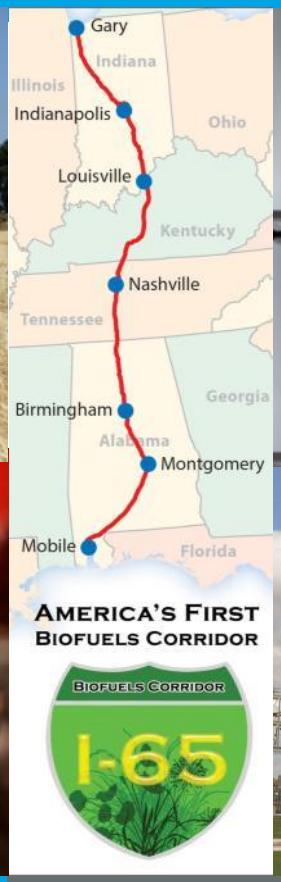
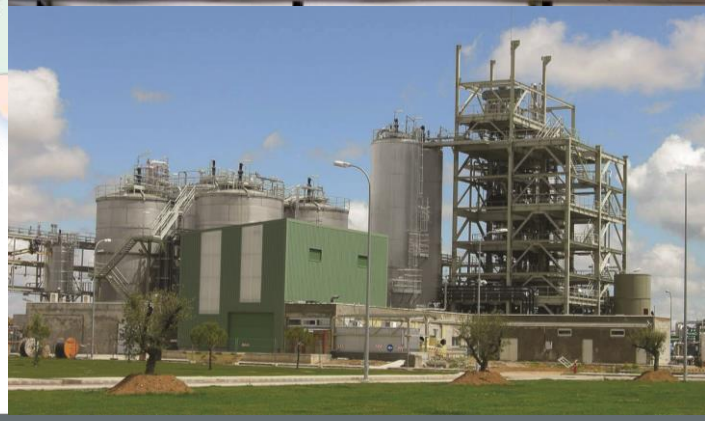
BIOENERGY TECHNOLOGIES OFFICE

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy





Biomass Research & Development Technical Advisory Committee

Mark P. Elless, Ph.D.
Designated Federal Officer

June 15, 2017
Arlington, VA

Outline

I. TAC Overview

II. FY17 BRDI RFA Status

III. FY18 Congressional Budget Request

IV. BETO R&D Updates

V. BETO Communications Updates

VI. Bioeconomy 2017 Conference & 2017 Program Management Review

TAC Ground Rules

- TAC conforms to all Federal Advisory Committee Act (FACA) requirements: http://www.gsa.gov/portal/content/101010
  - Meetings are announced in Federal Register and open to public.
    - Public comments limited to 5 minutes per speaker
    - Minutes will be prepared and approved by the DFO. Approved minutes to be placed on Biomass R&D Board website within 90 days of meeting.
  - Subcommittees are permitted to work in closed sessions.
- Representative vs Special Governmental Employee (SGE)
  - Representative: provides stakeholder views only.
  - SGE: provide independent advice based on their expertise; also, an officer or employee of the Executive or Legislative Branch serving as a spokesperson for the US Gov't on committee matters.
- TAC provides suggestions for information requests via DFO and Co-chairs.
- Final recommendations are formed by majority consensus.
- Public policy recommendations are not prohibited.
- Co-Chairs are the spokespersons for the TAC: Refer press inquiries to them.

Travel Reimbursement

1. Traveler Information Form:
   - Please complete this form (except SSN) and submit to Shaune Gaither at DOE.
   - Shaune will make your travel arrangements (flights) and reimburse your allowable expenses.
   - Contact information is Lashaune.Gaither@ee.doe.gov or 202-586-5674.
2. Allowable Expenses:
   - Flights will be arranged by Shaune Gaither
   - Lodging location will identified for you at government per diem rates. You will make and pay for your own reservation and be reimbursed.
   - Continental Breakfast and lunches will be provided for each day of the meetings. You will be reimbursed at the per diem rate for dinners.
   - Other Expectable Expenses: baggage fees; cab/shuttles; parking; Wi-Fi

Reimbursement deadline for this meeting: June 30th, 2017

2017 Work Plan and Meeting Dates

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Meeting	Objectives
Q1 March 30-31	• Receive overview presentation from BETO, USDA, NIFA, Office of Science, and EPA on priorities for 2017. • Review and select work plan for 2017 Committee activities. • Identify 1-4 quarterly focus topics.
Q2 June 15-16	• Receive key presentation of selected quarterly focus topic. • Work in subcommittees to further develop key themes, ideas, and recommendations for the quarterly focus topic.
Q3 Week of August 14-18	• Receive key presentation of selected quarterly focus topic. • Work in subcommittees to further develop key themes, ideas, and recommendations for the quarterly focus topic. • Conduct a site visit (location TBD). • Vote on Q2 topic final recommendations.
Q4 Week of November 13-17	• Receive key presentation of selected quarterly focus topic. • Work in subcommittees to further develop key themes, ideas, and recommendations for the quarterly focus topic. • Vote on Q3 topic final recommendations.

FY17 BRDI RFA - Snapshot

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1. **Released through EERE Exchange on June 5, 2017**
2. **Total Purse: $9M**
   - USDA: $6M
   - DOE: $3M
   - No comingling of funds
3. **Award Size: $0.5 - $2M per project**
4. **Expected Number of Awards: 1-6 for DOE; 3-12 for USDA**
5. **Award Duration: up to 3 years**
6. **Timeline**
   - Concept Papers Deadline: July 7, 2017
   - Full Applications Deadline: September 22, 2017
7. **Point of Contacts and Roles**
   - **DOE-EERE Lead:** Dr. Mark Elless; oversees concept paper review
   - **USDA-NIFA Lead:** Dr. Daniel Cassidy; oversees full application review
8. **FY17 BRDI RFA is last one under current Farm Bill**

Biomass Research and Development Initiative

BRDI is Focused on Three Technical Areas

- Feedstock Development
- Fuels/Product Development
- Development Analysis (LCA)

Evolution of BRDI

- Total Program: ~ $200M Federal Investment
  - FY 2005: USDA $12M (average $1.1M)
  - FY 2012: USDA $40M (average $6.2M)
  - FY 2015: USDA $7M (average $1.4M)
  - Leverages ~ $80M from private sources
- FY 2009 required all projects address LCA
- FY 2010-2012 required integration of all three technical areas
- FY 2015 required only one technical area to be addressed
- FY 2017 will allow any or all technical areas to be addressed

Proposed Criteria and Weighting for Full Applications

Criterion 1: Technical Relevance and Merit (Weight: 35%)

Specific considerations are:

- Relevance and alignment of the project objectives to the Technical Area goals
- Novelty, innovation, uniqueness, and originality of the project objective or the extent to which the project objectives move the industry forward. Applications should articulate how this project will advance the industry against the relevant baseline that the system, technology, or product is building upon or competing against

Criterion 2: Technical Approach/Work Plan (Weight: 25%)

Specific considerations are:

- Clarity, reasonableness, and feasibility of the technical approach to achieve project goals;
- Viability, adequacy, and relevance of the proposed task structure, milestones, schedule, and performance measures and deliverables
- Likelihood that a Research and Development project will be ready to be demonstrated or scaled-up upon completion
- Likelihood that a Demonstration project will generate adequate performance data and business planning to secure additional funding or financing; and
- Adequacy and viability of the tools and management capabilities to mitigate project uncertainty and risks
- Status of environmental permitting (note: this bullet is applicable, as appropriate to invited full applications only, and not pre-applications)

Proposed Criteria and Weighting for Full Applications

Criterion 3: Technical, Management, and Facility Capabilities (Weight: 25%)

Specific considerations for this criterion are:

- Credentials, capabilities, experience (technical and managerial), availability and performance record of key personnel;
- Type, quality, availability, and appropriateness of facilities, equipment, and supplies; and
- Extent the roles and responsibilities of key personnel are clearly defined.

Criterion 4: Rural Economic Development & Sustainability (Weight: 15 percent)

Specific considerations are:

Extent to which the proposed project demonstrates the following criteria based on preliminary data specific to this proposal:

- Promotion of enterprise and community self-sufficiency, rural economic development, job creation; inclusion of community stakeholders;
- Quantification of life-cycle economic and environmental benefits, e.g. impacts and benefits to public safety, the environment, and land sustainability in rural areas. In particular, collection of data that can be used to gauge improvements in key sustainability areas, specifically soil quality, water quality/water use, generation/reduction of hazardous/toxic substances, air emissions; wastewater discharges; reductions in use of pesticides, herbicides and fertilizer, and other data necessary to quantify the sustainability of the project. Quantification of projected energy efficiency and/or petroleum displacement benefits and include any assumptions used;
- Demonstrate the integration of system evaluation methods to optimize the economic, environmental, and social performance of the system; and
- For advanced hydrocarbon-based biofuels, compatibility of the proposed technology or product with existing infrastructure and end use applications.

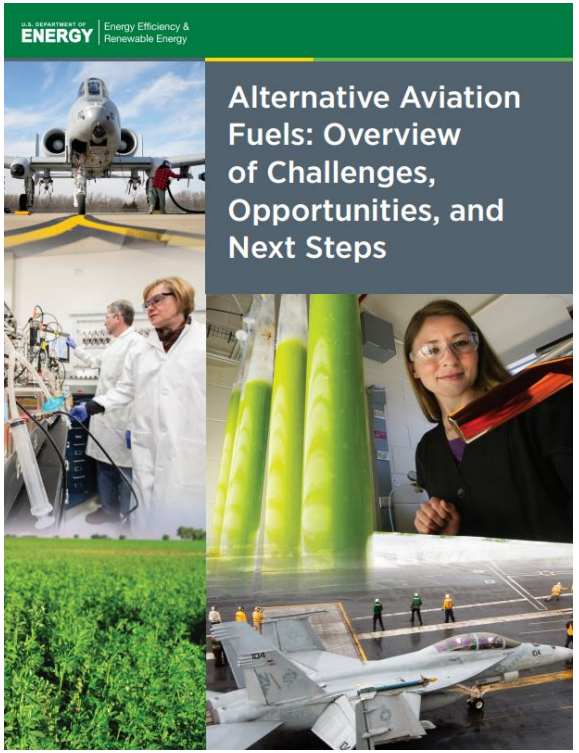
FY18 Congressional Budget Request

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

DOE Office	FY18 Budget Request ($M)	Difference to FY16 Enacted ($M)	Diff (%)	Notes
Office of Science	4,500	-874	-16.3	Focus on conducting cutting edge, early stage research
BES	1,600	-295	-15.6	To support facilities and core research activities
BER	349	-260	-42.7	
ARPA-E	20	-271	-93.1	Terminate, with funding for federal staff to oversee existing awards to completion
Innov. Technol. Loan Guarantee Prgm	0	-17	-100	Terminate
EERE	636	-1,433	-69.3	Focus on early-stage R&D
BETO	56.6	-168.4	-74.8	

Alternative Aviation Fuels Report

- BETO Published the Alternative Aviation Fuels Report on March 28th, 2017
- Report provides an overview of the current state of alternative aviation areas based upon input from the Alternative Aviation Fuel Workshop that was held in September 2016.
- The workshop focused on four main areas:
  - Economic and Technical Competitiveness
  - Fuel Conversion and Scale-Up
  - Environmental Sustainability and Life-Cycle Benefits
  - Feedstock and Product Supply Chains
- More than 100 BETO stakeholders attended the event, representing public- and private-sector organizations, national laboratories, and academic institutions.
- Knowledge assembled from the workshop will help to advance the understanding of current technical barriers for increasing the competitiveness of aviation biofuels.



Small Business/National Lab Collaborations

- On April 21st 2017 DOE announced 38 small businesses that will collaborate with national lab researchers through the Small Business Vouchers (SBV) pilot.
- There are 5 projects that will be partnering with 6 National Laboratories in the bioenergy area:
  - **Gevo:** ANL and NREL will partner with Gevo to produce the next generation of biofuels that augment petrochemicals by creating a model that measures the synergistic and antagonistic relationship between gasoline and isobutanol.
  - **Cogent:** INL will assist Cogent in improving its small-scale gasifier for distributed waste-to-energy applications and markets. The gasifier can produce profitable end products like electricity, hydrogen and/or chemical precursors, and liquid fuels.
  - **Kalion**: LBNL and Kalion will work together to reach full manufacturing-scale production of glucaric acid and glucuronic acid by creating a manufacturing-ready production strain and scaling up that strain to generate an appropriate process.
  - **Synvitrobio:** ORNL will work with Synvitrobio to develop cell-free-based analytical tools to convert renewable biomass into higher-order chemicals mevalonate and vanillin.
  - **ThermChem:** PNNL will partner with ThermChem to determine how to valorize the hydrothermal carbonization process liquids. This goal of this project is to identify the potentially valuable and intermediate chemicals in these aqueous phases and convert them into value-added biochemicals and bioproducts.

BETO SBIR Map

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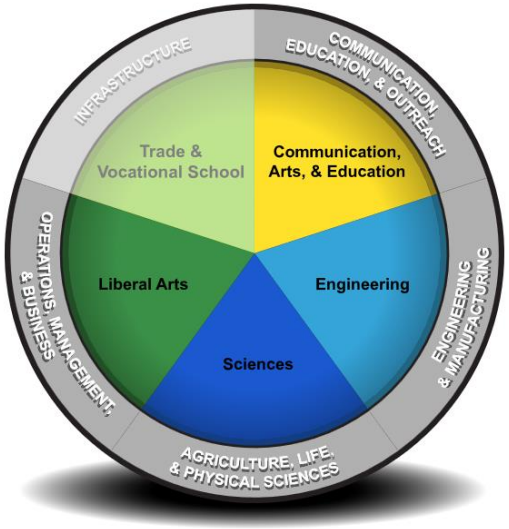
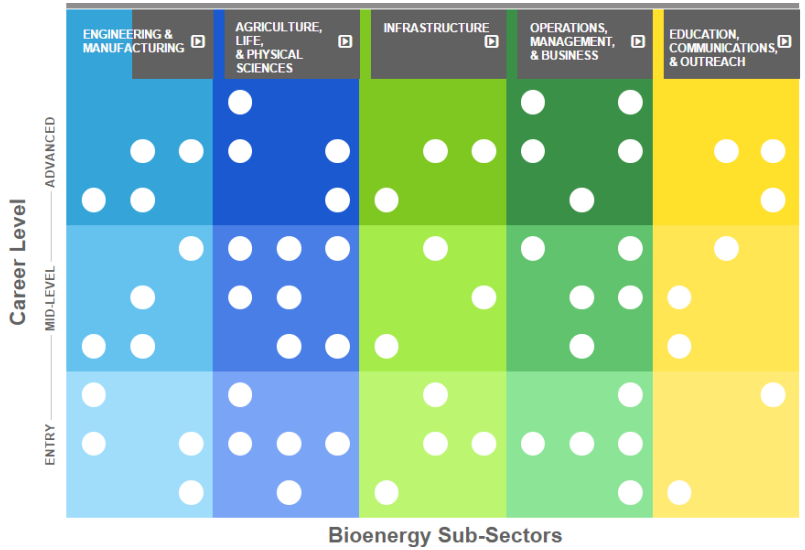
- On April 14, 2017 BETO launched the Interactive Small Business Innovation (SBIR) Projects Map on the BETO webpage.
- The SBIR interactive map depicts all of BETO's recent projects throughout the United States that are competitively awarded through the SBIR program.
- The SBIR interactive map provides:
  - The ability to filter the SBIR Projects Map results by year, state, SBIR phase, and program area, or search the entries by keyword.
  - The dollar amount of each award and its start and end dates are shown as well.
  - Displays a table below the map that automatically shows the filtered results, or users can browse all of the SBIR awardees alphabetically by name of the institution or its location.

Bioenergy Career Map

- BETO and Argonne National Laboratory (ANL) developed an innovative Bioenergy Career Map
- The Career Map enables users of all ages to discover traditional and nontraditional career opportunities in the bioenergy industry
- According to a recent assessment on the economic impacts of the bioeconomy, within the next 15 years, the United States could generate 1.1 million direct jobs in a wide range of sectors, including farming, plant operations, scientific research, and production and equipment design
- The Bioenergy Career Map also includes over 100 career pathways that illustrate ways in which an individual in a particular career in bioenergy can transition to a different sector of the industry





Bioprose

The Bioprose is a new blog that compliments BETO's other social media outreach presence. The blog will:

- ***Have a technical focus:***
  - This blog will discuss accomplishments from BETO-funded research but with a more focused, technical approach
  - Posts will dig into the scientific specifics in short, to-the-point posts aimed at conveying the big picture of how particular achievements encourage the bioeconomy
- ***Enable BETO to be a part of the broader conversation as it happens:***
  - The blog will give BETO a voice in trending discussions about issues that affect the bioeconomy
  - Bioprose will be used as an avenue to share interesting topics with the scientific community and respectfully and factually respond to comments in order to start an informed conversation
- ***Designed to target anyone interested in the Scientific Method:***
  - Posts will be written with a technical shade but also with the goal of being accessible to anyone willing to read them.
  - Bioprose intends for the reader to walk away with a technical understanding that is adequate enough to allow him/her to continue to research the subject independently.
- ***Be a collection of unique voices that make up the Bioeconomy:***
  - The regular contributors from BETO will each have their own personal profile, which will showcase their individual expertise, interests, and background.
  - Bioprose will look for "guest" contributions from other scientists to give the reader a broader understanding of how BETO leverage technological advances

Bioeconomy 2017 and Program Management Review

Bioeconomy 2017

- Will be held July 11-12, 2017 at the Sheraton Pentagon City Hotel
- Convene key representatives from across the bioenergy supply chain, including industry, federal agencies, and Congress
- New keynotes announced! Hear from LanzaTech, Impossible Foods, Ford Motor Company, ICM, and many more!
- **Register now!**

The 2017 Program Management Review

- Will be held July 13th at the Sheraton Pentagon City Hotel
- Results of the Project Peer Review will be presented by Lead Reviewers, along with an overall assessment of BETO's portfolio presented by the Steering Committee
- The Program Management Review will take place the day after BETO's annual conference, Bioeconomy 2017

Appendix

Duties of the Committee Regarding BRDI

1. To advise the Secretaries of Energy and Agriculture through the points of contact with respect to the Biomass R&D Initiative.
2. To evaluate and make recommendations in writing to the Board to ensure the following:

   (A) funds authorized for the Initiative are distributed and used in a manner that is consistent with the objectives, purposes, and considerations of the Initiative;

   (B) solicitations are open and competitive with awards made annually and that objectives and evaluation criteria of the solicitations are clearly stated and minimally prescriptive, with no areas of special interest;

   (C) the points of contact are funding proposals under this title that are selected on the basis of merit, as determined by an independent panel of scientific and technical peers predominantly from outside the Department of Agriculture and Energy; and

   (D) activities under this title are carried out in accordance with this title.
3. The Committee Charter specifically calls for the TAC to make recommendations related to the BRD Initiative.

Links for Additional Information

1. Federal Advisory Committee Act (FACA) requirements:
   - http://www.gsa.gov/portal/content/101010
2. Biomass R&D Board and TAC Website:
   - www.biomassboard.gov
3. TAC Library:
   - http://biomassboard.gov/committee/tac_library.html
4. Federal Register call for new nominations to the TAC:
   - https://www.federalregister.gov/articles/2016/05/25/2016-12319/biomass-research-and-development-technical-advisory-committee
5. Bioenergy KDF:
   - https://www.bioenergykdf.net/
6. BETO Website:
   - http://www.energy.gov/eere/bioenergy/bioenergy-technologies-office
7. BETO MYPP:
   - http://www.energy.gov/eere/bioenergy/downloads/bioenergy-technologies-office-multi-year-program-plan-march-2016
8. ARPA-E Website:
   - http://arpa-e.energy.gov/
9. Office of Science Website:
   - http://science.energy.gov/

FY17 RFA "Biomass Research and Development Initiative"

- **BRDI MANDATE:** Section 9001(a) of the Food, Conservation, and Energy Act of 2008 (FCEA) (Pub. L. 110-246), re-authorized BRDI competitive grants program by amending section 9008 of the Farm Security and Rural Investment Act of 2002 (FSRIA), as amended, (Pub. L. 107-171) (7 U.S.C. 8108). Collaboration between DOE and USDA on BRDI is directed under section 9008(e)(1) of FSRIA, as amended. Additionally, DOE provides funds guided by certain administrative provisions of the Energy Independence and Security Act of 2007 and the Energy Policy Act of 2005. Section 9008(e)(3) of FSRIA provides direction and guidance on the technical areas as described in BRDI.
- **2014 FARM BILL and BRDI:** Mandatory Funding FY 2014-2017 @ $3M per year
- **FOA SIZE:** up to $3M for DOE; $6M for USDA; $6-$9M total; awards made by each Department with no comingling of funds between Departments
- **AWARD SIZE:** $0.5 – $2.0M per project
- **EXPECTED NUMBER OF AWARDS:** 1-6 for DOE; 3-14 for USDA
- **AWARD DURATION:** 3 years
- **COST SHARE REQUIRED:** 20% for R&D projects; 50% for Demonstration