

## Request for Information (RFI) DE-FOA-0001615 Modification 000002: Cellulosic Sugar and Lignin Production Capabilities

DATE: October 26, 2016  
SUBJECT: Request for Information (RFI)

### Modification Information:

Modification 000002 updates the RFI removing all submission deadlines. This RFI will be posted on EERE Exchange indefinitely and will continue to accept submissions.

Modification 000001 updates the deadline for submissions to September 9, 2016 at 5:00 P.M. ET

**Description:** The U.S. Department of Energy (DOE) is seeking input from industry, academia, national laboratories and other biofuels and bioproducts stakeholders to identify existing capabilities to produce lignocellulosic sugars and lignin for use by the research community.

**Please note: it is DOE's intent to make all information submitted in response to this RFI publicly available to other interested parties. Thus, respondents are specifically directed to NOT include ANY proprietary, business sensitive or otherwise confidential information in their responses. DOE will consider all information submitted in response to this RFI to be non-proprietary.**

**Background:** The mission of DOE's Bioenergy Technologies Office (BETO) is to develop and transform the country's biomass resources into commercially-viable high performance biofuels, bioproducts, and biopower through targeted research, development, demonstration and deployment (RD&D) supported through public and private partnerships. To facilitate this goal, BETO supports RD&D efforts that advance technologies to produce both (a) drop-in biofuels that can replace gasoline, diesel and jet fuel and (b) biomass-based products and chemicals that can compete with their petroleum-derived counterparts and enable biofuels deployment.

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Many conversion technologies that produce these biofuels or bioproducts utilize cellulosic sugars or lignin in their process. As a result, both lignocellulosic sugars and lignin have become necessary intermediates for advancing research towards economically producing biofuels and bioproducts.

Over the past several years, a number of companies have entered this field and are producing lignocellulosic sugars and/or lignin. However, it is not clear how many of these companies are willing and able to sell these products to the research community, and what quantities are available. BETO recognizes that to fully support RD&D efforts to advance technologies using lignocellulosic sugars or lignin, compiling and disseminating information on the availability of these substrates would be beneficial for the industry. Thus, BETO is interested in assessing currently existing capabilities to produce and sell lignocellulosic sugar and/or lignin for use by the research community.

**Purpose:** The purpose of this RFI is to develop a comprehensive list of suppliers who are willing and able to produce and sell cellulosic sugar and/or lignin for use by the research community. ***BETO requests any information that a supplier is willing to share that is non-proprietary. BETO's intent is to provide all information submitted in response to this RFI to the public via its public website and respondents are therefore directed to NOT include ANY proprietary, business sensitive or otherwise confidential information in their responses. DOE will consider all information submitted in response to this RFI to be non-proprietary.*** BETO believes this information will be used by both recipients of BETO funding as well as the general research community to determine what resources are available. This is solely a request for information and not a Funding Opportunity Announcement (FOA). EERE is not accepting applications.

**Disclaimer and Important Notes:** This RFI is not a Funding Opportunity Announcement (FOA); therefore, EERE is not accepting applications at this time. EERE may issue a FOA in the future based on or related to the content and responses to this RFI; however, EERE may also elect not to issue a FOA. There is no guarantee that a FOA will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential applicants if EERE chooses to issue a FOA regarding the subject matter. Final details, including the anticipated award size, quantity, and timing of EERE funded awards, will be subject to Congressional appropriations and direction.

Any information obtained as a result of this RFI may be used by the Government on a non-attribution basis for planning and strategy development; this RFI does not constitute a formal solicitation for proposals or abstracts. Your response to this notice will be treated as

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information only. EERE will review and consider all responses in its formulation of program strategies for the identified materials of interest that are the subject of this request. EERE will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that EERE is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI.

**Responses to this RFI do not bind EERE to any further actions related to this topic.**

**Evaluation and Administration by Federal and Non-Federal Personnel:** Federal employees are subject to the non-disclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The Government may seek the advice of qualified non-Federal personnel. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to EERE providing their response to non-Federal parties. Non-Federal parties given access to responses must be subject to an appropriate obligation of confidentiality prior to being given the access. Submissions may be reviewed by support contractors and private consultants.

## **Request for Information Categories and Questions**

### **Category 1: Lignocellulosic Sugars**

If you are a producer of lignocellulosic sugars and are willing and able to sell or otherwise make them available to the research community, please provide information in your response to the following questions. You may respond to as many or as few questions as you wish. The questions are intended to provide the research community with useful information when looking for a supplier of lignocellulosic sugars. **BETO is requesting NON-PROPRIETARY information only:**

Question 1: To which types of research entities are you willing and able to sell your lignocellulosic sugar (e.g., university researchers, national laboratories, industry/private sector)? Are there any types of research entities to whom you are not willing and able to sell your lignocellulosic sugar?

Question 2: What are the maximum and minimum quantities of lignocellulosic sugar you are willing and able to sell (kg)?

Question 3: What is the sugar concentration in your product?

Question 4: What physical form do you sell your sugars (e.g., solid or liquid)?

Question 5: How do you package your lignocellulosic sugars for shipping? Do you ship in bulk?

Question 6: What type(s) of biomass do you use to produce lignocellulosic sugar?

Question 7: What process do you use to produce lignocellulosic sugar?

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Question 8: What details of the scale of your process are you willing to share (e.g. batch and/or continuous/ volumetric productivity)?

Question 9: What is the typical composition of your sugar stream (e.g., glucose, galactose, mannose, xylose, arabinose) and what is the purity?

Question 10: Do you routinely test your cellulosic sugar for consistency within and between lots and between feedstocks (if applicable)?

Question 11: What impurities are present in your lignocellulosic sugar process and what testing do you perform to determine the presence of impurities?

Question 12: Does your process include a purification step?

Question 13: What is the highest concentration in grams/Liter you can provide?

Question 14: Have you examined the impacts of transport and storage on sugar degradation? If so, can you please provide any relevant (non-proprietary) details of these impacts?

Question 15: What additional information are you willing and able to provide to the research community about your lignocellulosic sugar? Please provide any non-proprietary cost information you are willing to share.

Question 16: Into what markets do you typically sell your lignocellulosic sugar? What is a typical application for your lignocellulosic sugar?

## **Category 2: Lignin**

Lignin is often classified differently depending on who produces it, how it is produced and for which specific market it is intended. Agriculture, for example, typically looks at acid soluble and non-digestible fiber (NDF) lignin while the pulp and paper industry typically looks at Klason, Kraft, and acid detergent lignin. BETO is interested in information related to all types of lignin available to the research community to provide the most comprehensive set of data.

If you currently operate a facility that produces lignin that you are willing and able to sell or otherwise make available to the research community, please provide information in response to the following questions. You may respond to as many or as few questions as you wish. The questions are intended to provide the research community with useful information when looking for a supplier of lignin. **BETO is requesting NON-PROPRIETARY information only.**

Question 1: To which types of research entities are you willing and able to sell or otherwise provide your lignin? (e.g., university researchers, national laboratories, industry/private sector)? Are there any types of research entities to whom you are not willing and able to sell your lignin?

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Question 2: What are the maximum and minimum quantities of lignin that you are willing and able to sell (kg)?

Question 3: In what units do you sell your lignin and is it packaged (e.g., super sacks), or sold in bulk?

Question 4: How do you ship lignin?

Question 5: What is the lignin concentration in your product?

Question 6: What type(s) of biomass do you use in your process?

Question 7: What process do you use that produces lignin (dilute acid, ammonium fiber expansion (AFEX), hot water, organosolv, etc.)?

Question 8: What details of the scale of your process are you willing to share (e.g. batch and/or continuous or volumetric productivity)?

Question 9: Do you measure the typical composition of your lignin? If so, what method do you use? How consistent is the composition of your lignin?

Question 10: Do you routinely test your lignin for consistency within and between lots?

Question 11: What impurities are present in your lignin and what testing do you perform to determine the presence of impurities?

Question 12: Does your process include a purification or filtration step?

Question 13: What is the typical concentration in g/L you can provide?

Question 14: Have you examined the impacts of transport and storage on lignin? If so, can you please provide any relevant (non-proprietary) details of these impacts?

Question 15: What additional information are you willing and able to provide to the research community about the lignin? Please provide any non-proprietary cost information you are willing to share.

Question 16: Into what markets do you typically sell your lignin? What is a typical application for your lignin?

## Request for Information Response Guidelines

Responses to this RFI must be submitted electronically to [sugarandlignin@ee.doe.gov](mailto:sugarandlignin@ee.doe.gov).

Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery.

Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 5 pages in length, 12 point font, 1 inch margins. Only electronic responses will be accepted.

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Please identify your answers by responding to a specific question or topic if applicable. Respondents may answer as many or as few questions as they wish.

EERE will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

Respondents are requested to provide the following information at the start of their response to this RFI:

- Company / institution name;
- Company / institution contact;
- Contact's address, phone number, and e-mail address.

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