

Notice of Intent (NOI) No.: DE-FOA-0002955
Issue Date: 08/29/2024

DISCLAIMER: The “Notice of Intent 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 Notice of Intent to Issue
Funding Opportunity Announcement No.: DE-FOA-0002956
“Advancing Technology Development for Securing a Domestic Supply of Critical Minerals and Materials (CMM)”

The Department of Energy (DOE) National Energy Technology Laboratory (NETL) intends to issue a joint Funding Opportunity Announcement (FOA) on behalf of the Office of Fossil Energy and Carbon Management (FECM) and the Office of Energy Efficiency and Renewable Energy’s Advanced Materials and Manufacturing Technologies Office (AMMTO). The FOA is anticipated to be issued in the third quarter of calendar year 2024.

BACKGROUND

The United States imports greater than 80% of its rare earth elements (REEs) demand from non-domestic suppliers. Similarly, in 2021, for at least 43 of the 50 critical minerals and materials (CMM),¹ the United States imported more than half its consumption with 15 of those CMM having no domestic production.² As evidenced by several Executive Orders,^{3,4} the Bipartisan Infrastructure Law (BIL),⁵ and DOE’s first ever strategy on securing America’s supply chains,⁶ transitioning the production of these CMM and their associated supply chains back to the United States is a strategic priority.

Pursuant to the Critical Minerals and Materials Program under Energy Act of 2020, the subject FOA, if issued, would focus on rebuilding the U.S. leadership role in the economically viable, environmentally benign CMM extraction, separation, and refining technologies arena. Strengthening these domestic capabilities will support the generation of sustainable U.S. domestic supply chains for onshore production of CMM for the commercial commodities, clean energy, and national defense industries thereby reducing our dependence on international supply chains; the creation of high-quality U.S. jobs; and the Administration’s goals of decarbonizing the electricity sector by 2035 and the economy by 2050.⁷

As part of the whole-of-government approach to advance equity and encourage worker organizing and collective bargaining,^{8,9,10} this FOA and any related activities will seek to encourage meaningful engagement and participation of labor unions, underserved communities, and underrepresented groups including

¹ U.S. Geological Survey, Department of the Interior, Final List of Critical Minerals 2022, 87 Fed. Reg 10381 (February 24, 2022). <https://www.federalregister.gov/documents/2022/02/24/2022-04027/2022-final-list-of-critical-minerals>

² U.S. Geological Survey, Department of the Interior, Mineral Commodity Summaries 2022, (January 31, 2022). <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022.pdf>

³ Executive Order 13817, A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals (December 20, 2017). See also U.S. Department of the Interior, Final List of Critical Minerals 2018, 83 Fed. Reg 23295 (May 18, 2018)

⁴ Executive Order 14017, America’s Supply Chains (February 24, 2021)

⁵ 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].

⁶ <https://www.energy.gov/policy/securing-americas-clean-energy-supply-chain>

⁷ <https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>

⁸ Executive Order 13985, “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” (January 20, 2021).

⁹ Executive Order 14025, “Worker Organizing and Empowerment” (April 26, 2021)

¹⁰ Executive Order 14052, “Implementation of the Infrastructure Investment and Jobs Act” (November 15, 2021)

consultation with Tribal Nations.^{11,12} Consistent with Executive Order 14052, this FOA is designed to help meet the goal that 40% of the overall benefits from Federal investments in climate and clean energy flow to disadvantaged communities through the Justice40 Initiative, and drive the creation of good-paying jobs through a focus on high labor standards and the free and fair chance for workers to join a union.

TECHNICAL IMPLEMENTATION STRATEGY

This Notice of Intent provides a high-level draft plan to support DOE's current vision to secure diverse, resilient, domestic CMM supply chains by expanding the Critical Minerals and Materials Program to fund additional processing research and development (R&D) for the recovery and refining of CMM, as required for critical supply chain use. The overall objectives of the anticipated FOA will be to (1) continue to advance CMM technology development, not only in the area of new advanced separation and recovery concepts, but also to (2) expand and improve process systems development, optimization, and efficiency, and to (3) improve CMM process system economic feasibility and align production costs with existing market sectors, and to (4) produce CMM from multiple, diverse feedstocks, including recycled materials. These objectives will be achieved by focusing R&D efforts on (a) coproduction of REE, other CMM, and non-fuel industrial carbon products from unconventional coal- and carbon-based feedstocks, (b) new technology development for the recovery from unconventional feedstocks of individual heavy rare earth elements (HREE) and other CMM deemed most critical, (c) separation and recovery of CMM from produced water especially oil and gas produced water, and (d) production of mixed rare earth oxides or salts (MREO/MRES) from multiple, diverse feedstocks including recycled materials, with the option of coproduction of other CMM or value-added materials.

The FOA, if issued, will require Applicants to address societal considerations and impacts (SCI), including diversity, equity, inclusion, and accessibility (DEIA), environmental justice, and economic revitalization and job creation. SCI will be evaluated as a part of the technical review process and potential Recipients will be required to report on SCI progress and outcomes throughout the project lifecycle.

The FOA is anticipated to be issued in the third quarter of calendar year 2024 and if issued is envisioned to have an initial closing 60 days after issuance for all Areas of Interest (AOI). Awards resulting from the FOA are envisioned to have a 36-month period of performance and will require a 20% cost share commitment.

Guidance on specific application and reporting requirements will be included in the FOA, if issued.

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 AND OTHER CONSIDERATIONS

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

AOI-1 - Coproduction of CMM and Carbon Manufacturing Precursor Materials from Unconventional Coal and Other Carbon-based Feedstocks (FECM):

Projects will develop a modular process circuit that uses existing technology to produce carbon manufacturing precursor materials (CMPM) from coal, coal wastes, coal byproducts, or carbonaceous shale/clay that is

¹¹ Executive Order 13175, "Consultation and Coordination With Indian Tribal Governments" (November 6, 2000) charges all executive departments and agencies with engaging in regular, meaningful, and robust consultation with Tribal officials in the development of Federal policies that have Tribal implications.

¹² <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/26/memorandum-on-tribal-consultation-and-strengthening-nation-to-nation-relationships/>, "Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships" (January 26, 2021)

saleable to manufacturers of end-use products (e.g., graphite). The novel process circuit will be integrated into existing small pilot-scale (or larger) facilities extracting REE and other CMM from unconventional carbon-based feedstocks using conventional extraction separation technologies.

AOI-2 - Recovery of Heavy Rare Earth Elements (HREE) from Secondary and Unconventional Resources (FECM):

Projects will use conventional separations and refining technologies or, preferably, will develop new, advanced, unconventional REE extraction, separation, and/or refining techniques and methods specific to recovery of individual heavy rare earth elements (HREE) Tb, Dy, and others (Gd, Ho, Er, Tm, Yb, Lu). Feedstocks must be secondary or unconventional feedstocks such as coal, coal mine waste/refuse, coal combustion residuals (fly ash, bottom ash, or slag), carbonaceous shale/clay, or other waste materials such as, but not limited to, hard rock mine waste, phosphogypsum, and red mud (from bauxite).

AOI-3 - Critical Mineral Recovery from Produced Water (FECM):

Projects will develop methodologies to scale existing aqueous Li extraction technologies to small pilot-scale Li production from oil and gas produced water (OGPW) or other produced water (PW) associated with fossil energy and carbon management operations. User-procured PW will be used to test and validate the scaled Li extraction technology. Coproduction of CMM (REE and non-REE) is an encouraged enhancement of project proposals under this AOI.

AOI-4 - Process Diversification: Production of Rare Earth Elements from Secondary/Unconventional Resources and Recycled Materials (FECM/AMMTO):

Projects will provide proof-of-concept at the bench-scale of the production of mixed rare earth oxides or salts (MREO/MRES) from multiple feedstocks, with the option of coproduction of other critical minerals and materials (CMM) and/or other value-added materials. The intent of this AOI is to demonstrate that the use of diverse feedstocks (i.e., number and type of feedstock resources) could be processed at a single commercial facility, thereby potentially increasing the agility and resilience of the domestic rare earth supply chain.

Other Considerations:

- For AOIs 1-3, feedstocks will consist of coal and coal byproducts, which may include secondary sources such as coal ash, coal prep plant tailings/refuse, coal-based AMD, etc.; carbonaceous shale/clay; other waste materials such as hard rock mine waste, phosphogypsum, red mud (from bauxite), or similar; and in-ground produced waters from fossil energy and carbon management operations.
- Process feedstocks will be AOI dependent; however, recycling streams and/or e-wastes are to be excluded as feedstocks for AOIs 1-3. AOI-4 will allow recycling streams and/or e-wastes as feedstock, including magnet swarf (magnet manufacturing waste), off-spec or end-of-life magnets, shredded hard disk drives, nickel metal hydride batteries, fluorescent lighting, amongst others.
- Process feedstocks must be domestically sourced within the United States.
- For all projects, feedstocks used must be real, sourced materials. There should be no synthetic or model compounds, mixtures, or fluids used for R&D or experimentation.
- For all projects, CMM processing (and commercial carbon manufacturing precursor material production for AOI-1) will be restricted to geographic locations within the United States.
- All projects will be designed to operate in an environmentally benign manner, being compliant with all federal, state, and local laws and regulations with respect to emissions and waste treatment and disposal.
- For all projects, societal considerations and impact (SCI) documents will be required and evaluated as a part of the technical review process, the required documents are a Diversity, Equity, Inclusion, and Accessibility (DEIA) Plan; Environmental Justice Questionnaire; and Economic Revitalization and Job Creation Questionnaire. Recipients will be required to report on SCI progress and outcomes throughout the project lifecycle.

- Work performed will not be duplicative of previous or existing work (currently) funded by the DOE or another federal agency.
- Industrial and manufacturing partners are strongly encouraged to participate as project team members, in order to provide guidance as to critical material specifications such as purity or composition (metal, oxides, carbonates, etc.); market/supply needs; and/or to assist in potential market entry (including possible off-take agreements) of the produced REE, CMM, and/or carbon manufacturing precursor materials or newly developed advanced separation, recovery, and/or refining processes/circuits.

TEAMING PARTNER LIST

DOE is compiling a “Teaming Partner List” to facilitate the formation of new project teams for this potential FOA. The Teaming Partner List allows organizations who may wish to participate on an application to express their interest to other applicants and to explore potential partnerships.

Updates to the Teaming Partner List will be available on NETL eXCHANGE. The Teaming Partner List will be regularly updated to reflect new teaming partners who provide their organization’s information.

SUBMISSION INSTRUCTIONS: View the Teaming Partner List by visiting the NETL eXCHANGE homepage and clicking on “Teaming Partners List” within the left-handed navigation pane. This page allows users to view published Teaming Partner Lists. To join the Teaming Partner List, submit a request within NETL eXCHANGE. Select the appropriate Teaming Partner List from the drop-down menu, and fill in the following information: Investigator Name, Organization Name, Organization Type, Area of Interest, Background and Capabilities, Website, Contact Address, Contact Email, and Contact Phone.

DISCLAIMER: By submitting a request to be included on the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. By facilitating the Teaming Partner List, DOE is not endorsing, sponsoring, or otherwise evaluating the qualifications of the individuals and organizations that are self-identifying themselves for placement on this Teaming Partner List. DOE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information.

SUBMISSION AND REGISTRATION REQUIREMENTS FOR FULL APPLICATION

If the FOA is released, it will be posted on NETL eXCHANGE at <https://netl-exchange.energy.gov>. 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 the NETL eXCHANGE at <https://netl-exchange.energy.gov>, online application portal.

There are several one-time actions that must be completed before submitting an application in response to this Funding Opportunity Announcement (e.g., register with the System for Award Management (SAM), obtain a Unique Entity Identifier (UEI) number, register with NETL eXCHANGE. 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 this FOA.

- **SAM** – Each applicant is required to: (1) register in the SAM at <https://www.sam.gov/> before submitting an application; (2) provide a valid UEI number in the application; and (3) maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency (unless the applicant is exempt from those requirements under 2 CFR 25.110). DOE may not make a Federal award to an applicant until the applicant has complied with all applicable UEI and SAM

requirements. If an applicant has not fully complied with the requirements by the time DOE is ready to make a Federal award, DOE will determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

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: First tier subawardees/subrecipients must also obtain an UEI from the SAM and provide the UEI to the Prime Recipient before the subaward can be issued. Full registration in SAM is not required to obtain an UEI for subaward reporting.

- **NETL eXCHANGE** – Register and create an account on NETL eXCHANGE at <https://netl-exchange.energy.gov>. This account will allow the user to apply to any open FOAs that are currently in NETL 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 NETL eXCHANGE website should be submitted to: NETL-ExchangeSupport@hq.doe.gov

- **Grants.gov** – Register in Grants.gov (<http://www.grants.gov>) to receive automatic updates when Amendments to this potential FOA are posted. Please note that Full Applications will **not** be accepted through Grants.gov.
- **FedConnect.net** – Register in FedConnect (<https://www.fedconnect.net>). To create an organization account, your organization's EBiz POC in SAM must create the account. For more information about registration requirements review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf.
- **Electronic Authorization of Applications and Award Documents** – Submission of an application and supplemental information under this FOA through electronic systems used by the DOE, including NETL eXCHANGE and FedConnect, constitutes the authorized representative's approval and electronic signature.

DISCLAIMER

This NOI is issued so that interested parties are aware that DOE may issue a FOA on this topic. Any information contained in this NOI is subject to change.

No Concept Papers or Full Applications are being accepted at this time.

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.

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