about 3 percent of U.S. energy consumption. Biomass is used to produce heat and power in industry, to produce electric power for sale to the grid, and to produce biobased fuels such as ethanol and biodiesel. Biomass consumption for heat and power was 2.1 quadrillion Btu in 2004. It represents about 3 percent of the market share for power production. Biofuels production was approximately 2 billion gallons 2004, about 1.2 percent of the market share for transportation fuels. Biomass also is used to produce chemical and material products that would otherwise be produced from petroleum-based feedstocks.

The original *Vision* established aggressive goals for biopower, biofuels and biobased products. For each of these goals, it established production and/or market share targets for 2010, 2020, and 2030. These targets were set to benchmark the progress towards a "well established, economically viable, bioenergy and biobased products industry".

In updating its *Vision*, the Committee evaluated its progress in achieving these original *Vision* goals. It found significant growth in demand for biobased fuels in recent years. If this rate of growth continues, the original *Vision* Goal of 1.3 quads or 4 percent of market share may be met. In the case of biopower, the U.S. is not on track to reach the 2010 *Vision* goal of 3.3 quads or four percent of market share.

Vision Goals

The updated *Vision* does not change the original 2010 goals but recognizes that in some cases the U.S. is not on track to meet them. Furthermore, the *Vision* makes minor changes to its 2020 and 2030 goals and establishes 2015 goals which describe the types of activities that must occur to reach that goal and move down the path to the aggressive targets for 2020 and 2030. Finally, the updated *Vision* sets a long-term target for 2050 and the role that biomass can play in energy and product markets at that time.

- **Biobased Fuels** - Transportation fuels produced from biomass include but are not limited to, ethanol (E-100, -85, -20), biodiesel (B-100, -20,-5), butanol, and any derivative. The Energy Policy Act of 2005 mandates a target of 12 billion gallons by 2012 or a doubling of our current ethanol for fuels use. If current trends are an indication of future demand for biofuels, there is a chance that the original 2010 target can be met.

- **Biopower** – Biomass consumed to produce heat and electric power produced in industry and utilities. This includes biomass used in co-firing, waste-to-energy, and gasification of biomass. It does not include residential and commercial sector use of wood energy. The U.S. is not currently on track to meet original *Vision* goals. In order to meet biopower goals, strong incentives and policies need to be put into place. A good example in which state and local governments are leading the way is through renewable portfolio standards.
- **Biobased Products** – The original *Vision* defined biobased products as biobased textile fibers, polymers, adhesives, lubricants, soy-based inks, and other products at an estimated 12.4 billion pounds per year. The *Vision* update defines biobased products as any product generated from biomass that would otherwise be produced using petroleum feedstocks. Lack of data on biobased products makes it difficult to measure progress in achieving *Vision* goals and further research is needed to benchmark and track the role of biobased products in the U.S. economy. Opportunities for biobased products will no doubt increase with efforts such as the Federal Biobased Products Preferred Purchasing Program (FB4P).

Vision Goals

Goal	2010	2015	2020	2030
Biofuels – Biomass share of liquid transportation fuels.	4% (1.3 quads)	6%	10% (4.0 quads)	20% (9.5 quads)
Biopower – Consumption of biomass for production of heat and power in industry and utilities.	4%	5.5%	7%	7%
Biobased Products – Production of chemicals and materials that would otherwise be petroleum based.	18 billion lbs.	20 billion lbs.	27 billion lbs.	42 billion lbs.

It is anticipated that *by 2050*, biomass will be playing a major role in the U.S. economy. The Committee does not attempt to predict actual levels of consumption but anticipates that 40 percent of biomass based energy and products will be in the form of liquid fuels, 30 percent heat and power, and 30 percent biobased products.

This *Vision* will provide the framework for action to achieve our goals. However, major progress need to occur in order to achieve the *Vision* targets. Lessons learned from the first *Vision* are that without effective policies and well-planned R&D, efforts to achieve the *Vision* are futile. The updated *Vision* will be the basis for future regional Roadmap workshops to chart the technical research, development, and demonstration activities needed to achieve the biomass economy. These Roadmap workshops will also outline the institutional and policy changes needed to remove the barriers to economically and environmentally sound development of sustainable biomass systems. Recommended areas of focus include:

- Research and Development
- Rural Economic Development
- Policy
- Demonstrations
- Partnership/Biomass Champion
- Financing
- Education and Outreach

Attachment F

**2005 Biomass R&D Technical Advisory Committee
Proposed Recommendations to the Secretaries**

Joint Solicitation Process & Requirements

Reduce minimum amount of qualifying funds to \$150,000 for individual projects, allowing greater number of awards in wider range of topics

Request ethanol fuel demo projects that encourage engine grad fuels that do not contain any fraction of petroleum

Consider previous years' recommendations still applicable

Obtain view of progress from Departments of Energy and Agriculture

Obtain Departments' opinion of proposals' relevance to Vision and Roadmap

Obtain Departments' view of proposals' relevance to reviewer pool selection

Obtain Departments' opinion of regular joint solicitation project progress reviews

Research and Development

Attempt to make up for thermal conversion deficiency of ethanol with biobased additive (biodiesel, ethyl acetate)

Fund Vision research for success

Obtain Agency and Committee agreement on funding level necessary, take message to Congress

Detail consequences of under-funded research

Define full research, development, and large-scale demonstration pathway when setting funding level

Overall Recommendations

Amend Charter to allow two consecutive three-year membership terms

Define biomass as including spent pulping liquors

Make a priority to utilize hemicellulose extracted from wood chips prior to pulping for production of ethanol and acetic acid

Give woody biomass equal priority as agricultural feedstocks

Emphasize funding for thermochemical platform

These proposed recommendations represent the suggestions received from two Committee members prior to the meeting.

Attachment G

	A
1	2005 Biomass R&D Technical Advisory Committee
2	Proposed Recommendations to the Secretaries
3	
4	Joint Solicitation Process & Requirements
5	Reduce minimum amount of qualifying funds to \$150,000 for individual projects, allowing a greater number of awards in wider range of topics. Where appropriate, projects should be incrementally funded.
6	Announce the Joint Solicitation results earlier.
7	Additional funding is needed for Joint Solicitation project reviewers from industry, academia, etc.
8	Research and Development
9	Achievement of <i>Vision</i> goals and <i>Roadmap</i> requires more funding (specific amounts TBD in future documents). Detail consequences of under-funded research.
10	Define full research, development, and demonstration of commercial viability when setting funding levels.
11	The Committee should coordinate with the FreedomCAR and Hydrogen programs to provide information on fuel and vehicle programs. Also to discuss the short term and long term potential for biomass as a vehicle for transition and a feedstock for the hydrogen economy.
12	Channel R&D to address issues or new opportunities for the utility of biofuels.
13	The Committee sees a need to fund further research on incentive programs and other methods to stimulate biobased products growth.
14	Recognize and communicate to other federal agencies the importance of basic sciences for the success of the biomass program.
15	Increase funding for biofuels co-product development.
16	
17	Overall Recommendations
18	Continue funding for thermochemical platform.
19	The Committee has lost the benefit of having the 2004 members participation. Expedite the approval process for future membership packages.
20	A subcommittee should interact with the congressional appropriations committee with the goal of getting funding realigned with the <i>Vision</i> and <i>Roadmap</i> goals.
21	Renewed emphasis on public education and awareness, e.g. educate policy makers, their staff, the public, etc.
22	Increase the number of university faculty directly involved in federally funded biomass
23	The Committee recommends Congress simplify the statutory language in section 9001 of the 2002 Farm Bill. Specifically the Committee requests a broader more inclusive (to include all bio-organic matter) definition of biobased products.
24	The Committee would like to see a uniform definition of biomass and biobased products as defined in our <i>Vision</i> statement.
25	The Committee wants to have the opportunity to interact with other federal advisory committees and recommends federal agencies interact more aggressively on biomass issues.

Attachment H

DRAFT

2006 Work Plan (Dec 2005 - Dec 2006) Biomass R&D Technical Advisory Committee

Background

The Biomass Technical Advisory Committee, in its advisory capacity, is chartered to provide the following to the Secretaries of Agriculture and Energy and their points-of-contact (the Under Secretary for Natural Resources and Environment, U.S. Department of Agriculture and the Assistant Secretary for Energy Efficiency and Renewable Energy, Department of Energy):

- Advice on the technical focus and direction of requests for proposals issued under the Biomass Research and Development Initiative (Initiative), and
- Advice on the procedures for reviewing and evaluating the proposals.

The Committee shall also:

- Facilitate consultations and partnerships among Federal and State agencies, agricultural producers, industry, consumers, the research community, and other interested groups to carry out program activities relating to the Initiative, and
- Evaluate and perform strategic planning on program activities relating to the Initiative.

Additionally, the Committee shall have the following duties:

- Advise the points-of-contact with respect to the Initiative;
- Make recommendations in writing to the Biomass Research and Development Board to ensure that:
 - Funds authorized for the Initiative are distributed and used in a manner that is consistent with the objectives, purposes, and considerations of the Initiative;
 - Solicitations are open and competitive with awards made annually and that objectives and evaluation criteria of the solicitations are clearly stated and minimally prescriptive, with no areas of special interest;
 - The points-of-contact are funding proposals under this title that are selected on the basis of merit, as determined by an independent panel of scientific and technical peers predominantly from outside the Department of Agriculture and Energy; and
 - Activities under the Initiative are carried out in accordance with the Biomass Research and Development Act of 2000.
- For each fiscal year for which funds are made available to carry out the Initiative, provide a report to the Secretaries of Energy and Agriculture on whether funds appropriated for the Initiative have been distributed and used in a manner that
 - Is consistent with the objectives, purposes, and additional considerations described in subsections (b) through (e) of section 307;
 - Uses the criteria established under subsection (a)(3),
 - Achieves the distribution of funds described in paragraphs (2) and (3) of section 307(g); and
 - Takes into account any recommendations that have been made by the Advisory Committee.

DRAFT

The following is provided to assist the Committee develop its 2006 Work Plan.

Required 2006 Activities

- Recommendations to Secretaries
 - Feedback on results of the FY 2006 Joint Solicitation and make recommendations for FY 2007 joint solicitation.
 - Progress of R&D funded under the joint solicitation in achieving the Committee's *Vision* goals, as revised after the Energy Policy Act of 2005 (EPAAct).

Recommended 2006 Activities

- Update the Committee's *Vision* document.
- Organize regional *Roadmap* update workshops, according to the update requirement in EPAAct. Report out to Board on update progress.
- Establish subject-specific subcommittees, to report on their progress in Policy and _____ to the full Committee at quarterly meetings.
- Identify other Federal Advisory Committees relevant to biomass (e.g. climate change) and cooperate activities.
- Meet with the R&D Board.

Recommended Committee Meeting Schedule

In 2006, the full Committee will meet at least quarterly, as required by law.

Tentative Date	Purpose
_____, 2006 ___ Day Meeting	<ul style="list-style-type: none">• Status of the FY06 Joint Solicitation• Discuss <i>Vision</i> Update• Plan Regional <i>Roadmap</i> workshops
_____, 2006 ___ Day Meeting	<ul style="list-style-type: none">• Conduct regional <i>Roadmap</i> workshop
_____, 2006 ___ Day Meeting	<ul style="list-style-type: none">• Receive a briefing from General Counsel on Special Government Employee (closed session)• Conduct regional <i>Roadmap</i> workshop• Receive an update on the status and awardees of the FY 2006 joint solicitation• Receive an update on the status of the FY 2007 joint solicitation
_____, 2006 ___ Day Meeting	<ul style="list-style-type: none">• Receive review of topics covered and materials received in 2006• Develop Recommendations to Secretaries• Joint meeting with R&D Board• Develop topics for the 2007 Work Plan• Receive a presentation on the updated USDA/DOE Portfolio Analysis by <i>Roadmap</i> category document

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2006 Deliverables

- Matrix tracking the progress of USDA and DOE biomass R&D portfolios.
- Revised *Vision* document.
- Recommendations to the Biomass R&D Board (required per section 309(b) of the Biomass R&D Act of 2000).
- Complete *Roadmap* Workshops.

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Attachment I

2006 Work Plan (Dec 2005 - Dec 2006)

Biomass R&D Technical Advisory Committee

Background

The Biomass Technical Advisory Committee, in its advisory capacity, is chartered to provide the following to the Secretaries of Agriculture and Energy and their points-of-contact (the Under Secretary for Natural Resources and Environment, U.S. Department of Agriculture and the Assistant Secretary for Energy Efficiency and Renewable Energy, Department of Energy):

- Advice on the technical focus and direction of requests for proposals issued under the Biomass Research and Development Initiative (Initiative), and
- Advice on the procedures for reviewing and evaluating the proposals.

The Committee shall also:

- Facilitate consultations and partnerships among Federal and State agencies, agricultural producers, industry, consumers, the research community, and other interested groups to carry out program activities relating to the Initiative, and
- Evaluate and perform strategic planning on program activities relating to the Initiative.

Additionally, the Committee shall have the following duties:

- Advise the points-of-contact with respect to the Initiative;
- Make recommendations in writing to the Biomass Research and Development Board to ensure that:
 - Funds authorized for the Initiative are distributed and used in a manner that is consistent with the objectives, purposes, and considerations of the Initiative;
 - Solicitations are open and competitive with awards made annually and that objectives and evaluation criteria of the solicitations are clearly stated and minimally prescriptive, with no areas of special interest;
 - The points-of-contact are funding proposals under this title that are selected on the basis of merit, as determined by an independent panel of scientific and technical peers predominantly from outside the Department of Agriculture and Energy; and
 - Activities under the Initiative are carried out in accordance with the Biomass Research and Development Act of 2000.
- For each fiscal year for which funds are made available to carry out the Initiative, provide a report to the Secretaries of Energy and Agriculture on whether funds appropriated for the Initiative have been distributed and used in a manner that
 - Is consistent with the objectives, purposes, and additional considerations described in subsections (b) through (e) of section 307;
 - Uses the criteria established under subsection (a)(3),
 - Achieves the distribution of funds described in paragraphs (2) and (3) of section 307(g); and
 - Takes into account any recommendations that have been made by the Advisory Committee.

The following is provided to assist the Committee develop its 2006 Work Plan.

Required 2006 Activities

- Recommendations to Secretaries
 - Feedback on results of the FY 2006 Joint Solicitation and make recommendations for FY 2007 joint solicitation.
 - Progress of R&D funded under the joint solicitation in achieving the Committee’s *Vision* goals, as revised after the Energy Policy Act of 2005 (EPAct).

Recommended 2006 Activities

- Update the Committee’s *Vision* document.
- Organize regional *Roadmap* update workshops, according to the update requirement in EPAct. Report out to Board on update progress.
- Establish subject-specific subcommittees, to report on their progress in Policy and Analysis to the full Committee at quarterly meetings.
- Identify other Federal Advisory Committees relevant to biomass (e.g. climate change) and cooperate activities.
- Meet with the R&D Board.

Recommended Committee Meeting Schedule

In 2006, the full Committee will meet at least quarterly, as required by law.

Tentative Date	Purpose
March 2-3, 2006 2-Day Meeting	<ul style="list-style-type: none"> • Status of the FY06 Joint Solicitation • Discuss <i>Vision</i> Update • Plan Regional <i>Roadmap</i> workshops
April 12-13 , 2006 2-Day Meeting	<ul style="list-style-type: none"> • Conduct regional <i>Roadmap</i> workshop
Summer 2006 2-Day Meeting	<ul style="list-style-type: none"> • Conduct regional <i>Roadmap</i> workshop • Receive an update on the status and awardees of the FY 2006 joint solicitation • Receive an update on the status of the FY 2007 joint solicitation
November 28-29, 2006 2-Day Meeting	<ul style="list-style-type: none"> • Receive review of topics covered and materials received in 2006 • Develop Recommendations to Secretaries • Joint meeting with R&D Board • Develop topics for the 2007 Work Plan • Receive a presentation on the updated USDA/DOE Portfolio Analysis by <i>Roadmap</i> category document

2006 Deliverables

- Matrix tracking the progress of USDA and DOE biomass R&D portfolios.
- Revised *Vision* document.
- Recommendations to the Biomass R&D Board (required per section 309(b) of the Biomass R&D Act of 2000).

- Complete *Roadmap* Workshops.