Notice of Intent No. DE-FOA-0003517

Notice of Intent to Issue
Notice of Funding Opportunity No. DE-FOA-0003518
AND
Notice of Funding Opportunity No. DE-FOA-0003520

The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Bioenergy Technologies Office (BETO), two Notice of Funding Opportunities (NOFOs):

1. DE-FOA-0003518, entitled "Sustainable Propane and Renewable Chemicals (SPARC)"; and
2. DE-FOA-0003520, entitled "Maximizing Algal System Yield (MASY)."

These NOFOs support BETO's research and development (R&D) priorities in the areas of (a) Conversion and (b) Renewable Carbon Resources (RCR).

Specifically, the SPARC NOFO supports research and development of domestic chemicals and fuels from a variety of biomass and waste resources. Producing chemicals and propane/liquid petroleum gas (LPG) from renewable feedstocks helps to secure domestic supply chains, support rural economies, and improve sustainability in the industry.

The chemical industry is fundamental to American manufacturing, with more than 96% of U.S. goods manufactured using products from the chemical sector.[1] The U.S. is the world's second-largest chemicals producer, and the sector directly employs over half a million people.[2] When considering the energy used for both feedstocks and heat and power, the chemical industry is the largest single energy user and emissions producer in the U.S. industrial sector.[3] Furthering U.S. production of chemicals from domestic biomass resources can help secure chemical and manufacturing supply chains, support the growth of rural economies, and boost American competitiveness in biotechnology and biomanufacturing. It can also improve sustainability of the industry by increasing energy efficiency and reducing greenhouse gas emissions. Importantly, the U.S. already has significant biomanufacturing capacity for ethanol which can be built upon to produce a broader slate of chemical end-products.

[1] https://www.cisa.gov/resources-tools/resources/chemical-sector-profile
[2] https://www.americanchemistry.com/media/files/acc/chemistry-in-america/data-industry-statistics/the-business-of-chemistry-by-the-numbers/files/business-of-chemistry-by-the-numbers.
[3] https://www.eia.gov/outlooks/aeo/___

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According to the 2020 Residential Energy Consumption Survey, 4.2% of U.S. households use propane as the primary heating fuel, with 7.8% of homes in the Midwest using propane as the primary heating fuel.[4] Rural households utilized 80% of all U.S. propane (3.4 billion gallons in 2020) for all end-uses.[5] Propane and LPG as fuels provide a unique value proposition compared to other biofuels. Unlike biogas or renewable natural gas, propane/LPG does not require pipeline access for distribution, allowing its use in rural and remote communities that are otherwise present access challenges. These applications include home heating/cooling, as a transportation fuel, and for local/microgrid electricity production. Further development of pathways that can produce renewable propane/LPG would result in lower energy costs for households and end-users that rely on this as a source of fuel. Thus, there are numerous benefits to the use of renewable propane/LPG.

The MASY NOFO will support high-impact, applied R&D focused on algal system cultivation and preprocessing, with the goal of improving process economics for biofuels and/or bioproducts. This funding opportunity will continue the RCR subprogram's strategy for advanced algal systems. Previous funding opportunities have focused on increased yield, enhanced value, system efficiency, and crop protection. This opportunity emphasizes relieving 'pinch points' in algal cultivation and preprocessing. Within the MASY NOFO, 'pinch point' will be defined as a challenge area within a proposed system that, if relieved, would enable scaling towards commercialization.

DOE expects to facilitate a Teaming Partner List should a SPARC and/or MASY NOFO be issued. There will be a single Teaming Partner List for both potential NOFOs, with a field to denote the specific NOFO and Topic Area. The Teaming Partner List will be made available on EERE Exchange at https://eere-exchange.energy.gov under NOI DE-FOA-0003517 and will be updated periodically until the close of the Full Application period of the potential NOFOs to reflect new Teaming Partners who have provided their information. By facilitating this Teaming Partner List, EERE does not endorse or otherwise evaluate the qualifications of the entities that self-identify themselves for placement on the Teaming Partner List. EERE will not pay for the provision of any information, nor will it compensate any respondents for the development of such information.

It is anticipated that the NOFOs may include the following Areas of Interest:

SPARC NOFO Topic Area 1: Bio-based Chemicals

Producing chemicals from renewable feedstocks helps to secure domestic supply chains, support rural economies, and improve sustainability in the industry. However, adoption of new chemical

[4] https://www.eia.gov/consumption/residential/data/2020/c&e/pdf/ce2.1.pdf
[5] https://www.eia.gov/consumption/residential/data/2020/c&e/pdf/ce4.1.pdf
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production pathways is challenging due to complex supply chains with many different stakeholders and the need for extensive product quality testing for new processes.

SPARC Topic Area 1 will support development and adoption of new production methods for value-added chemicals from biomass. Chemical products produced in significant volume in the U.S. or globally from a variety of biomass and waste feedstocks are of interest. In addition to broad interest in biobased chemicals, the SPARC NOFO may have a specific area of interest for 3-hydroxypropionic acid produced from whole-kernel corn feedstock using existing fermentation infrastructure and technologies that combine biological and chemical processes. By the conclusion of a project, it must produce a sufficient quantity of the target chemical from real feedstocks and complete feasibility testing in collaboration with relevant manufacturing and downstream partners in the value chain. Project teams should represent the chemical value chain and must include a formulator and/or end user partner as part of the team.

SPARC NOFO Topic Area 2: Bio-based Propane/LPG

SPARC Topic Area 2 seeks to develop new production pathways to produce sustainable liquefied propane and/or petroleum gases from a variety of biomass and waste resources including municipal waste, agricultural residues, forest resources and fats, oils, and grease. Topic Area 2 will support multiple conversion routes to produce propane and LPG.

Nearly all renewable propane/LPG that is currently produced is a co-product of the hydrotreated esters and fatty acids (HEFA) process at renewable diesel or SAF facilities that utilize fats, oils, and greases as feedstocks. However, the market for these feedstocks (yellow grease, animal fats, soybean oil) is limited. To realize sustainable fuel production goals, new oil seeds (e.g. camelina, carinata) are actively being developed, and compatibility with current HEFA catalysts and processes is critical to ensuring that existing refineries can utilize them. SPARC Topic Area 2 will improve and optimize catalyst performance for these 'emerging oil seeds' and accelerate the introduction of these new oil seeds to market. Applicants, therefore, must start with engineered forms of catalyst for these projects as opposed to developing new catalysts. Project teams must include a catalyst manufacturer as part of their team.

Gaseous conversion routes are also viewed as promising approach to the production of propane and LPG. SPARC Topic Area 2 would therefore support development of pathways that can convert various gaseous intermediates including biogas, carbon dioxide, and syngas, into LPG. Many of these gaseous intermediates are readily available and can offer near term opportunities for technology development and deployment.

MASY NOFO: Maximizing Algal System Yield

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The MASY NOFO seeks applications to address 'pinch points' in algal system operations that currently limit expansion of algae as a domestic bioenergy feedstock. Developing algal systems that use photosynthetic growth of algae (micro-, macro-, and cyanobacteria) is an important component of BETO's strategy.

While algal systems can be highly productive, technical challenges exist in translating results to reliably and economically produce biofuels and/or bioproducts at scale. By addressing these challenges now with targeted applied R&D, BETO will accelerate the development of innovative technologies that can enable algae developers to bring new bioproducts to market, thus growing domestic supply chains, expanding access to renewable feedstocks, and improving energy security.

Applicants will be required to propose their specific cultivation/preprocessing system and product regime, identify their 'pinch point' for focused research, and support it with previous data and analysis showing how the proposed research will overcome that 'pinch point'. Applicants will be required to justify their 'pinch point' through Techno-Economic Analysis and/or Life Cycle Analysis (TEA/LCA) and generate clearly defined improvement metrics that show how overcoming their 'pinch point' will impact the overall system economics. Applicants will be required to run multiple cultivation/preprocessing campaigns under conditions that represent the intended commercial application (outdoors, farm, greenhouse, tumble culture, etc.).

EERE envisions awarding multiple financial assistance awards for each of the SPARC and MASY NOFOs, in the form of cooperative agreements. The estimated period of performance for each award will be approximately 3 years.

This Notice is issued so that interested parties are aware of the EERE's intention to issue these NOFOs in the near term. All of the information contained in this Notice is subject to change. EERE will not respond to questions concerning this Notice. Once the NOFOs have been released, EERE will provide an avenue for potential Applicants to submit questions.

EERE plans to issue the NOFOs in or around January 2025 via the EERE eXCHANGE website https://eere-eXCHANGE.energy.gov/. If Applicants wish to receive official notifications and information from EERE regarding these NOFOs, they should register in EERE eXCHANGE. When the NOFOs are released, applications will be accepted only through EERE eXCHANGE.

In anticipation of the NOFOs being released, Applicants are advised to complete the following steps, which are **required** for application submission:

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- Register and create an account in EERE eXCHANGE at https://eere-eXCHANGE.energy.gov. This account will allow the user to apply to any open EERE NOFOs that are currently in EERE eXCHANGE.

  To access EERE eXCHANGE, potential applicants will be required to have a Login.gov account. As part of the eXCHANGE registration process, new users are directed to create an account in 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.

  It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-eXCHANGESupport@hq.doe.gov

- Register with the System for Award Management (SAM) at https://www.sam.gov. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually. Upon registration, SAM will automatically assign a Unique Entity ID (UEI).

  NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process they should utilize the HELP feature on SAM.gov. SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: GSAFSD Tier 0 Knowledge Base - Validating your Entity.

- Register in FedConnect at https://www.fedconnect.net/. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf

- Register in Grants.gov to receive automatic updates when Amendments to a NOFO are posted. However, please note that applications will not be accepted through Grants.gov. http://www.grants.gov/. All applications must be submitted through EERE eXCHANGE.

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