Notice of Intent No.: DE-FOA-0003122

DISCLAIMER: The Notice of Intent (NOI) to Issue is for informational purposes only; the Department of Energy is not seeking comments on the information in this notice and applications are not being accepted at this time. Any information contained in this notice is subject to change.

This is a NOI to Issue
Funding Opportunity Announcement No.: DE-FOA-0003018
Title: Bipartisan Infrastructure Law (BIL) - Clean Fuels & Products Shot: Supporting Carbon Utilization Products via Electrochemical Conversion and Refinery Retrofitting

The Department of Energy (DOE) National Energy Technology Laboratory (NETL) intends to issue a Funding Opportunity Announcement (FOA) on behalf of the Office of Fossil Energy and Carbon Management (FECM). The FOA is anticipated to be issued in the first quarter of Calendar Year 2024 and will be funded under authorization of the Bipartisan Infrastructure Law (BIL).[1]

BACKGROUND

The BIL is a once-in-a-generation investment in infrastructure, designed to modernize and upgrade American infrastructure to enhance United States competitiveness, drive the creation of good-paying union jobs, tackle the climate crisis, and ensure stronger access to economic and environmental benefits for disadvantaged communities. The BIL appropriates more than $62 billion to the DOE to invest in American manufacturing and workers; expand access to energy efficiency and clean energy; deliver reliable, clean and affordable power to more Americans; and demonstrate and deploy the technologies of tomorrow through clean energy demonstrations.

The DOE-FECM's Carbon Conversion Program[2] will develop an opportunity funded through the BIL Section 40302-Carbon Utilization Program, which amended Section 969A of the Energy Policy Act of 2005 (EPAct 2005) (42 U.S.C. 16298a). This Carbon Conversion Program aims to develop commercially viable products that are derived from anthropogenic carbon oxides and demonstrate significant net reductions in lifecycle greenhouse gas emissions compared to incumbent technologies, processes, and products.

ELECTROCHEMICAL CONVERSION & REFINERY RETROFITTING RESEARCH AND DEVELOPMENT (R&D) IMPLEMENTATION STRATEGY

This NOI provides a high-level draft plan of DOE-FECM's current vision for supporting carbon utilization products via R&D projects for engineering-scale electrochemical conversion and feasibility studies for refinery retrofits. Projects will include experimental and/or design and analytical efforts to illustrate the viability of technologies and address technical gaps. Projects are

[1] Infrastructure Investment and Jobs Act, Public Law 117–58 (November 15, 2021), https://www.congress.gov/bill/117th-congress/house-bill/3684/text. This NOI uses the more common name "Bipartisan Infrastructure Law" [hereinafter BIL].
[2] The Carbon Conversion Program was previously referred to as the Carbon Utilization Program.

also expected to produce volumes of data that will be used as the basis for lifecycle and techno-economic analyses that can quantify the environmental impact and commercial viability of the technology.

DOE-FECM's Carbon Conversion Program is developing technologies for large-scale conversion of CO_2 into environmentally responsible, equitable, and economically valuable products. In this FOA (DE-FOA-0003018), if released, supported R&D will address carbon conversion challenges across multiple areas, including engineering-scale electrochemical conversion and refinery retrofits. R&D in electrochemical conversion will address the challenge of extending system durability to a point where further scale-up is warranted under future efforts. Feasibility studies of refinery retrofits will support pathways for the adaptation of refineries for carbon conversion technologies.

ANTICIPATED CRITERIA FOR DE-FOA-0003018:

Please note this is a preliminary FOA implementation plan and will likely evolve during the FOA development process. Guidance on specific application and reporting requirements will be included in the FOA, if issued. The resulting awards are envisioned to have a 24-month period of performance for engineering-scale electrochemical conversion projects, and an 18-month period of performance for refinery retrofitting feasibility studies. All projects will require a minimum 20% cost share commitment from the Applicants.

DOE will **not** accept questions at this time regarding issuance of the FOA. Details on how to submit questions and comments will be provided in the FOA, if issued.

TECHNICAL OBJECTIVES:

If released, the objectives of this FOA are expected to support R&D of engineering-scale electrochemical conversion pathways and feasibility studies for refinery retrofits. Proposed concepts should demonstrate lifecycle greenhouse gas emissions that are at least 10% (and preferably 25%) lower than equivalent incumbent products.

With regards to electrochemical conversion, the FOA will support engineering-scale R&D for electrochemical conversion of CO_2 into value-added products with a specific focus on electrolyzer material set durability. Applicants should examine durability across the entire operational envelope using cell and stack tests and validate durability with at least one medium-term test (minimum 2000 hours).

With regards to refinery retrofits, the FOA will support feasibility studies for proposed retrofits of existing operating facilities, as well as model or sample facilities representative of operating facilities, including the retrofitting of petrochemical refineries. In the case of model facilities, feasibility studies must note determinant metrics such as capacity, geography, and end markets. Applications should describe existing components of the facility that can be repurposed for carbon oxide conversion, as well as describe what new equipment is required.

Applications under both topics will require a discussion of process inputs and outputs, listing of knowledge gaps and technical challenges, identification of target products and markets, as well as preliminary Life Cycle Analysis (LCA) and Techno-Economic Analysis (TEA) to quantify the environmental and economic benefits, respectively.

The two Areas of Interest (AOI) in this FOA are further delineated as follows.

Area of Interest 1 (AOI 1): Engineering-Scale Testing of Electrochemical Systems for the Conversion CO_2 into Value-Added Products. The objective of this area of interest is to support engineering-scale R&D for electrochemical conversion of CO_2 into value-added products (minimum value of $1/kg) with a specific focus on electrolyzer material set durability. Value-added products of interest include but are not limited to; engineering polymer/resin precursors, specialty chemicals, and commodity chemicals with a minimum value of $1/kg.

Area of Interest 2 (AOI 2): Retrofitting of Refineries for Carbon Conversion. The objective of this area of interest is to support feasibility studies examining the retrofitting of refineries for carbon utilization and production of value-added products. It is anticipated that responses and results of these studies could inform follow-on funding opportunities to advance proposed retrofit or renovations for carbon conversion.

The application requirements are anticipated to include, but are not limited to:

- Degree to which the Applicant comprehensively advances arguments and provides details that clearly distinguishes the proposed R&D and why it is needed now relative to prior work.
- Degree to which the Applicant conveys its understanding of the requirements to interface/integrate the proposed technology with the proposed CO_2 source.
- Degree to which the proposed technology utilizes CO_2 in the product, including carbon uptake and carbon efficiency.
- Degree to which product offers at least a 10% (preferably 25%) reduction in GHG emissions as compared to incumbent products.
- Adequacy of the Community Benefits Plan incorporating the following aspects: Diversity, Equity, Inclusion, and Accessibility (DEIA), Energy Equity, and Workforce Implications.

The anticipated award sizes are as follows: (i) Electrochemical Conversion: $7.5 million (of which $1.5 million is the Applicant's cost share); (ii) Refinery Retrofits: $1.25 million (of which $250,000 is the Applicant's cost share). Awards will be structured as cooperative agreements.

SUBMISSION AND REGISTRATION REQUIREMENTS FOR FULL APPLICATION (IF FOA IS RELEASED)

If the FOA is released, it will be posted at Grants.gov (http://www.grants.gov) and at FedConnect (http://www.fedconnect.net). Entities interested in applying for awards under the FOA are strongly encouraged to register at these sites to receive notification of announcements regarding the FOA. If DOE decides to issue the FOA, applications can only be submitted through Grants.gov.

If a FOA is released, there are several one-time actions that must be completed before submitting an application in response to the FOA (e.g., obtain a Unique Entity Identifier (UEI), register with the System for Award Management (SAM), register with Grants.gov, and register with FedConnect.net to submit questions). It is vital that Applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an Applicant's ability to apply to a FOA.

- **SAM** – Applicants must register with SAM at https://www.sam.gov/ prior to submitting an application in response to this FOA. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Failure to register with SAM will prevent your organization from applying through Grants.gov. The Applicant must maintain an active SAM registration with current information at all times during which it has an active Federal award or application under consideration. More information about SAM registration for Applicants is found at: https://www.fsd.gov/gsafsd_sp?id=gsafsd_kb_articles&sys_id=650d493e1bab7c105465eaccac4bcbcb .

  NOTE: If clicking the SAM links do not work, please copy and paste the link into your browser.

  Due to the high demand of SAM registrations and UEI requests, entity legal business name and address validations are taking longer than expected to process. Entities should start the SAM and UEI registration process as soon as possible. If entities have technical difficulties with the SAM registration or UEI validation 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.

- **UEI** – Applicants must obtain an UEI from the SAM to uniquely identify the entity. The UEI is available in the SAM entity registration record.

  NOTE: Subawardees/subrecipients at all tiers must also obtain an UEI from the SAM and provide the UEI to the Prime Recipient before the subaward can be issued.

- **Grants.gov** – Applicants must register with Grants.gov and set up your WorkSpace. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Questions relating to the **registration process, system requirements, or how an application form works** must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov.

- **FedConnect.net** – Applicants must register with FedConnect to submit questions. FedConnect website: https://www.fedconnect.net/

DISCLAIMER

This NOI is issued so that interested parties are aware of DOE's intention to issue a FOA in the near term. Any information contained in this NOI is subject to change.

Applications are not being accepted at this time. DOE will not respond to questions concerning this NOI. Details on how to submit questions and comments would be provided in the FOA, if issued.

DOE may issue a FOA as described in the NOI; may issue a FOA that is significantly different than the FOA described in the NOI; or may not issue a FOA at all.