U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy

Bioenergy Technologies Office
NATIONAL LABORATORY CALL FOR PROPOSALS

National Lab Funding for Fiscal Year 2024

This Lab Call is being issued by the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) Bioenergy Technologies Office (BETO).

Questions about this Lab Call? Email simon.roberts@ee.doe.gov
Problems with EERE Exchange? Email EERE-ExchangeSupport@hq.doe.gov Include Lab Call name and number in subject line.

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I. Lab Call Description

A. Background and Context

i. Overview and Purpose

EERE National Laboratory Guiding Principles require all offices to pursue a merit review of direct-funded National Laboratory work. In line with these principles, BETO is issuing this lab call for fiscal year 2024 (FY 2024).

Some labs have continuing multi-year projects that have already gone through the merit review process. These will continue to be reviewed through the biennial peer review process. Labs should work with BETO project and program managers to ensure that ongoing projects are included in the annual operating plans (AOP) to meet AOP deadlines. This lab call will only pertain to the new topic areas below.

Building a clean and equitable energy economy and addressing the climate crisis is a top priority of the Biden Administration. This lab call will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035 and to "deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050"[1] to the benefit of all Americans. The Department of Energy is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of underserved communities.[2]

The research and development (R&D) activities to be funded under this lab call will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of clean energy technologies, which are critical for climate protection. In support of these Administration priorities, BETO is focused on developing technologies that use biomass and waste feedstocks to reduce greenhouse gas (GHG) emissions in difficult-to-electrify transportation sectors and the chemicals industry. Additionally, BETO is focused on valorizing these biomass and waste feedstock

[1] Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

[2] The term "underserved communities" refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list in the definition of "equity." E.O. 13985. For purposes of this Lab Call, as applicable to geographic communities, applicants can refer to economically distressed communities identified by the Internal Revenue Service as Qualified Opportunity Zones; communities identified as disadvantaged or underserved communities by their respective States; communities identified on the Index of Deep Disadvantage referenced at https://news.umich.edu/new-index-ranks-americas-100-most-disadvantaged-communities/, and communities that otherwise meet the definition of "underserved communities" stated above.

utilization technologies to decarbonize the agricultural sector, generate carbon-negative power, draw down carbon, and provide other benefits. Specifically, this lab call will fund R&D in technologies that utilize biomass, including algae, and waste feedstocks to produce sustainable aviation fuel (SAF) and sustainable chemicals, to support the Administration's goal of net-zero GHG emissions by 2050. This Lab Call will renew the Bio-Optimized Technologies to keep Thermoplastics out of Landfills and the Environment (BOTTLE) consortium that is a multi-organization consortium focused on developing new chemical upcycling strategies for today's plastics and creating tomorrow's plastics to be recyclable by design. Other areas include terrestrial feedstock supply and carbon negative algal biofuels; biochemical conversion (including Lignin); and bioenergy supply chain data modeling and analysis. In support of these Administration priorities, BETO is focused on developing technologies that use biomass and waste feedstocks to reduce greenhouse gas (GHG) emissions in difficult-to-electrify transportation sectors and the chemicals industry. Additionally, BETO is focused on valorizing these biomass and waste feedstock utilization technologies to decarbonize the agricultural sector, generate carbon-negative power, draw down carbon, and provide other benefits. Specifically, this lab call will fund R&D in technologies that utilize biomass and waste feedstocks to produce sustainable aviation fuel (SAF) and sustainable chemicals. In addition, this lab call will emphasize increasing diversity of research staff, increasing diversity of voices in research design, and increasing quantification and emphasis on supporting underserved communities.

ii. Timeline and Process Logistics

Timeline

KEY DATES	
Lab Call Release Date:	4/25/2023 5:00 PM ET
PROPOSAL DEADLINE AND DECISION DATES	
Concept Paper Submission Deadline:	5/19/2023 5:00 PM ET
Full Application Submission Deadline:	7/17/2023 5:00 PM ET
Decision Date:	9/08/2023 5:00 PM ET
Expected Beginning Award Issue Date:	10/31/2023 5:00 PM ET

Process Logistics

All communication to BETO regarding this Lab Call must email simon.roberts@ee.doe.gov and CC the topic POC (Topic 1a – chenlin.li@ee.doe.gov; Topic 1b&c – daniel.fishman@ee.doe.gov; Topic 2 – ian.rowe@ee.doe.gov; Topic 3 –

andrea.bailey@ee.doe.gov) as appropriate. Replies will be provided to all LRMs with anonymity maintained to the extent possible.

- **PROPOSAL SUBMISSIONS:** To apply to this Lab Call, lab personnel must register (and sign in) with their lab email address and submit application materials through EERE Exchange. Application materials must be submitted through EERE Exchange at https://eere-exchange.energy.gov, EERE's online application portal. Frequently asked questions for this Lab Call and the EERE Application process can be found at https://eere-exchange.energy.gov/FAQ.aspx.

  Applicants are responsible for meeting the submission deadlines. DOE strongly encourages all applicants to submit the required information at least 24 hours in advance of the submission deadline. Applicants should not wait until the last minute—internet and data server traffic can be heavy in the last hours before the submission deadline, which may affect the applicants' ability to successfully submit the required information before the deadline.

- Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov. To ensure fairness for all lab participants, please do not ask individual BETO staff questions directly.

- **NOTIFICATION OF SELECTION:** When selections are finalized, lab leads will receive an email from the specific program POCs.

B. Key Considerations and Topic Areas

i. Key Considerations

- **AVAILABLE FUNDING:** There is approximately **$20,725,000 in annual funding** available to fund **all** projects solicited in this Lab Call pending appropriations, program direction, and go/no-go decision points.

- **CRADAS AND FOA AWARDS:** The call for proposals below should **NOT** be construed as requiring the renegotiation of an existing Cooperative Research and Development Agreement (CRADA) or previously competed FOA award in which the lab is a prime or sub-recipient. Labs with CRADAs or FOA awards addressing any of the topic areas below may incorporate that work in proposals they submit in response to the Lab Call to demonstrate existing capability and leverage existing partnerships with industry and other partners. If the proposal is not selected for funding under this Lab Call, the work under

the CRADA or FOA award will continue—there is no additional risk to the provision of DOE funding.

- **ELIGIBILITY:** All DOE/National Nuclear Security Agency (NNSA) Federally Funded Research and Development Centers (FFRDCs), and all National Laboratories, are eligible to submit proposals as prime awardees, unless specified otherwise. Proposals that involve more than one laboratory are also allowed. Individual proposals cannot be submitted to multiple subtopics in this Lab Call.

- **DIVERSITY, EQUITY, and INCLUSION:**
  It is the policy of the Biden Administration that:

  > [T]he Federal Government should pursue a comprehensive approach to advancing equity[3] for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our Government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity.
  >
  > By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.[4]
  >
  > As part of this whole of government approach, this lab call seeks to encourage the participation of underserved communities and

[3] The term "equity" means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. E.O. 13985.

[4] Executive Order 13985, "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government" (Jan. 20, 2021).

underrepresented[5,6] groups. Applicants are highly encouraged to include individuals from groups historically underrepresented, in STEM on their project teams. As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to reference, if available, the existing laboratory Diversity, Equity, and Inclusion Plan and describe within the technical volume the actions the applicant will take to foster a welcoming and inclusive environment, support people from underrepresented groups in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities. Section II.A.iii. of this Lab Call includes details on the project specific implementation of the lab-wide DEI plan. Because a diverse set of voices at the table in research design and execution has an illustrated impact on innovation, this implementation strategy for the lab-wide plan will be evaluated as part of the technical review process.

Further, to the extent the proposed project will include external partners, the applicant is encouraged to include Minority Serving Institutions[7], Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community. The Selection Official may consider the

[5] According to the National Science Foundation's 2019 report titled, "Women, Minorities and Persons with Disabilities in Science and Engineering", women, persons with disabilities, and underrepresented minority groups—blacks or African Americans, Hispanics or Latinos, and American Indians or Alaska Natives—are vastly underrepresented in the STEM (science, technology, engineering and math) fields that drive the energy sector. That is, their representation in STEM education and STEM employment is smaller than their representation in the U.S. population. https://ncses.nsf.gov/pubs/nsf19304/digest/about-this-report For example, in the U.S., Hispanics, African Americans and American Indians or Alaska Natives make up 24 percent of the overall workforce, yet only account for 9 percent of the country's science and engineering workforce. DOE seeks to inspire underrepresented Americans to pursue careers in energy and support their advancement into leadership positions. https://www.energy.gov/articles/introducing-minorities-energy-initiative

[6] Note that Congress recognized in section 305 of the American Innovation and Competitiveness Act of 2017, Public Law 114-329:

> (1) [I]t is critical to our Nation's economic leadership and global competitiveness that the United States educate, train, and retain more scientists, engineers, and computer scientists; (2) there is currently a disconnect between the availability of and growing demand for STEM-skilled workers; (3) historically, underrepresented populations are the largest untapped STEM talent pools in the United States; and (4) given the shifting demographic landscape, the United States should encourage full participation of individuals from underrepresented populations in STEM fields.

[7] Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities/Other Minority Institutions) as educational entities recognized by the Office of Civil Rights (OCR), U.S. Department of Education, and identified on the OCR's Department of Education U.S. accredited postsecondary minorities' institution list. See https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html.

inclusion of these types of entities as part of the selection decision. See Section II.B.ii for the DEI criteria reviewed under Criterion 1 of the review process for full applications.

- **EERE NATIONAL LABORATORY GUIDING PRINCIPLES:** To ensure continued alignment with EERE lab engagement principles, applicants should consider the following when developing their proposals:
    - BETO strongly encourages projects that bring together multiple labs in a consortia-based approach to meet a high-level strategic goal, leveraging multiple lab capabilities with strong, centralized leadership.
    - To the extent possible and appropriate, BETO seeks lab projects that involve industry engagement or industry partners.

ii. Topic Area Descriptions

Topic 1: Renewable Carbon Resources

- Eligibility: Subtopic 1a is restricted to INL and ORNL. Subtopic 1b has no restrictions. Subtopic 1c, if funded, has no restrictions.
- Estimated DOE FY24 Funding Available: Up to $4,750,000
- Estimated Number of Projects Expected: Up to 5 (Up to an additional 9 projects for Subtopic 1c if fully funded)
- Estimated Project Duration: 3 Years
- POC: Subtopic 1a: Chenlin.Li@ee.doe.gov; Subtopics 1b: Daniel.Fishman@ee.doe.gov; Subtopics 1c: Chenlin.Li@ee.doe.gov (Terrestrial feedstocks); Daniel.Fishman@ee.doe.gov (Algal feedstocks)

The Renewable Carbon Resources (RCR) Program at BETO includes R&D, cross-cutting analysis, resource assessments, and workforce development activities to enable the deployment of feedstocks for bioenergy applications. No single bioenergy feedstock can be sustainably produced at the volumes necessary to displace petroleum-derived fuels and chemicals. RCR R&D addresses the unique technical challenges posed by each class of resource. RCR activities include lowering production costs and improving yields of aquatic resources, including but not limited to pond-cultivated algal systems, feedstock supply chain analysis and development of methods to identify, quantify, and mitigate supply chain risk, climate smart management and sustainability practices for energy crop systems, development of harvest, collection, storage, handling and preprocessing technologies to minimize logistics burden and improve the quality of raw biomass and waste streams for conversion-ready feedstocks, and carbon management strategies including soil carbon storage and carbon drawdown. The overall RCR Program mission is to enable the deployment of feedstocks for bioenergy applications,

including displacement of petroleum derived-commodities such as SAF or plastics, which will help meet aggressive national targets for low-carbon intensity, domestically-sourced, biomass-based climate solutions. Algae, seaweed, and potentially other aquatic biomass resources are uniquely positioned among the full suite of biomass feedstocks for near-, mid-, and long-term growth of the domestic bioenergy sector in support of achieving aggressive national SAF volumetric goals.

The FY24 Lab Call seeks proposals in both terrestrial and aquatic feedstocks. For terrestrial feedstocks, RCR seeks proposals for continuation of specific projects**; see subtopic below for details.** Over-target proposals are also welcome. For algae, RCR seeks proposals in carbon negative algal biofuels. There is also an open topic for over target proposals.

For terrestrial feedstocks, BETO anticipates making $1,750,000 available for this lab call in FY24**.** For algae, BETO anticipates making $3,000,000 available for this lab call and requests proposals in the range of $1,000,000-$1,500,000 for a three-year scope of work. Specific amounts per subtopic are listed below.

Subtopic 1a: Terrestrial Feedstock Supply and Value-added Process Intensification

- Eligibility: INL and ORNL
- Estimated DOE Funding Available: $1,750,000/year
- Estimated Number of Projects Expected: Up to 3
- Estimated Project Duration: 3 Years

In FY23, five projects in the RCR - terrestrial feedstock technology space have reached the end of the 3-year negotiated cycle. BETO will take this opportunity to reassess and reprioritize AOP activities to ensure they continue to align with the objectives provided above. BETO is interested in three subtopics below:

- Terrestrial Feedstock Supply Chain Analysis topic is for Idaho National Laboratory to propose analysis on the regional case studies delivering low carbon intensity feedstocks for SAF production. Specific analysis regions and regionally important feedstocks should be identified. Feedstock quantity, quality specifications, their associated carbon intensity and cost should be evaluated. This proposal should also identify R&D needs to reduce carbon intensity and improve quality of feedstocks. This proposal should also ensure alignment with BETO's Design Report work and directions. Available funding up to $500,000 per year.
- Biomass Supply Scenario Analysis subtopic is intended for Oak Ridge National Laboratory to propose analysis work on current available

feedstocks to meet 2030 SAF goals, and energy crops at scale to meet 2050 SAF goals. Proposals should focus on case studies to generate supply and pricing data for diverse biomass resources at multiple geographic regions. Proposals should also investigate the regional feedstock supply scenarios, integrated landscape management strategies, and associated impact on the ecosystem services and sustainability to enable "early adopters" of energy crops. This work should continue to support the communications and information dissemination of BT23 study. Available funding up to $750,000 per year.

- Value-added Process Intensification in the Supply Chain subtopic is intended for Idaho National Laboratory to propose R&D that focuses on the flexible storage systems for diverse and regional feedstocks. The proposed approach should demonstrate value added benefits via Techno-Economic Analysis (TEA), evaluate the impact on carbon intensity reduction via Lifecycle Assessment (LCA), and collaborate with industry for large scale storage operations. Available funding up to $500,000 per year.

Subtopic 1b: Carbon Negative Algal Biofuels

- Eligibility: No Restrictions
- Estimated DOE FY24 Funding Available: $3,000,000
- Estimated Number of Projects Expected: Up to 2 ($1,500,000 per three-year project, fully funded up front; please note that this is different than other BETO programs)
- Estimated Project Duration: 3 Years

The life-cycle GHG emissions of algal biofuels have been the subject of extensive investigation but, with a dearth of relevant at-scale data for critical components of the full value-chain, remain uncertain and highly sensitive to input assumptions. Published LCA values vary widely; however, emerging from the variability are several notable strategies to realize so-called "carbon-negative" algal biofuels, that is, where global warming potential (GWP) of the algae-derived biofuels in the overall pathway is less than 0 g CO2-eq/MJ fuel.[8] Further, in the BETO-specific context, the 2021 State of Technology Supply Chain GHG emissions for renewable diesel via the waste-derived algae HTL pathway was asserted to be carbon negative.[9] With these examples as guides, BETO expects to see proposals focusing on pathways that include co-products

[8] Cruce, et al., 2021. "Driving toward sustainable algal fuels: A harmonization of techno-economic and life cycle assessments." Algal Research. https://doi.org/10.1016/j.algal.2020.102169.
[9] Cai, et al. 2022 "Supply Chain Sustainability Analysis of Renewable Hydrocarbon Fuels via Indirect Liquefaction, Hydrothermal Liquefaction, Combined Algal Processing, and Biochemical Conversion: Update of the 2021 State-of-Technology Cases." Argonne National Laboratory. doi:10.2172/1862925.

with highly favorable carbon intensities as compared to the incumbent product, such as alternative proteins for food and feed, bio-based fertilizers, environmental services, and/or durable commodities such as plastics.

The topic of interest is for proposals that seek to, in a holistic framework driven by both rigorous LCA that highlights the critical aspects of the algal feedstock performance in the overall system as well as realistic assessment of product regulatory challenges and acceptance. Projects may:

- Identify pathways that could supply impactful amounts of algal feedstocks that result in affordable biofuels with a GWP of less than zero and quantify the volumetric potential and GWP impact of the pathway;
- Conduct proof-of-concept experiments with new technologies that will demonstrate the feasibility of the algal feedstock(s) performance in-line with requirements as established by a prior LCA analysis;
- Partner to deliver multidisciplinary projects that achieve both aims.

It is imperative to create teaming arrangements that allow for appropriate industrial involvement for co-product testing and acceptance.

Subtopic 1c: Open Topic

- Eligibility: Over-target proposals only
- Estimated DOE Funding Available: Subject to Congressional Budget Appropriations
- Estimated Number of Projects Expected: Up to 9
- Estimated Project Duration: 3 Years

In the event that Congressional appropriations allow for an expanded Lab Call budget, RCR would like to have a variety of over-target proposals to select from. For terrestrial feedstocks, RCR welcomes over-target proposals on renewable carbon resource mobilization strategies and novel preprocessing technologies in collaboration with industry stakeholders. For algal feedstocks, RCR welcomes over target proposals around algae-based wastewater treatment, algae breeding for enhanced performance, and/or other areas where lab capabilities can enhance the commercialization of algae. Other ideas that are not captured here are also welcome.

Topic 2: Conversion Technologies

- Eligibility: No restrictions.
- Estimated DOE Funding Available: $11,800,000
- Estimated Number of Projects Expected: Up to 13
- Estimated Project Duration: up to 3 Years (Subtopic 1c is 1 Year)
- POC: ian.rowe@ee.doe.gov

Background:

The strategic objective of the Conversion Program in BETO focuses on research and development to reduce the costs of deconstructing renewable carbon resources into intermediate products and upgrading those intermediates into low carbon intensity bioenergy, along with renewable chemicals and materials. Conversion R&D supports the broader 2030 BETO performance goals by:

- Enabling delivery, preprocessing, and deconstruction of biomass and waste feedstocks to biofuel intermediates that can meet industry relevant cost and performance requirements, with focus on SAF capable of >70% reduction in GHG emission relative to petroleum.
- Enabling >10 commercial renewable chemicals and materials with >70% GHG reduction relative to relevant petroleum-derived counterparts, supporting >1 million metric tons/year CO2 emissions reductions.
- Enabling at least one cost-effective and recyclable bio-based plastic that mitigates ≥50% GHG emissions relative to virgin resin or plastic intermediates.

Toward these goals, Conversion R&D aims to develop improved tools and methods for faster and less costly conversion technology development. The current Conversion portfolio explores a variety of conversion technologies that can be combined into pathways, from feedstock to product.

In the FY24 lab call, Conversion seeks high-impact technology research and development to decarbonize the transportation and industrial sectors through conversion of biomass and waste feedstocks into sustainable fuels, chemicals, and products with improved performance properties. Specific areas of interest, are outlined in the subtopics below.

Subtopic 2a: Conversion Technologies – Biochemical Conversion, including lignin

- Eligibility: No restrictions
- Estimated DOE Funding Available: Approximately $4,430,000/year
- Estimated Number of Projects Expected: 3-6

- Estimated Project Duration: 3 Years

Specific Objectives:

The intent of this subtopic is to support projects that enable biochemical conversion of cellulosic biomass to support BETO goals toward the decarbonization of the transportation and industrial sector. BETO is specifically interested in projects which advance bioprocessing, including optimizing fermentation strategies, sugar co-utilization, and strain development, with the goal being to improve the overall titer, rate, and/or yield of a specific biochemical conversion process. The beneficial use of lignin is also key to enabling biochemical processes and technologies that continue to increase the yield of lignin products without sacrificing sugar quality. Applicants are also encouraged to integrate in-situ product separations, including those developed in the Separations Consortium.

BETO is strongly encouraging industrial partnerships to demonstrate commercial interest in either developing technologies relevant to their industry or in deploying technologies that were developed from prior national lab work. This includes efforts that seek to generate enough product or material for commercial testing.

R&D metrics/outcomes for lignin valorization efforts:

- As appropriate, demonstrate solvent or chemical recovery at >98% by the conclusion of the 3-year duration.
- Demonstrate sugars or pulp fraction is convertible at >90% titer/productivity rate/yield relative to pure sugars.

Subtopic 2b: Conversion Technologies – BOTTLE Consortium

- Eligibility: No Restrictions
- Estimated DOE Funding Available: $10,000,000/year*
- Estimated Number of Projects Expected: 1
- Estimated Project Duration: 3 Years

*Subject to Congressional appropriations

The overarching goals of the BOTTLE Consortium are in developing novel technologies that depolymerize thermoplastics and thermosets, upcycling deconstructed waste plastic into higher value materials, and redesigning existing plastics to be “recyclable by design.”

Specific Objectives:

BETO and the Advanced Materials & Manufacturing Technologies Office (AMMTO) aim to promote the development of platforms for recyclable by design polymers and plastic recycling. Reducing the plastics industry's dependence on virgin petroleum sources through the promotion of recycling and redesign is critical to decarbonization of the plastics and chemicals supply chains. This approach includes reducing and removing plastic waste from the environment by developing improved recycling and valorization strategies, reducing the GHG footprint of plastics production through development of bio-based plastics, and ensuring technologies are scalable and provide cost and environmental benefits sufficient to motivate their deployment. Enabling processes to develop new plastics out of renewable feedstocks with both deconstruction and reconstruction in mind will ultimately be required to enable a circular plastics economy.

BETO and AMMTO seek a new three-year R&D proposal from the BOTTLE consortium that supports the offices' goals for plastics deconstruction and redesign with end of life in mind. The R&D proposal should address the following:

- How the next 3 years of funding will build upon developments from the initial funding cycle and a plan for transitioning to a consortium model that is sustained, at least in part, by external funding.
- Provide technoeconomic and life cycle analysis to support the selection of valorization pathways, products, and markets with specific focus on reducing GHGs.
- Develop scalable/implementable polymer deconstruction strategies that lead to a valorized product and identify industrial partners interested in either the product or process.
- Design new monomers and polymers with significantly reduced (50% or more) lifecycle emissions and energy impacts by incorporating recyclability and end of life in their design while still provide performance metrics suitable to the application.
- Perform processing scale up and material characterization of at least one recyclable by design polymeric material with an industrial partner to demonstrate at scale material properties and product translation into the marketplace.
- Design new associated processes for chemical recycling of tomorrows plastics and composites that are inherently recyclable by design.
- Engage industrial partnerships to scale and deploy promising polymer deconstruction and synthesis developments.

- Outline a strategic approach toward dissemination and licensing of developed technologies.
- Invest in workforce development across all BOTTLE laboratories with a focus on improving Diversity, Equity and Inclusion and environmental justice.
- Discuss how each task addresses decarbonization goals and a path to commercialization.

R&D metrics for the BOTTLE Consortium include:

- >50% energy savings relative to virgin material production
- >50% lifecycle emissions savings relative to virgin material production
- >75% carbon utilization from waste plastics
- >2x economic incentive above price of reclaimed materials

The established consortium will continue enabling cross cutting analysis that uses consistent assumptions (economic, energetic, sustainability, and chemical/material analysis) to support a circular economy of plastics. By combining selective approaches, enabled by an interdisciplinary team, this consortium will continue developing innovative new processes that would not otherwise be achieved in smaller individual projects.

Subtopic 2c: Conversion Technologies – CO_2 Utilization

- Eligibility: No Restrictions
- Estimated DOE Funding Available: Approximately $750,000/year
- Estimated Number of Projects Expected: 1-2
- Estimated Project Duration: 1 Year

Specific Objectives:

The intent of this subtopic is to support 1-year seed projects for the CO_2 Reduction and Upgrading for e-fuels Consortium. This includes two "legacy" CO_2 Consortium projects that end their 3-year cycle in FY23. If warranted, selected projects would then align with the entire CO_2 Consortium lab call in FY25.

BETO is specifically requesting that such proposals *align and integrate their work to support existing projects and efforts (i.e., strains, intermediates, catalytic activities, etc) that are already being explored in the Consortium*. Interested researchers are encouraged to reach out to current projects in order to see where their efforts would be most effective.

Subtopic 2d: Conversion Technologies – Waste/Performance Advantaged Bioproducts (PAB)

- Eligibility: No Restrictions
- Estimated DOE Funding Available: $1,620,000/year*
- Estimated Number of Projects Expected: 4
- Estimated Project Duration: 3 Years

*Subject to Congressional appropriations

Specific Objectives:

As it relates to waste, the intent of this topic is to continue to support local decision makers on subjects relating to organic waste resource and energy recovery. Of particular interest is analysis that can support other experimental research and development projects and/or support the needs of local communities. In addition, new analysis areas could include topics that have been identified from past technical assistance or stakeholder engagement efforts such as case studies, cost-benefit analysis, impacts of new regulations and policies (local, state and national), etc. There is also interest in development of other resources and easily accessible/usable tools based on prior analysis.

In previous cycles, the focus of this work has been on organic waste, in the upcoming cycle, the Conversion Program is open to including additional wastes in these analysis efforts, namely plastics*.

*Note that if plastics analysis, technical assistance, or other information dissemination should be coordinated with the BOTTLE consortium.

Performance advantaged bioproducts have enhanced properties versus traditional, commercially-available materials which could include improved recyclability. The main goals of the Performance Advantaged Bioproduct consortium are to predict, synthesize and characterize new bio-derived material formulations across a range of polymer applications at least at the gram scale. Conversion seeks a new 3-year proposal focused on the development of new materials that exceed relevant petroleum-derived material properties by at least 10% for industry to consider the materials “performance advantaged” and that are within 25% of the cost of the comparable petroleum-derived material in this discovery phase. Targeting novel bioproducts should be facilitated by machine learning and molecular simulation to narrow down the biochemical space by predicting important physical metrics that correlate with performance advantage.

Subtopic 2e: Open Topic

- Eligibility: Over target proposals only
- Estimated DOE Funding Available: Subject to Appropriations
- Estimated Number of Projects Subject to Appropriations
- Estimated Project Duration: 3 Years

Specific Objectives:

In the event that Congressional Appropriations allow for an expanded Lab Call budget, Conversion R&D would like to have a variety of over-target proposals to select from. The subprogram welcomes over-target proposals that fall outside the scope of Subtopics 2a-d. Lab management is encouraged to review such proposals and limit submissions to those with the greatest industrial interest and/or the greatest potential for significant GHG reduction or process improvement.

Topic 3: Data, Modeling and Analysis

- Eligibility: No restrictions
- Estimated DOE Funding Available: $3,375,000
- Estimated Number of Projects Expected: up to 9
- Estimated Project Duration: up to 3 years
- POC: Andrea.Bailey@ee.doe.gov

Background:

The Data, Modeling, and Analysis (DMA) subprogram activities provide quantitative analysis to inform BETO's decisions regarding the future direction and scope of its research, development, and demonstration (RD&D) portfolio. Activities include techno-economic, life-cycle, resource, impact, and risk assessments that provide the analytical basis for planning and assessing progress against program goals and targets. System-level analyses identify the key gaps in existing knowledge and where additional research could have the greatest impact. Decision support, data management, and analytical tools allow the program to identify and verify performance goals and measure progress toward these goals. The subprogram plays a key role in determining the most efficient ways to use bioenergy technologies to achieve the largest GHG emissions reductions for the least cost.

The subprogram's sustainability activities are focused on developing science-based strategies to understand and enhance the environmental and socio-economic benefits of advanced bioenergy and bioproducts while minimizing potential negative impacts.

This includes research targeting underproductive aspects of agricultural and forestry systems and leveraging the ability of biomass to improve degraded soil and water resources. Sustainability research also fills critical knowledge gaps about how to increase bioenergy production without detriment to food security, air, land, and water resources.

Examples of Previously Funded AOPs:

- Sustainable Aviation Fuel State of the Industry Report.
- Development of a tool to assess ecosystem services associated with bioenergy crops for specific regions.
- Development of an input-output model encompassing economic, environmental and workforce metrics.
- Continuation of the development of the Scaling Up PERennial Bioenergy Economics and Ecosystem Services Tool (SUPERBEEST) to assess biomass crop growth on marginal land.

Linkage to Goals/Strategies: Projects funded under all subtopics in this area should support the BETO Mission to develop and demonstrate technologies to facilitate greenhouse gas emissions reductions through the cost-effective, sustainable use of biomass and waste feedstocks across the U.S. economy.

Projects should specifically support DMA goals to develop and deploy accessible modeling frameworks and tools to enable quantification of the environmental, social, and economic sustainability of renewable carbon resource utilization. Specific preference will be given to applications that link project goals to the DMA activities and approaches described in BETO's 2023 Multi-Year Program Plan (MYPP).

Requirements for all Subtopics in Topic Area 3:

All applications proposing to develop a specific model or tool for Topic Area 3 need to include information about where the model or tool will be housed and what (if any) are the plans to make the final model or tool publicly available.

All applications should also clearly identify the user of the project's final product (BETO, other government agencies, industry, general public, etc.). Plans to track the usage of the final product where relevant should also be included with relevant metrics for tracking success.

Areas not of interest for Topic Area 3 include:

- Projects considering TEA or LCA of specific technologies or units of operation. These analyses should be considered under the appropriate tech area (RCR, Conversion, SDI).
- Projects examining topics already covered under DE-FOA-0002910: Reducing Agricultural Carbon Intensity and Protecting Algal Crops (RACIPAC). This includes analysis of climate-smart agricultural practices and technologies to reduce the carbon intensity of agricultural residues harvested for biofuel production, and analysis of the efficacy of biochar application for producing lower carbon intensity feedstocks for biofuels production.
- Projects intending to utilize DMA lab call funding to perform field work. Projects that already have access to field work data/capabilities from other funding and would like to propose additional related analysis are welcome to apply.

Subtopic 3a: Enhancing current capabilities in bioenergy data modeling and analysis

- Eligibility: No restrictions
- Estimated DOE Funding Available: Up to $2,750,000 - $3,000,000/year
- Estimated Number of Projects Expected: Up to 6
- Estimated Project Duration: 3 Years
- POC: Andrea Bailey (andrea.bailey@ee.doe.gov)

Projects applying to this topic area should build off previous BETO-funded work and must include an explanation of how the lessons learned from previous funding have led to the proposed new scope. Applicants are encouraged to consider new priority areas identified for DMA in the recently published MYPP, and existing models looking for continuation funding should prioritize making sure that existing modeling products are applicable to the SAF production process.

A. *Decision Making Tools for the Bioenergy Industry (would include new work based on findings of projects concluding in FY23):* This subtopic seeks applications for projects working on modeling and tool development to help inform decision makers about the role of biofuels in meeting national decarbonization goals. This may include models or tools that focus on either all or part of the bioenergy supply chain.

Projects concluding their 3-year cycle in this space include:

- Bioeconomy Scenario Analysis and Modeling and

- Alternative Marine Fuel Pricing, Supply, and Demand and related work with the Department of Transportation's Volpe Center

Proposed work for FY24 and beyond under this subtopic should focus on:

- Answering questions posed by the SAF Grand Challenge and other DOE strategic initiatives, and
- Gaining a better understanding of the impact of policy, technology development, or economic scenarios on biofuel supply.

B. *Enhancing the Supply Chain Sustainability of Bioenergy (would include new work based on findings of projects concluding in FY23):* This subtopic seeks applications from projects working on modeling and analysis of the sustainability impacts of the overall bioenergy supply chain. DMA is particularly interested in models and tools that can help to calculate the potential impacts of siting bioenergy facilities across multiple locations and upgrading technologies.

Projects concluding their 3-year cycle in this space include:

- Life Cycle Analysis of Biofuels and Bioproducts and GREET Development,
- Valuation and Visualization of Water Sustainability,
- Geospatial Analysis of Ecosystem Service Portfolios from Biomass Production,
- Integrated Land Management, and Resource Mobilization

Projects should consider sustainability impacts from feedstock to finished product which may include:

- Modeling the LCA impacts of different biomass to finished product pathways in GREET and updating GREET to consider relevant new questions such as harmonization with other models,
- Enhancing understanding of the social and environmental impacts of the bioenergy supply chain for other indicators such as air quality and water quality and quantity,
- Increasing the ability to identify regionally specific benefits of biomass feedstocks including potential payment for associated ecosystem services, and
- Assessing alternative markets and cascading value strategies to maximize feedstock availability and the impacts that bioenergy feedstock production has on the associated communities and how those impacts propagate.

Subtopic 3b: Developing new capabilities in bioenergy data modeling and analysis: Global Sensitivity Analysis to Explore Uncertainty

- Eligibility: No restrictions
- Estimated DOE Funding Available: up to $300,000/year
- Estimated Number of Projects Expected: 1
- Estimated Project Duration: 12-36 months
- POC: Michael Shell (michael.j.shell@ee.doe.gov)

Despite continual improvements in landscape data collection techniques that enhance understandings of current and historical land cover and land use estimates, there are inherent uncertainties how landscapes could evolve in the future because of climate change, changes in policy, technological advancement, and socioeconomic trajectories. BETO seeks to explore the sensitivities of environmental outcomes for bioenergy scenarios under a range of potential future conditions, and to understand the conditions under which optimal or suboptimal outcomes may be realized. With an integrated assessment model (IAM) or a computable general equilibrium model (CGE), develop the ability to quantify ranges of emissions implications from individual pathways and multi-pathway strategies. With this capability BETO can explore synergies and risks to meeting climate targets utilizing biomass in a range of applications taking into consideration other demands on land, energy, and capital.

Specific Objectives:

Through global sensitivity analyses with multi-sector modeling frameworks, BETO seeks to build an assessment of a range of environmental outcomes of bioenergy scenarios. This effort can inform strategies for ensuring the full potential of bioenergy is realized, and strategies for avoiding less desirable outcomes. Examples of modeling frameworks that may be suitable include the Global Change Assessment Model (GCAM), the Dynamic Global Trade Assessment Project model (GTAP-Dyn), and the Energy Policy in General Equilibrium model (EPGE). The product of these analyses will be a range of outcomes (e.g., GHGs, costs) across a range of scenarios testing combinations of sensitivities across inputs (e.g., agricultural yields, incomes, technological learning)

To this end, BETO seeks modeling capabilities to:

- Perform global sensitivity analysis of potential future conditions featuring a combinatorial set of scenarios with varied input parameter values.
- Glean insights about the set of conditions that lead to different outcomes, and the total range of plausible outcomes (uncertainty range).

- Develop a public-facing interface to allow users to explore the outcome space and evaluate the most influential factors in bioenergy outcomes.

To produce these insights, models should have the ability to:

- Represent key economic sectors (e.g., transportation, energy) as well as physical systems (e.g., land use, carbon stocks, emissions).
- Model a variety of fuels pathways including first generation biofuels, sustainable aviation fuels (SAF), and petroleum-based fuels, and model competition for the demands on biomass feedstocks.
- Represent various land cover types and land uses with particular detail on agricultural land uses.
- Look out over time (minimum of 2050) and solve for future time steps (either using a recursive-dynamic approach or intertemporal optimization).
- Consider the global economy and trade between geopolitical regions.
- Reflect several potential socio-economic and technological futures.
- Nimbly perform sensitivity analysis using high-performance computing.
- Generate emissions profiles for a range of bioenergy pathways.

Subtopic 3c: Developing new capabilities in bioenergy data modeling and analysis: Decarbonization of chemicals and other products

- Eligibility: No restrictions
- Estimated DOE Funding Available: up to $750,000 - $1,000,000* total
- Estimated Number of Projects Expected: 1
- Estimated Project Duration: 12-18 months
- POC: Jay Fitzgerald (jay.fitzgerald@ee.doe.gov) and Lisa Guay (lisa.guay@ee.doe.gov)

**This project will be jointly funded by multiple offices within EERE. The final budget total will depend on the funding available from each partner office and is subject to change.*

AMMTO, BETO, The Hydrogen and Fuel Cell Technologies Office (HTFO), and The Industrial Efficiency & Decarbonization Office (IEDO) seek high-level analysis to understand and prioritize investment towards the most promising alternative feedstocks and conversion pathways to decarbonize the industrial chemical sector. The analysis should take a holistic approach to match expected feedstocks and low–carbon intensity electricity and hydrogen available in the near and long term to projected chemicals demand.

The scope for the analysis should include:

- Target the top ~50-70 chemicals which are based on hydrocarbons currently derived from petroleum or natural gas. Potential metrics to identify the target chemicals might include those produced annually at >0.5 million metric tons (MMT) in the United States or >1 MMT globally. Chemicals may be considered as classes or groups if appropriate. Functional replacements for these chemicals should also be considered where appropriate.
- Feedstocks of biomass, municipal solid waste, waste/recycled plastics, biogas, carbon dioxide, hydrogen, and carbon monoxide. Petroleum as a feedstock should also be compared, as some chemicals may not have good pathways from alternative feedstocks.

Output should include rating different feedstocks and production methods for feasibility and priority for different chemicals along several dimensions.

- Dimensions may include feedstock availability, conversion efficiency, GHG emissions, non-GHG emissions, energy use, water use, land use, toxicity, and other resource use. Additional dimensions may also be important to support the overall goal of industrial chemical decarbonization.
- Relevant production pathways should be considered and reported. These pathways may include thermocatalytic, electrochemical, and biomanufacturing methods.
- Detailed LCA and TEA of individual pathways is not required.
- Organization of results by chemical NAICS codes is desired.
- A top-down approach of matching available feedstocks to chemical products is desired, but bottom-up approaches focusing on individual chemicals may also be included.
- Anticipated differences in feasibility and priority for 2035 and 2050 timelines should be included.
- Analysis should consider the impacts of achieving United States clean energy goals, including clean electricity and clean hydrogen.

Shorter-term goals should be included where possible to allow AMMTO, BETO, HFTO, and IEDO to begin using findings to inform strategic direction.

Topic 4: Understanding and Integrating Social Sustainability Impacts into Biorefinery Siting

- Eligibility: Restricted to ORNL, NREL and LBNL
- Estimated DOE Funding Available: Up to $800,000/year

- Estimated Number of Projects Expected: 1 to 2
- Estimated Project Duration: 18-24 Months

In order to reach national decarbonization targets, biofuels and bioproducts produced from underutilized refinery infrastructure will be critical to replace petroleum in hard-to-decarbonize sectors like aviation, both in terms of the limited material and economic resources for new construction and the economic advantage of retrofitting decommissioned facilities. However, refinery infrastructure is disproportionately sited in disadvantaged communities, and repurposing this infrastructure will negatively impact local air quality and may have other adverse environmental and health impacts. Stakeholder engagement, surveys, and public dissemination of the results from these analyses are a requirement. As applicable, recipient labs may also subcontract with industrial collaborators to obtain data and other Non-Governmental Organizations (NGOs)/air quality research groups to leverage existing work.

- *Social Sustainability Analysis of Biorefinery Operations:* Develop research, analysis, and case studies on social license to operate, social acceptability, other localized concerns and technology developers' approaches to addressing localized concerns regarding biofuels production siting at repurposed facilities. Of particular interest are oil and gas refineries that are repurposed for renewable diesel or SAF and pellet/paper mills repurposed for biorefineries.

- *Increasing Social Sustainability for Biorefinery Operations:* Explore mitigation techniques for air emissions and other environmental concerns, improved localized air quality monitoring and modeling studies, and/or other topics relevant for equitable siting analysis. This could also include a zero-impact biorefinery study, model, or tool. Ideal end-users would be industry partners or local partners (e.g., community-based organizations, local government organizations).

II. Application Submission and Review Information

A. Application and Submission Details

i. Application Process

To apply to this Lab Call, applicants must register with their lab email address and submit application materials through EERE Exchange at https://eere-exchange.energy.gov, EERE's online application portal. Beginning on July 8, 2022,

eXCHANGE will be updated to integrate with Login.gov. As of August 5, 2022, potential applicants will be required to have a Login.gov account to access EERE eXCHANGE. As part of the eXCHANGE registration process, users will be directed to create an account in https://login.gov/. Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the Exchange Multi-Factor Authentication (MFA) Quick Guide in the Manuals section of eXCHANGE.

All submissions must conform to the guidelines for format and length, and be submitted at, or prior to, the deadline listed.

Applicants will be required to include project information and details in eXCHANGE that will be used to develop and accelerate negotiations of FY 2024 AOPs if selected. Appendix A provides a worksheet to guide applicants through this process in eXCHANGE. Any information the applicant considers to be of significance for the review process must be included in the proposal, as reviewers will not have access to the AOP development information entered in eXCHANGE.

ii. General Proposal Requirements

Proposals should be formatted for 8.5 x 11 paper, single spaced, and have 1-inch margins on each side. Typeface size should be 12-point font, except tables and figures, which may be in 10-point font.

iii. Proposal Content

Proposal content aligns with content required in the EERE AOP project forms, with additional information to assist reviewers in evaluating technical details. The narrative should build on the information provided as part of the EERE eXCHANGE template. **Applicants must include all content they wish to have reviewed in the proposal (proposal reviewers will not review any information provided in eXCHANGE for AOP development).**

Concept Papers

Each Concept Paper must be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.

The Concept Paper must conform to the template titled "FY24_AOP_Concept_Paper_Template" included in the Lab Call listing in eXCHANGE. Concept Papers should be no longer than 3 pages.

Full Applications

- EERE will not review or consider ineligible Full Applications.
- Each Full Application shall be limited to a single concept or technology. Unrelated concepts and technologies shall not be consolidated in a single Full Application.

Full Applications must conform to the following requirements:

SECTION	FILE FORMAT	PAGE LIMIT	FILE NAME
Technical Volume	PDF	15 for non-consortia, 30 for consortia, excluding Section 5 References and Relevant CVs	ControlNumber_LeadOrganization_TechnicalVolume

Technical Volume

The Technical Volume must be submitted in PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages. Save the Technical Volume in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_TechnicalVolume".

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. However, EERE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application for non-consortia may not be more than 15 pages, single-spaced, using 11-point font (Times New Roman preferred), including Sections 1-4 outlined in the "FY24_AOP_Full_Proposal_Template", excluding the References and Relevant CVs section 5. For consortia, similar rules apply except the

limit is 30 pages. The applicant should consider the weighting of each of the evaluation criteria when preparing the Technical Volume.

The Technical Volume must conform to the following content requirements under headings corresponding to the bullets below:

- **Section 1: Project General Information:** Include the project title, AOI being applied for, principal investigator(s), brief partner description, and high level financials.
- **Section 2: Technical Merit, Innovation and Approach:** Describe the objective of the approach including targets for the end of each fiscal year. The end of project goal should be clearly stated. Describe the types of experiments or technical approach that will be undertaken to accomplish the objectives. Include scale of experiments, relevant data being generated, measures or techniques being used. The benchmark/baseline should be described to establish context of the propose work. All proposals should clearly state how goals and objectives will support the objectives set forth in each Area of Interest.

Project Specific Implementation of lab-wide DEI plan

As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a description of how the project will support or implement the lab-wide Diversity, Equity, and Inclusion Plan and describe the actions the applicant will take to foster a welcoming and inclusive environment, support people from groups underrepresented in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities. The plan should include SMART milestones supported by metrics to measure the success of the proposed actions.

The following is a non-exhaustive list of actions that can serve as examples of ways the proposed project could incorporate diversity, equity, and inclusion elements. These examples should not be considered either comprehensive or prescriptive. Applicants are encouraged to propose appropriate actions not covered by these examples.

a. Diversity on the research team
    i. Include persons from groups underrepresented in STEM as PI, co-PI, and/or other senior personnel;‘
    ii. Include persons from groups underrepresented in STEM as student researchers or post-doctoral researchers;

iii. Implement evidence-based, diversity-focused education programs (such as implicit bias training for staff) in your organization;
iv. Identify Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses to solicit as vendors and sub-contractors for bids on supplies, services and equipment
v. Include faculty or students from Minority Serving Institutions as PI/co-PI, senior personnel, and/or student researchers;
vi. Enhance or collaborate with existing diversity programs at your home organization and/or nearby organizations;
vii. Collaborate with students, researchers, and staff in Minority Serving Institutions;

b. Explicit diversity in research impact
   i. Illustrated outcome impact in underserved communities
   ii. Disseminate results of research and development in Minority Serving Institutions or other appropriate institutions serving underserved communities;
c. explicit diversity in research design. Inclusion of a broad community, academic, policymaking staff in research design and execution phase

The Diversity, Equity and Inclusion Implementation Plan should be integrated into the technical volume.

- **Section 3: Project Impacts and Outcomes:** Describe what is to be proven or accomplished, the impact of the project, including intended stakeholders, users, beneficiaries and linkages to BETO and EERE goals. For consortia related proposals, describe how the project will advance the overall long term vision of the consortia. If applicable, include a summary of any significant industry engagement.
- **Section 4: Project Workplan:** Include all tasks for the full life of the project and describe the performer(s), duration, planned costs and description of activities. Describe project milestones, including at least one SMART milestone per year, quarterly milestones and end of project milestone. For projects longer than one year a Go/No-Go decision (SMART milestone) should be included between months 12-18 of the project duration. Describe the risks associated with the project scope, schedule and budget as well as regulatory. Each risk should be assigned a severity and probability along with an overall classification.

- **Section 5: References and Relevant CVs:** Include references and CVs of all relevant team members. Section 5 does not count towards the full page limit.

B. Application Review Details

i. Merit Review and Selection Process

Upon receipt and review for initial compliance with requirements, all proposals received in eXCHANGE by the deadline will undergo a thorough technical review. BETO will use expert reviewers familiar with the BETO portfolio, goals, and objectives. BETO will collect and collate review scores and comments for use in making final project selections. The BETO Selection Official will consider the merit review results to make the final project selections. For transparency, BETO will provide summaries of the review results to assist labs in understanding how their submission reviewed and aid in improving future work.

ii. Technical Review Criteria

Concept Papers

Concept Papers are evaluated based on consideration of the following factors:

Criterion Concept Paper Criterion: Overall Lab Call Responsiveness and Viability of the Project (Weight: 100%)

This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed technology, describes how the technology is unique and innovative, and how the technology will advance the current state-of-the-art;
- The applicant has identified risks and challenges, including possible mitigation strategies, and has shown the impact that EERE funding and the proposed project would have on the relevant field and application;
- The applicant has the qualifications, experience, capabilities and other resources necessary to complete the proposed project; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the Lab Call.

Final Applications

Applications will be evaluated against the merit review criteria shown below:

Criterion 1: Technical Merit, Innovation, and Approach (Weight: 50%)

This criterion involves consideration of the following factors:

- Extent to which the proposed work is at the proper stage TRL.

- Extent to which the proposed project is likely, from a technical perspective, to achieve the goals and objectives of the proposed project.
- Sufficiency of technical detail to assess whether the proposed work is scientifically meritorious.
- Diversity, Equity, and Inclusion
    - The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
    - Extent to which the project benefits underserved communities.

Criterion 2: Impact and Project Work Plan (Weight: 25%)
This criterion involves consideration of the following factors:

- Extent to which the proposed project is responsive to the mission of the Bioenergy Technologies Office, and extent to which, if the project were successful, it could meaningfully impact biofuel/bioproduct production (e.g. how large is the feedstock market, how broadly applicable is the technology solution), greenhouse gas reduction, and other environmental benefits.
- Extent to which the proposed project aligns with the selected BETO subprogram's Areas of Interest.
- Degree to which the applicant has clearly defined the scope, schedule, and budget, that in combination reasonably demonstrate that the project will be able to achieve its goals/outcomes as planned.
- Degree to which the proposal considers and demonstrates a grasp of the risks involved in the project.

Criterion 3: Plan, Team and Resources (Weight: 15%)
This criterion involves consideration of the following factors:

- Degree to which the teams and PIs have the capabilities/expertise to deliver the work.
- Degree to which the inter-lab collaboration is occurring and quality of the collaboration, as appropriate.
- Level and appropriateness of any external partnerships, and the clarity in the description of roles and responsibilities.

Criterion 4: Diversity, Equity, and Inclusion (Weight: 10%)
This criterion involves consideration of the following factors:

- The quality and manner in which the measures incorporate diversity, equity and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

iii. Selection for Award Negotiation

BETO carefully considers all of the information obtained through the proposal process and makes an independent assessment of each compliant and responsive proposal based on the criteria set forth in this Lab Call. BETO may select or not select a proposal for negotiations. BETO may also postpone a final selection determination on one or more proposals until a later date, subject to availability of funds and other factors. BETO will notify applicants if they are, or are not, selected for award negotiation.

iv. Selection Notification

BETO anticipates completing the project selection process and notifying labs of selections during the week of August 25, 2023 **(subject to change)**.

BETO will notify lab leads of selection results from the subprogram POC and will provide lab leads with summaries of anonymized review comments for each proposal submitted.