

**ATIP Foundation Regional Bioeconomy Forums:  
“Addressing the Challenges & Opportunities of Advancing the Billion Ton Bioeconomy”**

**A Report to Participants in the Midwest (MW) Regional Bioeconomy Forum  
Schisler Conference Center, Ohio State University, Wooster, OH  
November 15, 2016  
Wes Jurey, Foundation CEO, and R.J. Brenner, Director, ATIP Foundation**

**Background**

In late 2013, the seven agencies and the Office of the President that constitute the Biomass Research and Development Board,<sup>1</sup> (BR&DB) began development of a vision to promote the expansion of the bioeconomy. With the projection that this nation, by 2020, will sustainably produce a billion tons of biomass annually, the “Vision” was published as the *“Federal Activities Report on the Bioeconomy,”* (known as FARB) released by USDA Under Secretary Cathie Woteki at the 2016 Advanced Bioeconomy Leadership Conference in Washington, D.C. (February). “The goal of the Billion Ton Bioeconomy Vision is to develop and implement innovative approaches to remove barriers to expanding the sustainable use of America’s abundant biomass resources, while maximizing economic, social, and environmental outcomes.” BR&DB engaged the ATIP Foundation in September 2015 to arrange and convene several regional listening sessions.

Separately, during the month of April, 2016 USDA and DOE co-led some informal “listening sessions” at three major conferences: 2016 International Biomass Conference and Expo in Charlotte, NC (April 11-14); World Congress on Industrial Biotechnology in San Diego, CA (April 17-20); and the Symposium on Biotechnology for Fuels and Chemicals in Baltimore, MD (April 25-28). In addition, a webinar on the Vision was conducted jointly by USDA and DOE on May 5, 2016. Input garnered from these events helped shape a subsequent document, tentatively titled *“The Billion Ton Bioeconomy Initiative: Challenges and Opportunities,”* released in November 2017 by the BR&D Board (for a copy, go to [http://www.biomassboard.gov/pdfs/the\\_bioeconomy\\_initiative.pdf](http://www.biomassboard.gov/pdfs/the_bioeconomy_initiative.pdf) ).

The rationale and strategy for these reports, and purpose for the public gatherings was published in a USDA a blog, including the Vision and the scope of the listening sessions designed to “... gather information and engage stakeholders on how to build and grow the “Billion Ton Bioeconomy.” (<http://blogs.usda.gov/2016/04/27/growing-and-building-the-billion-ton-bioeconomy/>)

**Regional Bioeconomy Stakeholder Forums**

The federal agencies contracted with the ATIP Foundation --- a non-profit consortium of State Economic Development organizations --- to develop and co-host with a coordinating entity, a series of regional Bioeconomy Forums to garner input from a broad range of stakeholders on the Challenges & Opportunities to help shape a “multiyear implementation plan,” expected to be prepared by the Biomass R&D Board during the second quarter of the fiscal year 2017, submitted to the Office of Science and Technology Policy (OSTP).

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<sup>1</sup> The Biomass R&D Board consists of representatives from the U.S. Department of Energy, U.S. Department of Agriculture, U.S. Department of the Interior, U.S. Department of Defense, U.S. Department of Transportation, the National Science Foundation, the Environmental Protection Agency, and the Executive Office of the President of the United States.

Forums were convened in the SE U.S with Georgia Tech as co-host (**September 16, Renewable Bioproducts Institute, Atlanta, GA**), in the SW. U.S with the Mineral Wells Chamber of Commerce, Mineral Wells, TX, (**September 29, Holiday Hills Country Club, 4801 Highway 180 East, Mineral Wells, TX**), in PNW with Washington State University as co-host (**October 3, Sea-Tac Conference center, Sea-Tac airport**), in NE U.S. co-hosted by The University of Maine, Orono (**October 18** ), and in the MW U.S. , **co-hosted by The Ohio State University (Schisler Conference Center, Wooster, OH, November 15)**. Co-hosts arranged for the meeting room, a modest noon meal, and a dedicated note taker with real-time display so the participants could verify their remarks.

The goal of each Bioeconomy Forum was to bring together a mix of stakeholders (about 40-60 participants) from six sectors to seek their input, relative to the initiative’s vision, strategies, and implementation. These sectors are (1) industry; (2) state and local government; (3) economic and workforce development; (4) investment & finance; (5) academia; and (6) agricultural and environmental organizations. Co-hosts, with the assistance of BR&D Operations Committee, derived the list of by-invitation-only participants.

**Forum Structure and Role of the Foundation and Co-hosts**

The Midwest U.S. Bioeconomy Forum was moderated by Wes Jurey, CEO of the ATIP Foundation. Members of the BR&DB Operations Committee made presentations that reviewed the FARB and posed questions related to advancing the bioeconomy.

Table 1: Demographics by sector describe the demographics of invitees by sector, and the actual number that participated on October 18, 2016. As has been the case in the regional bioeconomy forum series, both industry and investment & finance have low positive response rates (or few participants) to invitation to participate.

Table 1. Demographics (by sector) of invitees and participants convened by ATIP Foundation and co-host The Ohio State University, Midwest Regional Bioeconomy Forum, Wooster, OH, November 15, 2016.					
Sector Designation	Invited	% of invited	No. Participated	%RSVP to Attend	% of Attendees
Industry	60	36	22	37	39
State and local government	42	25	11	26	20
Economic and workforce development	18	11	6	33	11
Investment & finance	9	5	1	11	2
Academia	25	15	10	40	18
Agricultural and environmental organizations	13	8	6	46	11
<b>Totals</b>	<b>167</b>	<b>100</b>	<b>56</b>	<b>33.5</b>	<b>100</b>

The agenda (Attachment 1) included welcoming comments Dennis Hall, Director, Ohio Bioproducts Innovation Center (OBIC) at Ohio State University, Tony Logan, State Director, USDA Rural Development, and Wes Jurey, Chairman, ATIP Foundation. A presentation was made by Todd Campbell (USDA) (Attachment 2). In addition, a “discussion document” was provided to the participants (Attachment 3). The remainder of the day consisted exclusively of stakeholder attendees from the six sectors participating in discussions on these “discussion document” questions. Notes were taken (attributed to the commenter) by Jennifer Brown (USDA, RD), and Shannon Ellis (OBIC, OSU). The audio was also recorded from a laptop in case it was needed later to clarify comments.

Post forum, participants received a link to a Google Document (notes of Jennifer and Shannon, combined) and a two-week window to edit their specific comments, or add additional comment. Thereafter, the document was closed and the ATIP Foundation reviewed comments, clarified with authors as warranted, redacted all names of comment contributors (rendering the comments “non-attribute,” and annotated with comments (RJB) from the Foundation). The document is presented (Attachment 4) as a record of the forum and it includes participant prioritizations of each “challenge” and “opportunity” --- from their perspective --- to determine whether each was in the top 3 priorities of the Midwest U.S.

Figure 1a (below) reflects their perspective on these “Challenges”.

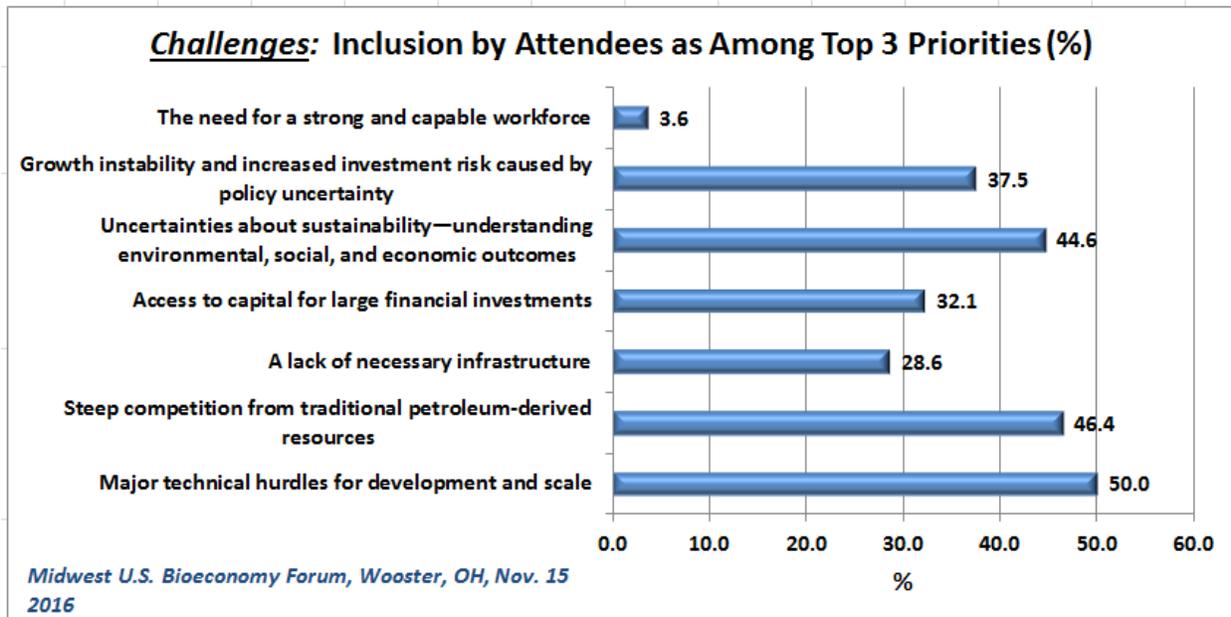
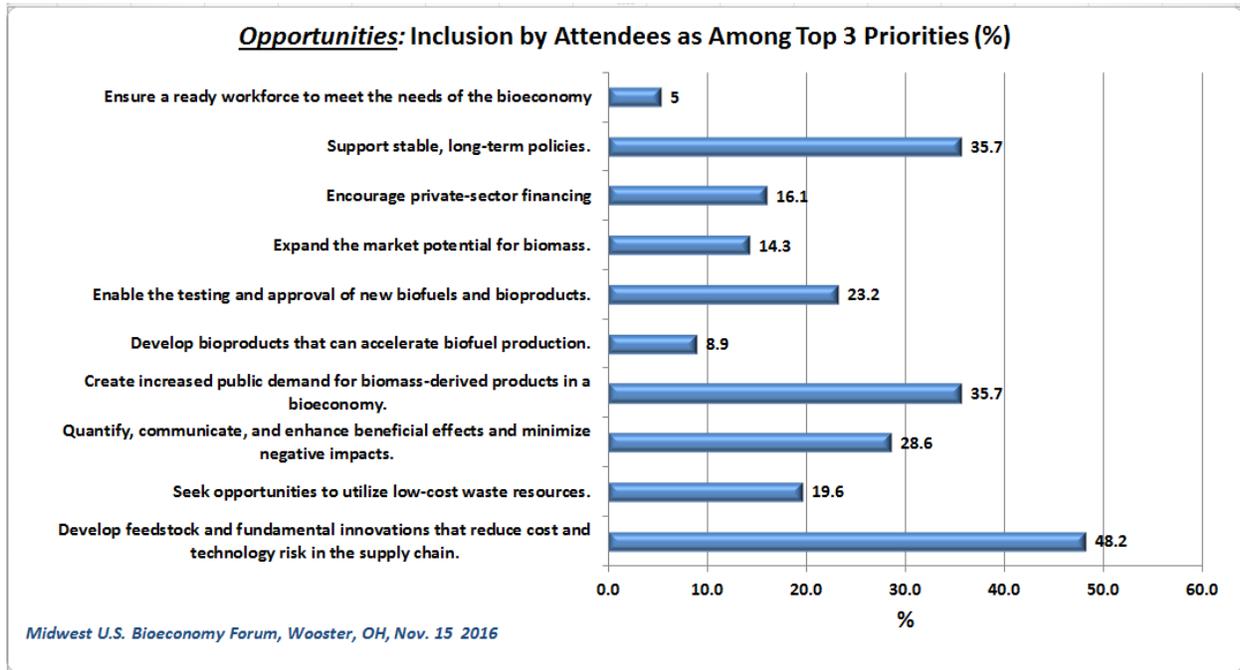


Figure 1b (below) reflects their priorities on “Opportunities.”



### **Reporting of Participant Comments**

Regarding the “Critical Discussion Point” session, there were a number of comments from the MW region that characterized regional issues, but also many comments that were fairly common issues across the 5 regional forums. Below, are non-attribute comments from participants, as well as notations by the ATIP Foundation; the latter are preceded below by “[NOTE:...],” and are also reflected in Attachment 4 as “Comment[RJB#].”

#### ***“What was missed in the “challenges” and “opportunities?”***

- Life cycle thinking has to be included in any definition of sustainability. Social and economic factors also have to be included in sustainability. Quantify the benefits through a Sustainability Life Cycle Assessment.

#### ***“What are state/local/regional challenges to the bioeconomy and how can the federal agencies help address these regional challenges?”***

- Finance: Funding for proof of concept, prototyping, pilot-scale facilities
- Finance: As to funding sources, need to engage the banking industry into the bioeconomy industry.
- An education program, which would get buyers informed.
  - **Actionable item – focus on buyers and USDA biopreferred program.**
  - **quantify and communicate benefits and minimize negative impacts – Communication aspect of benefits – biggest challenge**

- Finance: investment in technology for scale-up. If we are introducing new technology we have to have funding to take risk off the investors.
  - USDA has loan guarantees **but we need gap financing**. Need financial partners involved to address the gaps. Can there be an established clearing house for these products to get everyone on the same page?
- Workforce development area – Industry led internships that really make it practical. Opportunities can be very valuable --- Federal gov't could provide some incentives to make this happen.
- Wage matching program for interns. The Andersons had 35 interns this past year. Training students engages youth in industry and jump-starts workforce development.
- How do we get to a billion tons without some type of incentive for chemical products? RECOMENDATION

Comments on ***“What are state/local/regional opportunities to the bioeconomy and how can the federal agencies help leverage these regional opportunities?”***

- To attract invest, have tax credit. Second – infrastructure related – industry not there for end of life products.
- Educate the public and the consumer [**Note: increases demand**]
  - Support cross-boundary meetings where we get people together from different industries. Need more workshops allowing people to connect and work to solve and discuss problems and issues.
  - What is the benefit that we tell the American public of achieving the billion tons? We need to educate the consumers. How do we define sustainability? Vision and clarity is needed. What does it mean at the end of the day? Suggestion – How do we define things like sustainability? Needs to be consistent definition and message of importance.
  - A company that creates biobased lubricants is struggling with definition of sustainability. Their struggle is scale. *The problem is they were hoping the Federal gov't fleet would be first adopters however, the definition of sustainability is getting in the way. The Federal gov't needs to make the definition clear that it's biobased.* Currently, if a fossil fuel based lubricant is mixed with more than 5% recycled lubricant, it can be classified as sustainable. The classification needs to be made very clear on what is considered sustainable
- Potential to connect end-users (polymer, paint, engineered products, food companies with University researchers, innovation programs and biomass producers.
- The sourcing of chemicals and materials in a sustainable and environmentally positive way.
  - We have to embrace sustainability and economy-wide opportunities. We are aware of current issues in our own industry/space, but not potential solutions from other industries E.g. CO2 sequestration need for power plants, etc.; this can be used as an input to make more sustainable products (agriculture) rather than dead-end storage (mineralization or down-hole injection) options. Requires cross-cultural discussion (facilitate people to get out of their silos).
  - Develop a “Circular Economy” – common in Europe, new in the U.S. *Materials Exchange Initiative (cloud-based platform) – companies can list their excess materials. Need to expand this to include the bioeconomy.*

- **Key summary of what the federal agencies can do**
  - **(1) develop a favorable and stable policy at federal/state level that can be mirrored at state / local level; combined permitting process; incentives for private lending or capital. Tax incentives not long term enough.**
  - **(2) Create regulatory environment that is favorable: Fast track/ combine permitting with EPA/Building/Zoning..**
  - **(3.) Provide / create incentives for private lenders to participate**

***“What sets the MW Bioeconomy apart from other regions of the country? What inherent advantages do you have? [Note from ATIP Foundation: This forum was among the most positive in clearly describing their inherent and diverse advantages.]***

- We are centrally located. This is a great place to be to get things to the rest of the country. Close to Great Lakes.
  - We also, have the Ohio River --- Low energy costs, Ohio River, Grain costs.
- The scale of polymers and materials, and agriculture.
- The strength of our universities and strength of public/private partnerships.
  - R&D is fantastic in the area.
  - **Need more support for R&D. [Recommendation]**
  - It is important for us to own the disruptive technology to make it work here, to keep jobs here.
- Focus on 4 main disruptive technologies (Additive manufacturing, Factory Automation, Advanced materials & Sustainability) that will affect our workforce for Ohio, because about 20% of Ohio’s GSP comes from manufacturing products, and all of the above trends are disruptive to the manufacturing industry & its workforce. If we don’t focus on attracting & nurturing innovators in these disruptive technologies, we’ll lose our current edge.
  - focus on polymers and fine chemicals to use biomass as feedstock.
- Ag is Ohio's #1 industry and polymers is #2
- We have a large workforce in coal mine areas and steel valley. Is there a mechanism to target these regions? Any incentive for these areas?
  - Development in Appalachia. POWER initiative is EDA and ARC funding to allow the coal industry to reconfigure. This is an advantage for Ohio and the Midwest.
  - Mentioned targeted job areas for Ohio; match federal policy to state policy.
- From a manufacturing standpoint, we have a lot to offer.
- Besides corn and grain crops, we have the largest supply of animal tallow.
- Large land base with ability to not compete for food but available for other uses that are related to non-food items.
- Less weather-related variability as other places (such as droughts in western states).
- The entire infrastructure is here. We are close to raw materials (i.e. corn); close to refineries, farmers
  - 45% of polymers in U.S. within 500 mile drive. Lubrizol, Emery, Ashland are all located here.

***“What other biomass would you like to consider in the discussion of advancing the bioeconomy? Animal wastes / carcasses / concentrated animal feeding operations / seafood industry wastes? Municipal landfill biorefineries? Others?”***

- hog, poultry industry in Ohio – manure will become more of an issue; Phosphorus run-off an issue. How do you get the biomass from those farms?
- Ohio has a large food processing industry so we have large food waste.
- Municipal Solid waste/sewer treatment, one of Ohio strengths is the Ag Community (i.e., good partnering opportunity for ag sector to lend expertise to other community issues).

***“As a region, how can you enhance your bioeconomy through new partnerships in the region, or on a more global ?”***

- Include community colleges with the bigger universities. Even high schoolers.
- Most solid waste districts that own landfills have an incentive to landfill vs. find other uses for organic wastes that could be used as feedstocks for bioproducts and biofuels. For example a solid waste district usually receives a payment for every ton of material received at a landfill. These incentives need to be reversed so that they are disincentivized to landfill materials so that they will more actively seek opportunities to reuse and recycle them instead.
- Create formal networking that is steady and regular. Have monthly meetings/discussions to stay connected.
- What about economic agencies working with groups like JumpStart? Can they utilize federal funds to help start companies?
  - In the last 50 years, startups have been creating the jobs.
  - Focus on job creators.
  - Partner with Manufacturing Extension Partnership (MEP), JumpStart, etc.

## Summary Statement from ATIP Foundation

### **MW Regional Bio-Economy Forum Summary Wes Jurey, CEO, ATIP Foundation**

The ATIP Foundation was established in 2011 at the request of the US Department of Agriculture (USDA), Agricultural Research Service (ARS), to serve as a third-party intermediary, engaging a variety of stakeholders with ARS research, programs, and initiatives. The initial goal of the Foundation was to enable a more collective, collaborative approach on behalf of the private sector, with each member representing one of the eight agricultural research regions in the USDA ARS infrastructure.

The fundamental premise behind this approach was the need to create greater awareness of the breadth and scope of USDA intramural research activity (and that of their federal and state partners such as Department of Energy, Department of the Interior, National Science Foundation), and possibly other collaborative agencies of USDA (e.g., Rural Development, Natural Resource Conservation Services, National Institute of Food and Agriculture), conducted in collaboration with 90 + ARS labs throughout the United States, and to foster an understanding that the federal research outcomes are available for use by business and industry, ultimately resulting in economic growth and development, in the agribusiness sector.

The Foundation was incorporated by eight state and regional technology-based economic development organizations, each individually serving as a federal partnership intermediary to USDA's ARS, with many members also having facilitation agreements with other federal agencies, as well as their own network of in-state / regional non-federal stakeholders on many aspects of federal / private sector partnerships.

The Foundation's approach to establishing the five "Advancing the Bioeconomy" forums was premised on identifying regions within the United States whose stakeholders were receptive to the idea that each forum would serve as a springboard to launch one or more demonstration projects within the region. These projects would utilize the scope of research and related outcomes resulting from the massive amount of federal research coordination overseen by the seven federal agencies comprising the Biomass Research & Development Board, formed by statute in 1999.

The ultimate purpose of the regional projects is to demonstrate that the federal research outcomes--- combined with other federal / state / local agencies whose scope is in "implementation" of research outcomes, can result in economic growth and development, particularly in rural areas of the country, creating new businesses and enabling existing businesses to expand, resulting in job creation.

From the Foundation's perspective, based on the response from forum participants, we believe our premise is sound. At the conclusion of the Midwest forum, participants were unanimous in support of reconvening in a year, and working to formulate a specific demonstration project tailored to their region in the interim.

It is noteworthy to the foundation that, while each of the five regional forums offered some unique perspectives, relative to their region, six common themes resonated throughout all five forums, relative to each region's ability to make use of the federal research to enhance the growth of regional economies.

First, the need for public awareness is considered a major challenge. At the beginning of the forum, there was significant discussion on what the bioeconomy actually was, beyond biofuel.

Second, the lack of knowledge of and about the federal resources within the seven agencies was cited. Throughout the discussion it became apparent that most attendees knew little, if anything, about the scope of research conducted; the number of federal labs that existed; or the significant number of research scientists employed. Additionally, there was little knowledge in terms of how to access the federal resources available, even if one were aware of them.

Third, the need to develop a talent pipeline for current and future workers was a strong concern. It was noted that although seven federal agencies were members of the BR&D Board, the Departments of Education & Labor were not engaged at the federal level. At the MW Regional forum, there was discussion on the need to include them in subsequent forums and pilot projects; none participated in this regional forum.

Fourth, development of the type of supply chain necessary to sustain the bio economy was expressed as a critical priority. It was noted that moving agricultural by products and waste more than 100 miles was a significant inhibitor of the growth of this industry.

Fifth, the need to finance the growth of demonstration projects, establish new businesses, and expand existing businesses, by seeking federal, state, and private sector financial assistance is a critical concern. It was further noted that the financial community was the least represented in the forum.

Sixth, it was noted that federal policy is one of the most critical issues, and is an underlying issue to the first five cited. Policy uncertainty means high risk to institutions that provide financial assistance. It determines the allocation of federal resources, the priorities of the public workforce system, discourages the establishment of a supply chain uncertain of the sectors future, and makes articulating a vision for the bio economy more challenging.

In our report to the BR&D Technical Advisory Committee in November 2016, and the BR&D Board in December, our findings, and particularly the six commonalities, were well received.

In conclusion, the Foundation looks forward to working with The Ohio State University and the participants in the initial forum, to expand the stakeholder base, in order to begin the development of a regional demonstration project.

We look forward to doing so in partnership with the seven member agencies of the BR&D board, optimistic that the vision of a billion ton bio economy can become a reality.

### **Summary Statement from Co-Host**

#### **Dennis Hall Summary Notes of Midwest Bioeconomy Forum Wooster, Ohio November 15, 2016**

##### Participants

The Midwest Forum included 55 stakeholders; including 25 representatives from industry, 10 from academia, 9 from non-governmental organizations, and 10 from governmental institutions. Only one individual attended from the finance sector. The tone of the meeting was positive and constructive with excellent participation from virtually all attendees. Many of the stakeholders have been active in the bioproduct and materials industry. There were significantly fewer representatives of the biofuel and bioenergy sectors. Also, biomass producers were under-represented for this forum.

##### Challenges and Opportunities

The list of suggested challenges was prioritized around the key theme of competitiveness. While there are many products that were created to compete with oil at significantly higher prices, major technical hurdles in development and scale must be addressed to be successful in the current marketplace. In addition, uncertainty about sustainability (biobased relative to today's incumbent materials) and public policy in this economic climate limits growth. Solving these problems will generate new access to capital and infrastructure development. Workforce development is not seen as an issue at this time due to the relatively weak job market for bioeconomy employees.

Three key opportunities were identified. These opportunities relate to technology development, market demand, and policy stability. A fourth opportunity that seemed to grow in popularity throughout the day was to, "quantify, communicate, and enhance beneficial effects and minimize negative impacts". It was suggested that the opportunity of increasing public demand for bioproducts is more accurately described as a challenge. How do bioproducts earn the premium prices necessary due to higher production costs?

Other topics suggested included many related to communications (among industry, between industry and academia, to consumers, and with future workforce). Circular economy, life cycle assessment, climate change, and other sustainability measures should be emphasized. Incentives similar to the biofuel sector such as tax benefits, streamlined permitting process, and first market assistance are needed to overcome barriers.

##### Example of issues shared by stakeholders:

*Company* went to the expense of developing a biobased polyol based on economics of that time. The price decline of petroleum made that product no longer competitive. If it is important to advance the bioeconomy, some sort of incentive will be necessary under this economic climate.

Have developed a product in which the company has significant engineering data to illustrate the benefit of their technology and price competitiveness, but still struggling with market penetration as no one wants to be the first customer.

Company has developed a biobased lubricant product and is disappointed by lack of support by federal procurement officials. Federal sustainability indicators favor recycled content over biobased content despite superior performance metrics.

A specialty chemical manufacturer interested in increasing biobased content recommends creating an “Industrial Biorefinery Council” that includes companies like ADM, Cargill, International Paper, etc. In addition, suggest that the paper industry is well suited to repurpose their assets to make chemicals instead of paper.

There is a large workforce in the steel valley. Is there a mechanism to target this region.

To facilitate collaboration, it is less helpful for academia and other technology providers to know the list of capital assets than to have a list of questions or problems experienced by the company.

The Midwest has lands that allow efficient production of crops like corn and soy. We should not abandon these feedstocks in the new bioeconomy. There are also lesser valuable lands (like strip-mined) where alternative crops may be more valuable. The Biomass Crop Assistance Program (BCAP) could be helpful in making this transition.

USDA has loan guarantees, but gap financing is still needed.

A National Network for Manufacturing Innovation (NNMI) is needed in the bioproducts/ biorefinery industry. Such a program should also include seed funding to support smaller bioeconomy projects.

--- End of report ---

**Attachment 1: Agenda**

**Attachment 2: Slide presentations**

**Attachment 3: “Discussion document”**

**Attachment 4: Non-attribute notes w/ comments (RJB annotated)**

## MIDWEST BIOECONOMY REGIONAL FORUM DRAFT AGENDA

*“Garnering stakeholder perspectives and input to help shape the vision, strategic planning, and implementation to promote and expand the bioeconomy”*

**Date: Tuesday, November 15, 2016**

**Time: 9:30 AM – 5 PM**

**Location: Shisler Center, OSU Wooster, 1680 Madison Avenue, Wooster, OH 44691**

**Purpose:**

- **To review the “Federal Activities Report on the Bioeconomy,”**
- **Introduce a synopsis of the subsequent “Billion Ton Bioeconomy Initiative: Challenges and Opportunities” report (not yet formally released), and**
- **Solicit input from stakeholders in (1) industry; (2) state and local government; (3) economic and workforce development; (4) investment & finance; (5) academia; and (6) agricultural and environmental organizations in order to accelerate the development of the bioeconomy.**

8:30 AM—Registration / Check-in

9:30 AM—Welcome and Introductions— Dennis Hall, OBIC Director, Ohio State University

- Tony Logan, State Director, USDA Rural Development
- Wes Jurey, Chairman, ATIP Foundation
- Todd Campbell, BR&D Board, Operations Committee (Senior Energy Advisor, U.S. Department of Agriculture)

10:00 AM–11:00 AM—Stakeholder Introductions

11:00 AM–12:00 PM— Overview of the “Federal Activities Report on the Bioeconomy” and the “Billion Ton Bioeconomy Initiative: Challenges and Opportunities” Report

- Presentation by Todd Campbell
- Establishes issues from the federal agencies and frames the topics for discussion

12:00 PM–3:45 PM—Stakeholder Comments and Discussion

- 12:30 PM—Networking Lunch

4:00 PM–4:30 PM—Facilitator Report Out and Next Steps

- Key comments, findings, and recommendations of the 6 sectors
- Includes next steps (timeline to review, prepare, and disseminate report) and feedback on session format

4:30 PM–5:00 PM—Closing Remarks / Adjournment

<sup>1</sup> The Biomass R&D Board consists of representatives from the U.S. Department of Energy, U.S. Department of Agriculture, U.S. Department of the Interior, U.S. Department of Defense, U.S. Department of Transportation, the National Science Foundation, the Environmental Protection Agency, and the Executive Office of the President of the United States.

**ATIP FOUNDATION** Agricultural Technology Innovation Partnership

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**ATIP Foundation Regional Bioeconomy Forums:**  
*Addressing the Challenges & Opportunities of Advancing the Billion Ton Bioeconomy*



**NEW HOLLAND**  
AGRICULTURE



**POET**



**DSM**

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**Leveraging Assets: Partnership Intermediaries of USDA ARS**

**The Agricultural Technology Innovation Partnership (ATIP) Network**



**ATIP FOUNDATION**  
Established June 2011

**ATIP FOUNDATION** Agricultural Technology Innovation Partnership

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**ATIP Foundation Regional Bioeconomy Forums:**  
*“Addressing the Challenges & Opportunities of Advancing the Billion Ton Bioeconomy”*

**Venues and Regional Co-hosts**

- September 16, Atlanta, GA (Georgia Institute of Technology)
- September 29, Mineral Wells, TX (Chamber of Commerce)
- October 3, Seattle-Tacoma, WA (Washington State University)
- October 18, Orono, ME (University of Maine)
- November 15, Wooster, OH (The Ohio State University)



**NEW HOLLAND**  
AGRICULTURE



**POET**



**DSM**

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**The Bioeconomy Initiative:**  
 A National Strategy for the Billion Ton Vision



**Todd Campbell**  
 USDA Rural Development  
 ATIP REGIONAL BIOECONOMY WORKSHOP  
 WOOSTER, OH  
 NOVEMBER 15<sup>TH</sup>, 2016

**In announcement inviting applications for 9003 Program...**

"The bioeconomy is a catalyst for economic development in rural America, creating new jobs and providing new markets for farmers and ranchers. Investing in the businesses and technologies that support the production of biofuels and biobased products is not only good for farm incomes. The whole economy benefits from a more balanced, diversified and consumer-friendly energy portfolio, less dependence on foreign oil and reduced carbon emissions."



--Secretary Tom Vilsack, USDA

**Working Together with CAAFI/FAA, DOE, and U.S. Navy**

Farm to Fly (2010, 2012 report) Navy/DPA/F2Fleet (2010, 2011, 2013) Farm to Fly 2.0 (2013, DOE 2014)



### Biogas Opportunities Roadmap and the Food Waste Challenge

**Biogas Progress Report Highlights:**

- Inclusion in RFS Pathways II cellulosic advanced fuels
- DOE Resource Assessment on Renewable Hydrogen Potential from Biogas
- USDA published final Rural Energy for America Program (REAP) rule, streamlined application and scoring
- DOE's BETO Multi-Year Program Plan explicitly calls out "wet waste", a key in biogas
- USDA Rural Utility Services loan guarantees to distributed generations projects that produce electricity (with Power Purchase Agreements) to serve rural areas.
- USDA 9003 Program interim rule and funding notice to provide loan guarantees to commercial, municipal, and industrial biogas plant deployment.
- [http://www.usda.gov/oce/reports/energy/Biogas\\_Opportunities\\_Roadmap\\_8-1-14.pdf](http://www.usda.gov/oce/reports/energy/Biogas_Opportunities_Roadmap_8-1-14.pdf)
- <http://www.rd.usda.gov/files/Biogas-Roadmap-Progress-Report-v12.pdf>
- Will also help to support the United States' first-ever **Food Waste Reduction Goal**, calling for total of 50-percent reduction by 2030 (133 billion pounds of waste per year)

### USDA Regional Biomass Research and Agricultural Utilization at Regional Research Centers

- Special Edition of BioEnergy Research reviews the research accomplishments of Agriculture Research Service (ARS) and Forest Service (FS) on biomass and bioenergy.
- The first 12 articles of issue encapsulate much of the research that was reported by the USDA Regional Biomass Research Centers since their inception in 2010.
- For a electronic copy of the report, use the following link: [Volume 9, Issue 2, June 2016 Special Edition of BioEnergy Research](#)
- More on [Cooperative Research and Development Agreement \(CRADA\)](#) and [Technology Transfer](#) to move research to marketplace

### External Research supported through the National Institute for Food and Agriculture (NIFA)

- Agriculture and Food Research Initiative (AFRI)
  - \$21M available through [Sustainable Bioenergy and Bioproducts challenge area](#), which creates or sustains jobs by enhancing existing food and fiber production systems, boosts ecosystems by reducing greenhouse gases and improving water and habitat quality, and providing renewable energy, chemical, and product options.
  - Received 23 proposals for four \$15M awards, ~dozen targeting aviation biofuel
  - Invested ~\$237 million in research, education, extension grants since '09
- [Biomass Research and Development Initiative \(BRDI\)](#) Request for Application due out soon, Joint USDA-NIFA and DOE-BETO
- Joint Feedstock Genomics for Bioenergy Program solicitation due out this month, joint USDA-NIFA and DOE-Office of Science
- Biorefinery Optimization solicitation may be out before the end of the year, joint USDA-NIFA and DOE-BETO

### Biomass Crop Assistance Program (BCAP) and New Risk Mitigation Tools for Producers

- BCAP incentivizing nearly 1,000 growers on 49,000 acres to establish and maintain new dedicated biomass crops for delivery to USDA-approved conversion facilities.
- Retrieval payments are provided at a dollar for dollar match match, up to \$20 per dry ton for eligible materials including corn residue, diseased or insect-infested wood materials, or orchard waste.
- More at [www.fsa.usda.gov/bcap](http://www.fsa.usda.gov/bcap) or contact a FSA county office.
- Risk Management Agency recently announced producers in Montana, North Dakota, and South Dakota can insure carinata by written agreement under canola and rapeseed plans.
- Builds on available tools that support coverage for crops such as camilina, miscanthus, switchgrass, etc.
- Learn more about crop insurance and the modern farm safety net at [www.rma.usda.gov](http://www.rma.usda.gov).

### Pioneer Plants through the Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program (9003)

- The program now provides loan guarantees of up to \$250 million to develop, construct and retrofit commercial-scale biorefineries and to develop renewable chemicals and biobased product manufacturing.
- For this announcement, USDA will seek applications in two cycles. Applications for the first funding cycle were due **October 3, 2016**. Applications for the second cycle are due **April 3, 2017**.
- Newly implemented two-phase application process to help identify projects that have made most progress in the development stage, greatest capacity for implementation and loan closing.
- First two cycles under the new process yielded complete applications from projects producing biogas, biodiesel, cellulosic ethanol, biobased lubricants and oils, lignin cake and syrup, and fertilizers.
- For more information, p. 48377 of the July 25, 2016, [Federal Register](#).
- Application materials on USDA's [Rural Development website](#).

### Expanding markets with a Biofuel Infrastructure Partnership

- USDA is partnering with 21 states through the Biofuel Infrastructure Partnership (BIP) to nearly double the number of fueling pumps nationwide that supply renewable fuels to American motorists.
- With the matching commitments by state and private entities, the BIP is investing a total of \$210 million to strengthen the rural economy, with match amounts and requests outpacing the \$100 million available.
- These awards are estimated to expand infrastructure by nearly 5,000 pumps at over 1,400 fueling stations.
- More information: [www.fsa.usda.gov/programs-and-services/energy-programs/bip/index](http://www.fsa.usda.gov/programs-and-services/energy-programs/bip/index)

### Strengthening Markets with BioPreferred

- More than 2,700 biobased products on store shelves carrying BioPreferred label, Represents companies in over 40 countries on six continents; [Apply on BioPreferred.gov](http://Apply.on.BioPreferred.gov)
- Over 100 designated product categories representing around 15,000 products included in the mandatory federal purchasing initiative



Tide PurClean, recently certified through the BioPreferred Program

### BioPreferred Economic Impact Report

- To learn more about the viability of the U.S biobased industry and bioeconomy read the original published [BioPreferred Economic Impact Report](#) (2015) and Updated [Economic Impact Analysis of the U.S. Biobased Product Industry](#) (2016)

The Number of Jobs Contributed to the U.S. Economy by the U.S. Biobased Products Industry in 2014

**4.22 Million**

Up from 4.02 Million in 2013

Value added Contribution to the U.S. Economy from the U.S. Biobased Products Industry in 2014

**\$393 Billion**

Up from \$369B in 2013

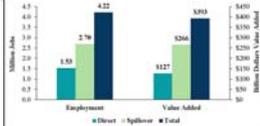
The Jobs Multiplier

**2.76**

For every 1,000 Biobased Products jobs, 1,760 more jobs are supported in the United States

Up from 2.64 in 2013

2016 report shows increase of 200,000 total jobs and \$24 billion additional value-added contribution to the U.S. Economy from 2013 to 2014



Category	2013	2014
Employment (Millions)	4.02	4.22
Value Added (\$ Billion)	369	393
Total	4.02	4.22

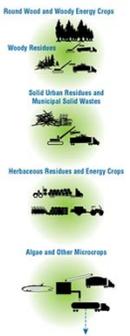
### Bioeconomy Definition

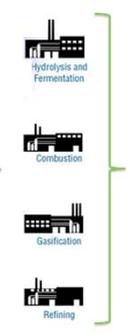
**The BIOECONOMY** is defined as:  
The global industrial transition of sustainably utilizing renewable aquatic and terrestrial biomass resources in energy, intermediate, and final products for economic, environmental, social, and national security benefits.

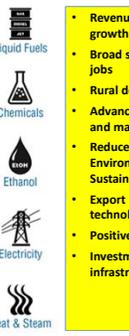
--From 2014 Report commissioned by USDA BioPreferred: [Why Biobased? Opportunities in the Emerging Bioeconomy](#)



### Simplified Bioeconomy Concept







- Revenue and economic growth
- Broad spectrum of new jobs
- Rural development
- Advanced technologies and manufacturing
- Reduced emissions and Environmental Sustainability
- Export potential of technology and products
- Positive societal changes
- Investments and new infrastructure

### Biobased Economy Expansion over Several Administrations Perspectives on the Growth of the U.S. Bioeconomy

- Executive Order 13134 issued in August 1999, President Clinton launched a national Bioenergy Initiative, "a national partnership...to produce power, fuels and chemicals from crops, trees and wastes." The Executive Order established goal: to "triple the U.S. use of biobased products and bioenergy by 2010."
- The Biomass Research and Development Act of 2000, later amended by Section 9001 of the Food Conservation and Energy Act of 2008 (FCEA) and most recently reauthorized in the Agricultural Act of 2014, established the Biomass Research and Development Board (BRD). The BRD is co-chaired by the USDA and DOE with 6 other agencies servicing on the BRD. The Biomass Research and Development Board (Board) coordinates research and development activities concerning biobased fuels, products, and power across federal agencies.



### The Biomass Research & Development Board

- Board facilitates coordination among federal government agencies that affect the research, development, and deployment of biofuels and bioproducts.



Agency	Feedstock Supply	Biomass Conversion	Bioenergy Distribution	Bioenergy End Use
DOE	●	●	●	●
USDA	●	●	●	●
DOE	●	●	●	●
ERA	●	●	●	●
DOI	●	●	●	●
NSF	●	●	●	●
DoD	●	●	●	●

● Use an integrated systems approach ● Provide the science and the technology ● Public and private collaboration to accelerate biomass and bioeconomy development ● Develop a workforce for the future bioeconomy ● Understand and inform policy



### The Billion-Ton Reports and Bioeconomy Initiative

#### Billion-Ton Reports

- 2005
- 2011
- 2016

Resource Assessments – biophysical, economic, and sustainable availability of biomass resources under given assumptions and modeling capabilities

**How much biomass?**

**BIOECONOMY INITIATIVE**

Bioeconomy – expanded economy/market sector of various products under estimated feedstocks levels and given scenarios

**What can we do with it?**

Ensure that current demands for food, feed, industrial uses, and exports continue to be met.

### Need Biomass – Sustainably Produced

- **Baseline scenario**
- **\$60 dry ton<sup>-1</sup>**
- **2012 & 2030**

**Baseline**

**High-yield**

Currently Available Biomass Resources

Potentially Available Biomass Resources

### Federal Activities Report on the Bioeconomy (FARB)

In February, the Biomass R&D Board released the [Federal Activities Report on the Bioeconomy](#). This report aims to educate the public on the wide-ranging, federally funded activities that are helping to bolster the bioeconomy.

- The **vision** for the Billion Ton Bioeconomy is to sustainably reach the full potential of biomass-derived products as a way of expanding our nation's economy. In doing so, the bioeconomy will provide multiple economic, environmental, and social benefits to the Nation.
- The **goal** of the Billion Ton Bioeconomy is to expand and provide innovative ways to remove barriers to expanding the sustainable use of Nation's abundant biomass resources for biofuels, bioproducts, and biopower, while maximizing economic, social, and environmental outcomes.

FEDERAL ACTIVITIES REPORT ON THE BIOECONOMY

### A BILLION DRY TONS OF SUSTAINABLE BIOMASS

HAS THE POTENTIAL TO PRODUCE

**1.1 MILLION Direct Jobs**  
and keeps about **\$250 BILLION** in the U.S. (direct contribution and inflation-adjusted)

**85 BILLION\* kWh of electricity** to power **6 MILLION households**. Plus **1050 TRILLION BTUs** of thermal energy.

**50 BILLION gallons of biofuels** displacing almost **25%** of all transportation fuels.

**50 BILLION POUNDS** of bio-based chemicals and bioproducts, replacing a significant portion of the chemical market.

**400 MILLION TONS** of CO<sub>2</sub> reductions every year

**STEPS TO BUILDING THE BIOECONOMY**

- 1 Accelerate research & technology development
- 2 Develop production, conversion and distribution infrastructure
- 3 Deploy technology
- 4 Create markets and delivery systems

Projections based on:  
• 2016 Billion Ton Study Report (Forthcoming)  
• EIA 2015 AEO  
• 2015 USDA Long-Term Forecast

### FY16 Highlights and Accomplishments, FY 17 Goals

**Q3 BR&D Board Meeting Outcomes:**

- Presentations on the Great Green Fleet and the Federal Alternative Jet Fuel Strategy
- Approved establishment of new Sustainability Interagency Working Group to develop sustainability framework to be included in Action Plan, need called out in the FARB and the Challenges and Opportunities report.
- Agreed upon Summary Sheet of Challenges and Opportunities for use at ATIP Regional Forums/Stakeholder Workshops

**Bioeconomy Analyses Manuscript:**

- "An Assessment of the Potential Products and Economic and Environmental Impacts Resulting from a Billion Ton Bioeconomy"
- Approved for publication in *Biofuels, Bioproducts, & Biorefining*

**Next Steps:**

Launch the Bioeconomy on biomassboard.gov web page, Central website to house all Bioeconomy Initiative related materials, including workshop reports, event calendar, videos, and more

Coordinate with the Board, OpsCo, IWGs, and Writing Team to:

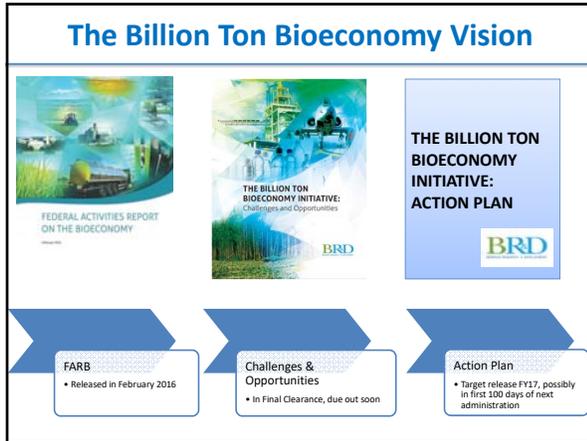
- Develop a scoping document for the Action Plan
- Host a workshop in 2017 to determine path forward for Action Plan
- Develop and release the Bioeconomy Initiative Action Plan

### Stakeholder Engagement Workshops with ATIP Foundation

Agricultural Technology Innovation Partnership (ATIP) Foundation, a consortium of State Economic Development organizations, co-host a series of regional Bioeconomy Forums with a coordinating entity to garner input from a broad range of stakeholders to seek their input, relative to the initiative's vision, strategies, and implementation to help shape a multiyear implementation plan being prepared by the Biomass R&D Board.

Dates & Locations		ATIP FOUNDATION
September 16, 2016	Atlanta, GA	
September 29, 2016	Mineral Wells, TX	
October 3, 2016	Seattle-Tacoma, WA	
October 18, 2016	Orono, ME	
November 15, 2016	Wooster, OH	

- Builds on Billion Ton Bioeconomy listening sessions conducted by USDA and DOE, Feb-May 2016 through webcast and at four major conferences:
  - Advanced Bioeconomy Leadership Conference in DC;
  - International Biomass Conference in Charlotte, NC;
  - World Congress on Industrial Biotechnology in San Diego, CA;
  - Symposium on Biotechnology for Fuels and Chemicals in Baltimore, MD.
- **Total consultation with ~600 people and ~3000 hours of recorded input for analysis**



### Report Outline



- Introduction
  - Purpose of the report
  - Background of the Bioeconomy Effort
- The Bioeconomy Initiative
  - Path to building the Initiative
  - Overview of the Bioeconomy Vision as stated in the FARB
  - Highlights and Learnings from the FARB
  - Expected benefits for 2030 as defined by Analysis IWG
- Challenge Areas (as identified by Stakeholders)
- Ongoing Interagency Areas of Importance and Growth for the Initiative
- Next Steps/Path Forward
  - How to move from the Strategy Report to an Action/Implementation Plan
  - Additional Stakeholder Involvement
  - Call for partners from industry/research community to 'Join the Initiative'
- Conclusion

26

### Key Challenges Identified

This report discusses seven of the high-priority challenges recognized by the bioeconomy stakeholder community, identified below:

- Major technical hurdles for development and scale.
- Steep competition from traditional petroleum-derived resources.
- A lack of necessary infrastructure.
- Access to capital for large financial investments.
- Uncertainties about sustainability—understanding environmental, social, and economic outcomes.
- Growth instability and increased investment risk caused by policy uncertainty
- The need for a strong and capable workforce.

### Key Opportunities

Specific opportunities within each challenge as potential growth areas for the future of the Initiative are detailed below:

- Develop feedstock and fundamental innovations that reduce cost and technology risk in the supply chain.
- Seek opportunities to utilize low-cost waste resources.
- Quantify, communicate, and enhance beneficial effects and minimize negative impacts.
- Create increased public demand for biomass-derived products in a bioeconomy.

### Purpose for this meeting:

- This workshop series is intended to focus on regional issues and their specific bioeconomy-related industries through the various state partnerships.
- The feedback gathered from these formal workshops will be used to solidify and support the Action Plan that is planned for release in FY2017.

### Critical Discussion Points

- What are state/local/regional challenges to the bioeconomy?
- How can the federal agencies help address these regional challenges?
- What are state/local/regional opportunities to the bioeconomy?
- How can federal agencies help leverage these regional opportunities?
- What is the value proposition of a bioeconomy?
- How can you contribute to the Billion Ton Bioeconomy?

30



## The Billion Ton Bioeconomy Initiative: Challenges and Opportunities

### *Overview and Outline of Topics*

#### **Purpose of the Billion Ton Bioeconomy Initiative: Challenges and Opportunities Report:**

In February 2016, the Board released the *Federal Activities Report on the Bioeconomy* (FARB) to highlight the potential for a stronger U.S. bioeconomy, specifically some of the impacts of increasing biomass utilization three-fold by 2030.<sup>1</sup> The goal of the Billion Ton Bioeconomy Initiative (Bioeconomy Initiative) is to develop and coordinate innovative approaches to expanding the sustainable use of America's abundant biomass resources, while maximizing economic, social, and environmental benefits.

Since the release of the FARB, the Board has engaged with the bioenergy stakeholder community to further develop the Bioeconomy Initiative. The new report, *The Billion Ton Bioeconomy Initiative: Challenges and Opportunities*, is the second in a three-part series intended to lay the foundation and serve as the public communication of the Bioeconomy. This report is foundational to the Board's objective to strengthen the commitment and coordination between the U.S. Government and the bioeconomy community. Early feedback from stakeholders has underscored the importance of biofuels, bioproducts, and biopower. This report details several challenges and opportunities that stakeholders have identified as critical to the success of the Bioeconomy Initiative.

#### **Summary of Challenges and Opportunities:**

This report discusses seven of the high-priority **challenges** recognized by the bioeconomy stakeholder community, identified below:

- Major technical hurdles for development and scale.
- Steep competition from traditional petroleum-derived resources.
- A lack of necessary infrastructure.
- Access to capital for large financial investments.
- Uncertainties about sustainability—understanding environmental, social, and economic outcomes.
- Growth instability and increased investment risk caused by policy uncertainty
- The need for a strong and capable workforce.

Specific **opportunities** within each challenge as potential growth areas for the future of the Initiative are detailed below:

- Develop feedstock and fundamental innovations that reduce cost and technology risk in the supply chain.
- Seek opportunities to utilize low-cost waste resources.
- Quantify, communicate, and enhance beneficial effects and minimize negative impacts.

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<sup>1</sup> [http://www.biomassboard.gov/pdfs/farb\\_2\\_18\\_16.pdf](http://www.biomassboard.gov/pdfs/farb_2_18_16.pdf)

- Create increased public demand for biomass-derived products in a bioeconomy.
- Develop bioproducts that can accelerate biofuel production.
- Enable the testing and approval of new biofuels and bioproducts.
- Expand the market potential for biomass.
- Encourage private-sector financing
- Support stable, long-term policies.
- Ensure a ready workforce to meet the needs of the bioeconomy

**Disclaimer:**

*The Billion Ton Bioeconomy Initiative: Challenges and Opportunities* is a product of interagency collaboration under the Biomass Research and Development Board and does not establish any new or explicitly reflect United States Government policy. Some information is based on activities conducted by the Executive Agencies as of May 2016. However, some of the views expressed in this document reflect stakeholder perspectives and do not represent United States Government policy. This report is not a policy or budget document nor an action plan, and it does not commit the federal government to any new activities or funding.

Not for Distribution

**Critical Discussion Points**  
**(from Biomass R&D Board representatives)**

1. What are state/local/regional challenges to the bioeconomy?
2. How can the federal agencies help address these regional challenges?
3. What are state/local/regional opportunities to the bioeconomy?
4. How can the federal agencies help leverage these regional opportunities?
5. What is the value proposition of a bioeconomy?
6. How can you contribute to the Billion Ton Bioeconomy?

**Additional Regional Discussion Points for Consideration**  
**(from ATIP Foundation and Ohio Planning Committee)**

- a) From the “Challenges” section of the above document, what would you list as the 3 highest priorities to discuss and address from the Midwest region?
  - From that same list, what SHOULD be added to that list from our regional perspective? Does it change your prioritization scheme?
- b) From the “Opportunities” section of the above document, is anything missing from the list, and what would you list as the 3 highest priorities to discuss and address from the Midwest region?
- c) What sets the Midwest Bioeconomy apart from other regions of the country?
  - What inherent advantages do you have?
  - What regulatory issues constrain success?
  - What incentives would help advance business opportunities to advance the bioeconomy?
  - What does success in the bioeconomy look like in Midwest U.S. now? In 10 years? In 20 years?
- d) What other biomass would you like to consider in the discussion of advancing the bioeconomy? Animal wastes including aquaculture, manure and carcasses/ municipal landfills/ strip-mined land reclamation/ Others?
- e) How can you enhance your bioeconomy through new partnerships in the region, or on a more global basis?
- f) Should products made using fossil carbon, but using a biological process, be included in the national bioeconomy strategy? Example- algae produced from coal flue gas, methane to biopolymers via micro-organisms

# Critical Discussion Points

Midwest Bioeconomy Forum

Wooster, Ohio

November 15, 2016

## Meeting Notes – Final Non-attribute

### Opening Notes/Comments:

- Denny Hall – commented on key challenges list.
- Todd Campbell– quantification of benefits, what sustainability means; a lot of different definitions; people are trying to get at what it means to be economically, socially sustainable.
- Comment: Sustainability – strongly based on LCA (Life Cycle Analysis); suggestion to reach out to American org on LCA to get input.
- Wes – how do we articulate this?
- Commenter: Argonne has been conducting analysis of economic and environmental benefits of the Billion Ton Bioeconomy from a LCA perspective, and this work has been published a journal article. They clarified the definition of sustainability in the paper. The potential in reducing GHG emissions and fossil fuel consumption, as well as job creation from a portfolio of scenarios for production of a variety of biofuel types and bioproducts via different biomass conversion technologies was quantified.
- Wes – commented that we probably won't redefine sustainability today. View is whether this industry is sustainable.
- Ashley Rose – extensive dialogue with stakeholders already – our chance to comment. If we expand, what does the future bioeconomy look like? What are the implications?
- Commenter: – may have voted differently before the election than today.
- Wes – frame within new administration with focus on job growth, economic development in rural communities. Look at the 7 key challenges & how we grow in the future.

### Key Challenges – Voting (only 3 votes/person):

1. Major Technical Hurdles – 28
2. Steep competition – 26
3. Lack of infrastructure – 16
4. Access to capital for investments – 18
5. Uncertainties about sustainability – 25
6. Growth instability – 21
7. Need for strong workforce – 2

### Key Opportunities – Voting (only 3 votes/person):

- Develop feedstock & fundamental innovations – 27

- Seek opportunities to utilize low-cost waste resources – 11
- Quantify, communicate... - 16
- Create increased public demand – 20
- Develop bioproducts ... - 5
- Enable the testing & approval – 13
- Expand the market potential for biomass – 8
- Encourage private sector financing – 9
- Support stable, long-term policies – 20
- Ensure a ready workforce – 3

#### **WHAT WAS MISSED?**

Commenter:- Life cycle thinking has to be included in any definition of sustainability. Social and economic factors also have to be included in sustainability. Quantify the benefits through a Sustainability Life Cycle Assessment.

Commenter: Using the lab cycle assessments has been utilized and supports the DOE. Agree there are uncertainties. What type of biofuels are we discussing?

#### **From Biomass R&D Board representatives:**

### What are state/local/regional challenges to the bioeconomy?

**Commenter: *Funding for proof of concept, prototyping, pilot-scale facilities***

### How can the federal agencies help address these regional challenges?

- Commenter: – with respect to organic food production, the toolbox for certified products is slim – rather than allowing imports, why would we not allow organic growers the opportunity to have an expanded list of approved products to meet demand of organic food? Organic growers currently have 25 crop protection products versus 500 for conventional growers.
- Commenter: – to attract invest, have tax credit. Second – infrastructure related – industry not there for end of life products.
- Commenter: – there are certain products not emphasized at the moment per report -- - short of plastics, need to include the use of waste as a input.
- Commenter: – He heard Navy is using biofuels, what about other branches?
- Todd Campbell – that was the first solicitation. Other army, air force is open for it. Has to be cost-competitive with traditional fuels. Biofuels is not just for research purposes, it is for tactical purposes.
- Commenter:– He suggested an education program, which would get buyers informed. Actionable item – focus on buyers and USDA biopreferred program.

Comment [RJB1]: So noted.

- Commenter: – Gov't is ignoring things we do well, i.e starch crops. Need cheap carbon to make bioproducts. The U.S. produces a lot of corn, we can use sugars from corn to make bioproducts at a cheap cost. There should be a production tax credit for bioproducts. Second, what can federal gov't do to encourage the things we do well. If we increase the value of biomass to develop the bioeconomy with we will go further.
- Commenter:– Federal gov't can help promote the value of bioproducts. “We can't get a premium for bioproducts” --- government. Why is that? Standardized communication. Also, investment in technology for scale-up. If we are introducing new technology we have to have funding to take risk off the investors.
- Wes – asked about smaller scale funding streams instead of all larger scale funding – most in agreement. Also, asked if the funds should be seed vs. sustainable funding.
- Denny Hall – Workforce development area – Industry led internships that really make it practical. Opportunities can be very valuable --- Federal gov't could provide some incentives to make this happen.
- Wes – How many would support Ohio having a platform for industry and students – workforce development? Utilizes the interns through Ohio had 35+ over the past year, bringing the students in to introduce them to the workforce.
- Commenter: – wage matching program for interns. The Andersons had 35 interns this past year. Training students engages youth in industry and jump-starts workforce development.
- Wes – Registered apprenticeship – do you equate that with unions? Not many raised their hands. DOL host forums, to foster apprenticeship programs. ---
- Wes – How many are aware of Centers of Excellence through EOL?
- Commenter: – He mentioned biobased polyol they developed – product was no longer competitive due to price of crude oil. How do we get to a billion tons without some type of incentive for chemical products? **RECOMENDATION**
- Commenter: – Lenders would be more open to invest if the government was offering something like the biofuels incentives. Need someone to step in to take care of the “gap financing”. Start-ups are risky.
- Commenter: – Process Intensification – from a mfg standpoint – Is Federal gov't looking at from a manufacturing standpoint with costs of biofuels?
- Commenter: – Some biomass not as value-dense. The cost to transport limits geographic mobility. Therefore, many smaller, distributed operations are better than fewer large installations. Put many small bio refineries in the bread basket.
- Commenter: – Mentioned Velocys (sp?) to make jet fuel; We could just as easily use biofuels through those reactors. Action: are they looking at this?
- Commenter: – 3D printing is a disruptive technology. Are there any companies working on new materials for 3D printing?
- Commenter: -- new materials like PLA/ bamboo is being used 3D printing
- Commenter: – 3D printing materials.

Comment [RJB2]: Noted, and passed on to agencies.

- Commenter: – Experience from Brazil – cost of connecting to the grid is a major obstacle for decentralized energy production. Facilitate selling into the “smart grid”. Recommends DOE to incentivize smart grids.

**Note: The following 7 enumerated comments all support the notion of “educating the public and consumers:”**

1. Commenter:– Support cross-boundary meetings where we get people together from different industries. Need more workshops allowing people to connect and work to solve and discuss problems and issues.
  2. Commenter:– Mentioned OBIC led tour in France of biorefineries, biobased companies. In the middle of the (wheat) region was a biorefineries complex – 6 different companies co-located at this site; butane, sugar, all the biomass was coming in but sharing products (Steam, rail) Suggestion is to incentivize co-location of biorefineries. Second, to create an industrial advisory council on biorefineries with participation of companies such as Cargill, ADM, International Paper, POET.
  3. Commenter: – What is the benefit that we tell the American public of achieving the billion tons? We need to educate the consumers. How do we define sustainability? Vision and clarity is needed. What does it mean at the end of the day? Suggestion – How do we define things like sustainability? Needs to be consistent definition and message of importance.
  4. Todd Campbell referred to slide with the benefits.
  5. Commenter: – need to drill down into to each of these categories in order for people to fully understand the full meaning. For example, under the chemical section, how does reducing this through the bioeconomy really benefit a consumer? Will this reduction result in a cleaner environment, less illness, etc.
  6. Ashley Rose – The board is looking to develop a sustainability framework based on the FARB released in February 2016.
  7. Commenter:– A company that creates biobased lubricants is struggling with definition of sustainability. Their struggle is scale. The problem is they were hoping the Federal gov’t fleet would be first adopters however, the definition of sustainability is getting in the way. The Federal gov’t needs to make the definition clear that it’s biobased. Currently, if a fossil fuel based lubricant is mixed with more than 5% recycled lubricant, it can be classified as sustainable. The classification needs to be made very clear on what is considered sustainable.
- Commenter: – A lot of work going on in terms of what sustainability means. It involves environmental and socioeconomic indicators. Defined by life cycle --- scientifically based that must include environmental benefits.
  - Commenter: – Agree with [commenter] – need to drill down so the consumers and farmers know what this means.
  - Commenter: – comment on challenges by the bio lubricants; plastics have the same type of challenges, difficult to bring an innovation to the market place. Be along the same line of cellulose ethanol or create a success story, Recommendations of success story to share

- Commenter: – sustainability needs to be carefully defined; concerned with comparing sustainability to biodegradability, recycled content, etc. Need objective metrics --- there are no simple solutions.

What are state/local/regional opportunities to the bioeconomy?

**Commenter: Potential to connect end-users (polymer, paint, engineered products, food companies with University researchers, innovation programs and biomass producers.**

How can the federal agencies help leverage these regional opportunities?

What is the value proposition of a bioeconomy?

**Commenter: The sourcing of chemicals and materials in a sustainable and environmentally positive way.**

How can you contribute to the Billion Ton Bioeconomy?

**From ATIP Foundation and Ohio Planning Committee:**

From the “Challenges” section of the above document, what would you list as the 3 highest priorities to discuss and address from the Midwest region?

***What did we not list as a challenge?***

- Commenter:– turn one of challenges into opportunities – lack of demand
- Commenter – Within groups (USDA) there is disagreement on how they look at sustainability, within some groups there are lack ambiguity between with policies especially USDA. For example, under the National Organics Standards Board (NOSB) there appears to be a very different view of sustainability than what even the USDA has even though the NOSB is part of the USDA.
- Commenter – quantify and communicate benefits and minimize negative impacts – Communication aspect of benefits – biggest challenge
- Commenter – keep in mind that the primary need for ag is to feed people; don't lose perspective but how do we feed the people. Not to take away from bioeconomy

- Todd Campbell – corn yield increase since 2005 (first renewable fuel std); development of corn ethanol, seeing corn, soybean yields; development of seed technology an opportunity for the bioeconomy – another way of looking at it.
- Commenter – Education is key; need a platform so industry know about the amazing technologies
- Commenter – technical & cost challenges; leaving out paper industry who are looking for opportunities. Not all industries are inclusive that can benefit from the bioeconomy. Why aren't we competitive? Looking for cellulose. Lack of certain elements/ingredients from the supply chain (Wes J).
- Commenter – industry needs incentive to switch from what they are currently doing. Even if the direction is set at the top (leadership) of the firm, folks throughout the organization need to be enabled to move towards sustainable practices. We sometimes observe disconnects between what some firms say and how they behave.
- Commenter – If our goal is to create a unified yet multi-dimensional bioeconomy we must agree on a definition of sustainability. But we should not waste time creating our own definitions when other organizations like the [Roundtable on Sustainable Biomaterials](#) (RSB) have already created standards and certifications. We cannot just rely on LCA to define sustainability we need other dimensions that address food security and labor rights. Not all biofuels/bioproducts are created equally and therefore we must adopt a unified set of sustainability standards.
- Commenter – have to embrace a sustainability and economy-wide opportunities. We are aware of current issues in our own industry/space, but not potential solutions from other industries E.g. CO2 sequestration need for power plants, etc.; this can be used as an input to make more sustainable products (agriculture) rather than dead-end storage (mineralization or down-hole injection) options. Requires cross-cultural discussion (facilitate people to get out of their silos).
  - **Note: really important point that has transcended all forums.**
- Commenter – Silos, people don't talk to each other. Even with everyone trying hard, there isn't a good database with all of these technologies that is accessible. We don't know each other – that is the problem.
  - **Note: PPP can be developed to address such issues. Contact [rbrenner@atipfoundation.com](mailto:rbrenner@atipfoundation.com) if further assistance is needed.**
- Commenter – build on pulp & paper comment – have had a healthy dialogue with a pulp & paper company that it is important for them to repurpose their assets. A real opportunity; also gets away from food vs fuel debate.
  - Comment- forest land could be converted into food production land as was done in most of the state of Ohio in the mid 1800s. So not sure how using wood gets away from this debate.
- Commenter – Challenge is we need to differentiate bioeconomy from the general economy. Need to make decisions based on price vs. quality.; consumers need to be made aware of advantages in bioeconomy. Defining “sustainability” and “bioeconomy” are viewed as critical first steps.

- Commenter – challenge is entrepreneur working with academia. How to balance things from a business perspective?
- Denny Hall – OBIC has aspired to act as a cluster agent over the years. Initially designed as a bridge between Industry & Academia. To continue to do this, OBIC needs sponsorship. Envious of Europe – funding for this type of activity.
- Wes – economies are regional. Need to think regionally in this discussion. Regional Aggregation.
- Commenter – Circular Economy – common in Europe, new in the U.S. Materials Exchange Initiative (cloud-based platform) – companies can list their excess materials. Need to expand this to include the bioeconomy.
- Commenter – Issue: How do we bring them into our industry, next generation-(need to groom the next workforce?) -- Social media? They will support this more than anyone else.
- Commenter – BioOhio main goals connect entrepreneurs to resources, manufacturers to suppliers. Information on BioOhio's website to help people find each other. Just visited high school (STEM) in Gahanna – doing great things, capstone classes. Need resources for educators and students. BioOhio helps connects the community, collection of 3000+ of business to connect you to resources. Need to spread the word about the resources. Where is the workforce coming from? Jr & Sr level kids at a local schools are focusing on building the yields, impressive young minds are out there looking, needs to be something in place for resources for educators and students to make the connections.
- Wes – need to make it easier to navigate.
- Commenter – 22 yrs old, OSU grad; interned at Renergy. It was very exciting. Thinks workforce is there.
- Commenter – last year summer mfg camp 6<sup>th</sup> – 8<sup>th</sup> grade. We could do this for the bioeconomy. Summer manufacturing camp: take kids around tour plants. Skills that are now required with computer 6&8 graders, excite them on what is available in the future.
- **Additional Reviews/Comments for Challenges or Opportunities**
- Commenter – (1) favorable policy at federal/state level that can be mirrored at state / local level; combined permitting process; incentives for private lending or capital. Tax incentives not long term enough. (2) Create regulatory environment that is favorable: Fast track/ combine permitting with EPA/Building/Zoning.. (3.) Provide / create incentives for private lenders to participate
- Commenter – some resources are available through OSU. BioHio Research Park to bring people together to move the technologies
- BioOhio Research Park offers opportunity of connecting resources and capabilities at OSU in the bioeconomy.
- Commenter – We should frame the bio-economy not just around job and economic growth but also around climate change. Yes, politically it makes sense to frame it around job creation with the new administration but the bioeconomy is positioned to last much

longer than Trump and therefore we should take a long-term approach by framing the bio-economy expansion around climate change mitigation. In the report, climate change was not mentioned once except in the annex section.

- Wes – need to be about sustainability, climate change, and economic viability – needs to be about all of the above. But goal of this initiative is to feed the world, etc.
- Commenter – Data shows people will pay a premium. Need to include climate change. Politically challenging, but need to keep the climate change in the forefront.
- Commenter – Suggest that agriculture is part of the solution. Most of us have forgotten that through photosynthesis that plants use carbon to help with root growth and give off oxygen. This process has a cooling effect and helps to regulate ambient temperatures.
- Commenter – Food, Energy and Water Environmental Engineered Systems approach – agriculture production working with community & regional energy and water resources. When local resources are focused on regional strengths leveraging geographic advantages, marketplace and production expertise, local economies thrive. clarify and demonstrate how can we have impact on regional areas ; how do we get rid of some federal programs. [RJB note: ?? – what federal programs?] How can federal programs like USDA NRCS be modified to include conservation programs that allow both soil, water and habitat conservation with agricultural product production on the NRCS funded protected lands? For example: perennial biomass crops to prevent soil erosion, nutrient runoff and enhance pollinator habitat yet can be harvested for forage, fiber or biomass feedstock on a defined interval.
- Commenter – next generation farmers coming up (only 2% farmed) – it will take work & effort to make change in the bioeconomy. How do we do this without the large capital investment, work and effort to come on and produce, it has to be profitable for them.
- Commenter – BioOhio represents all of biosciences. People are doing their jobs that are having a positive impact on lives. Benefits medical, ag production. This messaging covers it and should avoid political differences.
- Commenter – Market viability – over and above price vs performance – still have the challenge of market inertia – don't want to be the first company to market ("show me who has used the product and proof of it"). Early adopters are critical.
- Commenter – bought into climate change, but looking at it from an investor point of view, products have to be competitive -- If I'm investing I have to be competitive. Need policies that are stable.
- Commenter – one of the challenges is early innovation & getting products to market. why don't we have it in all/other industries for incentives? If there is no incentive it becomes difficult. Something across the line to offer to all.

From the “Opportunities” section of the above document, is anything missing from the list, and what would you list as the 3 highest priorities to discuss and address from the Midwest region?

What sets the Midwest Bioeconomy apart from other regions of the country?

- Commenter – we are centrally located. This is a great place to be to get things to the rest of the country. Close to Great Lakes.
- Commenter – the scale of polymers and materials, and agriculture. The strength of our universities. Strength of public/private partnerships.
  - Ag is Ohio's #1 industry and polymers is #2
- Commenter– we have a large workforce in coal mine areas and steel valley. Is there a mechanism to target these regions? Any incentive for these areas?
- Commenter– Development in Appalachia. POWER initiative is EDA and ARC funding to allow the coal industry to reconfigure. This is an advantage for Ohio and the Midwest.
- Commenter– From a mfg standpoint, we have a lot to offer. Also, have the Ohio River --  
- Low energy costs, Ohio River, Grain costs. Besides corn and grain crops, we have the largest supply of animal tallow.
- Commenter – Large land base with ability to not compete for food but available for other uses that are related to non-food items.
- Commenter– not as much weather-related variability as other places (such as droughts).
- Commenter– Close to raw materials (i.e. corn); close to refineries, farmers; advantage is we are deregulated. The entire infrastructure is here.
- Commenter– 45% of polymers in U.S. within 500 mile drive. Lubrizol, Emery, Ashland are all located here.
- Commenter– It is important for us to own the disruptive technology to make it work here, to keep jobs here. Opportunity to use corn and soybeans – already at an industrial scale.
- Commenter – Mentioned targeted job areas for Ohio; match federal policy to state policy. R&D is fantastic in the area. Need more support for R&D.
- Commenter – Jobs Ohio is trying to do that (Chris' comment). Focus on 4 main disruptive technologies (Additive manufacturing, Factory Automation, Advanced materials & Sustainability) that will affect our workforce for Ohio, because about 20% of Ohio's GSP comes from manufacturing products, and all of the above trends are disruptive to the manufacturing industry & its workforce. If we don't focus on attracting & nurturing innovators in these disruptive technologies, we'll lose our current edge..
- Commenter – Resource stewardship (???)

- Commenter – focus on polymers and fine chemicals to use biomass as feedstock. Current technology is based on adding complexity: e.g.; hydrocarbons → pharmaceuticals. Need to focus on general transformations of complex feedstocks.

**How much research is being done on what is needed? Do businesses/universities partnership contract R&D at the local universities?**

- Commenter – Mentioned MEP (Dept. of Commerce, Manufacturing Extension Partnership, <https://www.nist.gov/mep> ) [note from RJB --- this was developed using model of USDA Cooperative Extension Service.]
- Commenter – A lot of people doing research; work from others on by-products' way to transfer to our national resource base. How do we get researchers to work out ways to communicate with industry? Need a mechanism for communication --- perhaps using OSU Extension as a model on the agriculture side. RJB mentioned difficulty when calling universities to get listing of patents. Need a more centralized clearing house for Intellectual Property availability. [Note from RJB: Association of University Technology Managers (AUTM) may have such a list available to industry. See <http://www.autm.net/> ]
- Commenter – We need a list of problems from companies that we can take to the universities [RJB note: and to federal labs through <https://www.federallabs.org/> ] to find a solution. A list of patents available for licensing is like pushing a rope.
- Commenter – On 11/17/16, the AG's office is putting a seminar.
- Commenter – Mentioned that the Ohio 3<sup>rd</sup> Frontier program was a good example of industry/academic research partnership. OBIC was formed by a 3<sup>rd</sup> Frontier grant and the program has been successful initiating industry/academic partnerships that have had a large impact. (see [https://development.ohio.gov/bs\\_thirdfrontier/tvsf.htm](https://development.ohio.gov/bs_thirdfrontier/tvsf.htm))
- Commenter – working with Nonprofits to be successful in applying for grants; challenging for small businesses to compete in these grant programs.
- Rick Brenner – problem solving for industry through federal agencies is best through the Cooperative Research And Development Agreements (CRADA) that are fairly uniform across all federal agencies (by federal statute). Also look to gov't university industry research roundtable (GUIRR) for partnerships between industry and university research assets.
- Commenter – On the finance side – where is the financing? USDA has loan guarantees but we need gap financing. Need financial partners involved to address the gaps. Can there be an established clearing house for these products to get everyone on the same page?
- Commenter – Educate, especially the start-ups – no clue on financial, management side. Partnerships must be in place like with AgCredit and USDA. Equity always becomes a issues with a startup.
- Commenter – Need a point person in our region to get things done. Need to know who to call for assistance. Who is a contact for ATiP foundation engagement?
- Wes – We acknowledge that it is difficult to figure out who to work with in federal gov't. represented by 14 R&D agencies and 900 laboratories, especially when there is a need

to configure industry/governments/university partnerships. That is a role that the ATIP Foundation plays as an independent “partnership intermediary” to facilitate partnerships among private sector, federal researchers, university researchers, and investment community. The Foundation can be reached most efficiently through a simple call or email to Dr. Rick Brenner, Director, ATIP Foundation, at 410.980.1943, or [rbrenner@atipfoundation.com](mailto:rbrenner@atipfoundation.com).

- Commenter – Ashland is a member of CBiRC (Center for Biorenewable Chemicals (CBiRC) at Iowa State) and helped fund it. A couple of years ago, CBiRC was running out of money. Ashland just joined a NNMI consortium – 130 companies, 2 federal labs, 4 universities – for the composites industry. Thinks it is a great program that fosters discussion of the bio refinery concept with the universities and industry.
- Todd Campbell – Had CBiRC funding under 2 different Presidential budget proposals and were not approved by Congress. Decision made not to put in last budget since we have been on a Continuing Resolution the entire year that does not entertain any new initiatives.. Talked about Advanced Mfg Networks and regional catalysts to help to continue to fund.
- Commenter – As to funding sources, need to engage the banking industry into the bioeconomy industry.
- Commenter – Mentioned organization regarding USDA loan programs (2 years); National Lender association member that offers Rural Business Guarantee

**What other biomass would you like to consider in the discussion of advancing the bioeconomy? Animal wastes including aquaculture, manure and carcasses/municipal landfills/strip-mined land reclamation/Others?**

- Commenter – hog, poultry industry in Ohio – manure will become more of an issue; Phosphorus run-off an issue. How do you get the biomass from those farms?
- Commenter – they have storm pits and have anaerobic digester (AD ) on the farm.
- Commenter – Ohio has a large food processing industry so we have large food waste.
- Commenter – AD digestate should be considered. There are many issues involved in storing and processing AD byproducts. Especially methane emission which is a potent GHG.
- Commenter – crop rotations re: water quality; biomass harvesting – opportunity to maximize landscape and water quality.
- Commenter – forest products focus?
- Commenter – Municipal Solid waste/sewer treatment, one of Ohio strengths is the Ag Community. Works well with local universities, FB and other organizations. Would like to hear from others before a issue arises.
- Commenter – Energy Tobacco called [Solaris](#). USA is the #4 producer of tobacco worldwide. High yield crop can replace traditional tobacco farms which have recently

been in decline. Can produce several bioproducts including: biofuel, biodiesel, biomethane, and livestock feed.

- o Solaris revenue is flexible because it has several profit channels in addition to biofuel feedstocks, these include: biomass for paper and pulp, pelletized biomass for biogas and biomethane generation, and seed cake for livestock feed.
- Byproducts of grasses and tobacco. Can the biomass be harvested in a wildlife-friendly manner?
- Todd Campbell – Double cropping; photo on camelina – plant at end of corn & soybean season. Some conservation benefits. Attracts honeybees.
- Commenter – Emery has looked at camelina as an alternate raw material but infrastructure not there; not enough volume.
- Commenter – Need to educate farmers on these new crops.
- Commenter– Weather can be an issue to incorporate camelina or other crop rotations. A lot of risk. Need to put a biodigester facility on the farm or centralized location (don't want to ship because feedstock is 75% water).
- Commenter – Bamboo (7 varieties can be grown in Ohio). Grows quickly and is renewable.
- Commenter – mentioned watch out for invasive species. (some bamboo species)
- Commenter – Were climate models taken into consideration on the billion ton report?
- Commenter – yes climate change models were taken into consideration – next report stipulates this.
- Commenter – challenges in separating cellulose from corn cobs / corn stalks.
- Commenter – challenge in Ohio is high land costs. The growth of miscanthus on strip-mined lands does really well relative to other crops. After 3 years, harvest 6-8 tons of biomass/acre but in addition creating biomass subsurface that remediates cite. Opportunity to look at strip-mined lands to develop a crop.
- Commenter – Is there a definition of marginal lands? Does it include prairies, grasslands?

#### **National Wildlife Federation - Biomass Harvesting on Marginal Lands:**

Cultivating and harvesting biomass on marginal lands should be done in a way that protects and enhances wildlife habitat. Biomass cultivation should be limited to non-natural habitats, such as reclaimed mining fields and brownfields, to conserve wildlife. It is critical that conversion of native prairies, wetlands, forests, and other habitats is prohibited. Harvesting of biomass in native prairies should be done in a way that protects and enhances the wildlife habitat value of the land, for instance harvesting after the nesting season. There must be rigorous criteria in place before biomass harvesting can be permitted on natural habitats: A quantifiable minimum amount of biomass necessary to ensure stable resources must be established so native wildlife can maintain and grow their populations. There also needs to be sufficient organic material left on site to guarantee the replenishment of soil nutrients. Instead of monocrop production systems which require heavy industrial processes, National Wildlife Federation suggests wildlife friendly feedstocks, such as diverse mixtures of native species, or at least, polycrop systems and the use of crops which store a majority of their biomass below ground as a means to improve carbon storage in the soil. Feedstocks should be limited to native

species or non-native species with a low risk of invasion. National Wildlife Federation understands that different intensities of harvests may be (un)acceptable depending on the parcel of land and the proposed feedstock, however, there needs to be minimum standards in place to protect the wildlife and habitats that depend on land that many producers consider marginal. Given that sustainability is contextual and varies by region, biomass producers should engage with local stakeholders, such as landowners, extension officers, insurance officials, NGOs, and academic experts. Instead of developing new certification schemes or standards, we suggest adopting existing certification programs such as the Roundtable on Sustainable Biomaterials and Forest Stewardship Council.

Please see the National Wildlife Federation [Biomass BMG Report](#) for additional information.

- Commenter – failing septic tanks; how is this waste incorporated into estimated?
- Todd Campbell – mentioned marginal or underutilized lands, nutrient loss.; Nutrient loss/lower yield on marginal land use.
- Commenter – How do you get the younger generation at the table to discuss these issues?

## How can you enhance your bioeconomy through new partnerships in the region, or on a more global basis?

- Commenter – include community colleges with the bigger universities. Even high schoolers.
- Commenter – Seed treatment is typically done on the farm as it is too expensive to have seeds brought to a treatment center. Is there some kind of partnership to learn each other's waste materials so that you could see if one's waste is someone else's raw material? Some waste materials could be a raw material for someone. These might be smaller partnerships, not large ones.
- Commenter – Most solid waste districts that own landfills have an incentive to landfill vs. find other uses for organic wastes that could be used as feedstocks for bioproducts and biofuels. For example a solid waste district usually receives a payment for every ton of material received at a landfill. These incentives need to be reversed so that they are disincentivized to landfill materials so that they will more actively seek opportunities to reuse and recycle them instead.
- Commenter – Referred to establishing a local network so that everyone knows the local businesses and skills. You could create these networks on facebook.
- Commenter – Referred to Chamber of Commerce concept -- create formal networking that is steady and regularly Have monthly meetings/discussions to stay connected.
- Commenter – what about economic agencies working with groups like JumpStart? Can they utilize federal funds to help start companies?
- Commenter – In the last 50 years, startups have been creating the jobs. Focus on job creators. Partner with MEP, JumpStart, etc.

Should products made using fossil carbon, but using a biological process, be included in the national bioeconomy strategy?

Example- algae produced from coal flue gas, methane to biopolymers via micro-organisms.

- Denny Hall – Provided context for the question. Referred to USDA's definition of testing for biobased carbon.
- Commenter– this is a continuing conversation with his company. Same molecule regardless of the process. However, they get paid differently depending on what they derive it from (i.e. switchgrass vs. tires). This needs to be cleared up so they can talk with investors.
- Commenter – No, don't agree --- if you take shale gas should not equate bioeconomy with biorenewable.
- Commenter – Analyze the whole system from a LCA perspective, and consider all the fossil carbon inputs and biogenic carbon inputs to determine the carbon flows and carbon intensities of products.

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**Wrap-up Statements by Wes Jurey for participant confirmation:**

- Finance is a key issue
- Education and company awareness is a key issue
- Policy is a key issue
- Supply Chain is a key issue
- Workforce as an issue – mixed
- Easy access to federal resources is an issue – yes
- Collaboration is critical

Commenter: What is key is that we all have the same vision of where we want to be. Otherwise, it is like trying to put a puzzle together without a picture of what is suppose to look like.

Commenter– need to be able to communicate to general population as well as those that provide the funding.

Wes- economic case is the strongest, if we grow the economy then we can do more. Weak economy reaches from county all the way up to federal

## What do you want to do next? Where do we go from here?

- Commenter – looking at other countries that take the raw materials and send it back as products. A lot of diverse product but processing is involved. Biomass, why can't we finish the product and export food forest – diverse products, processing – For biomass, can we produce more locally and export it to China?
- Commenter – Linking buyers and sellers of biomass products is a challenge – Develop an eBay like app that utilizes GPS, google earth to id biomass resources in a field that someone wants to sell; then run an internet auction for buyers to bid on biomass.
- Wes – is everyone interested in continuing this collaboration?
- Denny Hall- Interest in having a larger forum with the expanded Midwest states participating
- OSU will continue to work with ATIP.
- Commenter – asked the question of how this would look regional (i.e. Sun Grant)? Regional Bioeconomy Forum, registration fee, how far will people travel.
- Commenter – at one of the first North Central Sun Grant regional forums, the focus was on biomass although other topics along the value chain were also discussed. A future Sun Grant meeting may be held within the five regions.
- Commenter – need to present more clarity to the vision when broadcasting to a wider audience. This is a first step as a region.
- Wes – suggested that those interested to let Denny know.
- Commenter – commented on original mission of Sun Grant being to conduct regionally relevant research.
- Commenter – many businesses don't recognize what the bioeconomy is so how do we get the message out to them?
- Wes- working with government, economic Development directors and chambers, community colleges, starting with the organizations that start with the stakeholder groups you are a part of; better to link networks with other networks, rather than knocking on individual doors.
- Commenter– what will new administration think of this work? Need to develop a strategy to advocate for this.
- Commenter – Is there a regional focus; regions aren't defined by state lines.
- Todd Campbell – Part of the billion ton assessment shows there are benefits to all areas of the country regardless of what product you're producing. The regions define themselves.