

**Biomass Research and Development
Technical Advisory Committee**

April 24, 2012

Webinar Summary

List of Acronyms

Biomass Act – Biomass Research and Development Act of 2000

Board – Biomass Research and Development Board

Committee – Biomass Research and Development Technical Advisory Committee

DFO – Designated Federal Officer

DOE – U.S. Department of Energy

EPA – U.S. Environmental Protection Agency

FY – Fiscal year

MSW – Municipal solid waste

RFP – Request for proposal

R&D – Research and development

RDD&D – Research, development, demonstration and deployment

RIN - Renewable identification number

USDA – U.S. Department of Agriculture

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I. Purpose

On April 24, 2012, the Biomass Research and Development Technical Advisory Committee (Committee) held a webinar. The purpose of the webinar was to present the analytical basis for setting technical goals for biofuels. The Committee heard from Zia Haq from the U.S. Department of Energy (DOE) Biomass Program.

II. Background

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

This report contains an overview of the presentation delivered at the webinar, key Committee questions and answers, and follow-up discussions with the Committee and the general public. Attachment A contains a full list of webinar Committee attendees. Attachment B contains the final webinar agenda. The webinar presentation can be found on the Biomass R&D Initiative website: <http://biomassboard.gov/committee/meetings.html>.

III. Committee Business

Elliott Levine, Biomass Program, U.S. Department of Energy

The Committee's Designated Federal Officer (DFO), Elliott Levine, provided an introduction for the webinar. He thanked all Committee members who were able to take the time to participate in the webinar. Mr. Levine also thanked the Biomass Program's Zia Haq for presenting. He stated that this webinar was in response to questions and data requests asked by Committee members at the first 2012 Committee meeting in March and that the webinar's goal is to provide data and information to the Committee members to use to develop recommendations for DOE and the U.S. Department of Agriculture (USDA) on future biomass R&D efforts. Mr. Levine asked that all questions be held until the end of the presentation—where Committee members would first be given an opportunity to ask questions, which would then be followed by the public who participated.

IV. Biofuels Design Cases

Zia Haq, Biomass Program, U.S. Department of Energy

Zia Haq provided a presentation on biofuels design cases. Mr. Haq stated that the DOE national laboratories conduct the Biomass Program's analysis activities, and the analyses are based on bench- or pilot-scale projects. The presentation provided background on the following DOE analysis activities:

- Developing design cases
- Estimating process economics

- Estimating state of technology for biofuels production
- Estimating Program goals
- Analyzing the potential for cost reduction
- Examining pathways for developing fuels from biomass.

Mr. Haq showed examples of the analysis results, including cost of production for hydrocarbon biofuels; biofuel production costs with examples of renewable fuels via pyrolysis; and algal biofuels baseline costs. Future analysis efforts will include more design cases with expanded scope and integrated topics such as pioneer plant costs, life-cycle greenhouse gas emissions, and water footprint.

Committee Discussion:

Huey-Min Hwang asked what type of algae is being modeled for cost reductions in the analysis. Mr. Haq replied that no specific types of algae were modeled, but assumptions were made for a generic strain of micro-algae.

John Tao asked what assumptions went into the pyrolysis upgrading that result in the cost savings from 2012 to 2017. Mr. Haq responded that DOE modeling assumed a number of technical improvements over time. One of the key assumptions was extending catalyst life. Currently, many catalysts have a lifespan of only around 30 days, so significant cost savings would result from extending catalyst lifespan to around 1 year.

Mr. Tao also asked in the methanol-to-gasoline case what the fuel production cost would be if natural gas at \$2 per million British thermal units was used to produce the methanol. Mr. Haq replied that they looked at two potential cases, one in which the gasifiers were fueled with biomass, and another in which the process heat was provided by natural gas. A low price for natural gas would reduce overall production costs for the fuel.

Mr. Tao also asked about algae modeling and the assumption of a doubling of lipid production. Mr. Haq stated that the developers are optimistic, but that is an issue that must be monitored over the next few years.

David Bransby asked what DOE's view is on the size of plants needed to be economically viable. Mr. Bransby feels there are a lot of advantages to smaller-scale facilities, and if they can be profitable, than they should be considered commercial-scale. Mr. Haq agreed. USDA is also interested in smaller-scale facilities. Mr. Haq said that he thought there had not been enough research in this area to-date and that current estimates of cost penalties for scale-down tend to be relatively primitive.

General Public Discussion:

Linda Beltz from Weyerhaeuser asked what technologies DOE is considering for cellulosic sugar production to get sugars for bioconversion, especially from woody biomass. Mr. Haq replied that DOE is looking at a variety of conversion technologies for biochemical conversion, including different types of enzymes and microorganisms.

Ms. Beltz continued asking what type of pretreatment technology is used to get sugars from woody biomass. Mr. Haq stated that DOE is looking at a variety of pretreatment options, such as

acids, steam, and gasification.

Bruce Bauman with the American Petroleum Institute asked what kind of assumptions DOE makes for scaling up from pilot- to demonstration-, to commercial-scale, to Nth generation plant. Definitions for the size of those facilities can vary, but DOE generally looks at pilot-scale facilities of around 1 ton per day, a demonstration-scale at around 100 tons per day, and a commercial-scale facility at around 1,000 tons per day.

Johnway Gao from Catchlight Energy asked how many people are working on solvent liquefaction technologies and what Mr. Haq's view is of this as a viable technology to fuel. Mr. Haq said the Pacific Northwest National Lab is working on those technologies, namely John Holladay and Jonathan Male. There are many interesting approaches that are being investigated now and many new ways to combine hybrid biochemical and thermochemical conversion approaches.

Elliott Levine concluded the webinar asking if the impact of renewable identification number (RIN) credits were taken into account when modeling production costs and market viability. Mr. Haq responded saying RIN and tax credits are not taken into account. RIN credits can fluctuate quite significantly over time, and the cellulosic tax credit is set to expire in December 2012 unless it is renewed by Congress.

Attachment A: Committee Members

Attendance – April 24, 2012

Co- Chairs	Affiliation	Attended?
Steve Briggs	University of California	NO
Ronnie Musgrove	Former Governor, MS	NO

Members	Affiliation	Attended?
Bob Ames	Solazyme	NO
William Berg	Dairyland Power	YES
David Bransby	Auburn University	YES
Pamela Reilly Contag	Cygnnet Biofuels	NO
Bruce Dale	Michigan State University	NO
Harrison Dillon	Solazyme	NO
Joseph Ecker	Salk Institute for Biological Studies	YES
Neal Gutterson	Mendel Biotechnology	NO
Jennifer Holmgren	LanzaTech Limited	NO
Huey-Min Hwang	Jackson State University	YES
Kevin Kephart	South Dakota State University	NO
Craig Kvien	University of Georgia	NO
Jay Levenstein	FL Dept. of Ag. and Consumer Services	NO
Stephen Long	University of Illinois	NO
Mary McBride	CoBank	NO
Maureen McCann	Purdue University	NO
David Nothmann	Battelle	NO
William Provine	Dupont	NO
James Seiber	University of California	YES
John Tao	O-Innovation Advisors, LLC	YES
Todd Werpy	Archer Daniels Midland Company	NO

Total: 6 of 23 members attended

Attachment B: Meeting Agenda

Technical Advisory Committee Webinar

April 24, 2012

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| 2:00 p.m. – 2:15 p.m. | Welcome
Elliott Levine, DFO |
| 2:15 p.m. – 3:30 p.m. | <u>Presentation</u> : <i>The Analytical Basis for Setting Biofuels Technical Goals</i>
Zia Haq, Biomass Program, U.S. Department of Energy <ul style="list-style-type: none">• Developing design cases• Estimating process economics• Estimating state of technology for biofuels production• Estimating Program goals• Analyzing the potential for cost reduction• Pathways for developing fuels from biomass |
| 3:30 p.m. – 4:00 p.m. | Public Comment |
| 4:00 p.m. | Adjourn |