Financial Assistance
Notice of Funding Opportunity
Part 1

U.S. DEPARTMENT *of* ENERGY

Department of Energy (DOE)
Fossil Energy
Infrastructure Investment and Jobs Act (IIJA): Mine of the Future - Proving Ground Initiative Notice of Funding Opportunity Number: DE-FOA-0003390

Applications due: January 30, 2026

Modifications:
000001: The application due date had been extended from December 15, 2025, to January 30, 2026. The subsequent timeline has been modified accordingly.

All modifications to the Notice of Funding Opportunity (NOFO) are HIGHLIGHTED in the body of the NOFO.

Contents

Before You Begin

Navigating the Notice of Funding Opportunity

To reduce the burden on applicants in the Notice of Funding Opportunity (NOFO) process and limit the length of the NOFO information requests DOE has separated the NOFO into two parts.

The NOFO Part 1 describes the specific DOE programmatic goals and evaluation criteria, eligibility, and other components that are specific to each funding opportunity. The NOFO Part 2 includes the fixed DOE requirements that generally do not change from NOFO to NOFO, including standard information for the application phase, expectations for award negotiations, and post-award requirements. Applicants must review both the NOFO Part 1 and the NOFO Part 2 prior to applying. To facilitate navigation, you will find links throughout this document to additional information found in Part 2.

There are several required one-time actions applicants must take before applying to this NOFO. Some of these actions may take several weeks, so it is vital applicants build in enough time to complete them. Failure to complete these actions could interfere with application or negotiation deadlines or the ability to receive an award if selected. If you have previously completed the necessary registrations, make sure your registration is active and up to date. All registrations are free. Please refer to NOFO Part 2, *Get Registered*, for additional information.

This announcement is published in conjunction with NOFO Part 2 Version 2.0.

I. Basic Information

A. Key Facts

Issuing Agency	Department of Energy, Office of Fossil Energy and Carbon Management (FECM), Critical Minerals and Materials (CMM) Program
Funding Opportunity Title	Infrastructure Investment and Jobs Act (IIJA) - Mine of the Future - Proving Ground Initiative
Announcement Type	Initial announcement
Funding Opportunity Number	DE-FOA-0003390
Funding Instrument	Cooperative Agreements
Assistance Listing Number	81.089 Fossil Energy Research and Development
Funding Opportunity Description	The objective of NOFO-0003390 is to establish mining technology proving grounds that accelerate novel technology development for the U.S. mining sector. These competitive awards would invest in the infrastructure and technologies to transform mining practices and speed the development of secure and resilient domestic CMM supply networks of the future.
Program Goals & Objective(s)	This NOFO will enable real-world testing and optimization of the next generation of mining technologies to be deployed at mine sites across the U.S. while offering a training ground for dissemination of skills, technology, practices, and expertise. These proving grounds will be a national resource accessible to all DOE Offices, industry, academia, and other research partners to advance innovation, testing, and workforce development in responsible mining.
Topic Areas	Single Topic Area: Development of Mining Technology Proving Grounds & Accelerated Mine Technology Research & Development (R&D) Projects
Eligible Applicants	Domestic Entities (Institutions of higher education; for-profit entities; non-profit entities; state and local government entities and Indian Tribes)
eXCHANGE URL and Helpdesk	https://netl-exchange.energy.gov/ NETL-ExchangeSupport@hq.doe.gov

KEY DATES

Notice of Funding Opportunity Issue Date: 11/14/2025

Application Deadline: 01/30/2026

Anticipated Selection Notification Date: 02/27/2026

Anticipated Conditional Award Date: 03/09/2026

Anticipated Award Date: 06/15/2026

Estimated Period of Performance: 06/15/2026 – 6/14/2030

1. Funding Details

Single Topic Area

- Approximate total available funding: $80,000,000 in FY26
- Approximate number of awards: Up to four
- Approximate dollar amount of individual awards: $5,000,000 to $40,000,000
    - The broad range of dollar amounts for individual awards represents DOE's desire to support a diverse set of facility designs, allowing for proving grounds of varying scales, complexities, and capabilities leveraging existing infrastructure where possible, and enabling targeted demonstration of technologies across different stages of the mining process.
- Minimum cost share required: 20% of total project cost
- Approximate award project period: 48 months
- Anticipated length of budget periods (BP): BP 1 & BP 2: for development of proving ground; BP 3: initial project execution
    - Three BPs will be required. The first two will take place during the development of the proving ground facilities, the third will take place during execution of the initial project(s). Applicants should select a logical length of each budget period along with logical Go/No-Go decision points at the end of each of the first two BPs.

2. Period of Performance

DOE anticipates making awards comprised of multiple budget periods. If applicable, project continuation will be contingent upon DOE's Go/No-Go decision. For a complete list and more information on the Go/No-Go review, see the NOFO Part 2, *Award Administration Information*. Funding for all budget periods, including the initial budget period, is not guaranteed. Given the distinct nature of the requested activities to include the development of a proving ground facility and the subsequent execution of technology testing at these grounds, multiple budget periods are necessary. The primary focus and a significant portion of the effort will be dedicated to the development of the proving ground facility. To facilitate more effective go/no-go decision points, it is intended that this development phase span multiple budget periods. Applicants are encouraged to propose and recommend the logical budget period breaks, as these points may vary considerably depending on the specific application."

B. Executive Summary

The Department of Energy (DOE), through the National Energy Technology Laboratory (NETL) and the Office of Fossil Energy and Carbon Management (FECM), intends to support the establishment of Mining Technology Proving Grounds that will act as specialized mining technology testing and research facilities. The primary objective of this funding opportunity is to develop and operate field-scale proving grounds that serve as testbeds for validating and de-risking emerging mining technologies. Additionally, these proving grounds are expected to provide the necessary infrastructure, operating environment, and technical capabilities to enable the advancement of innovative technologies from laboratory and/or bench-scale development to integrated field-scale demonstration.

DOE's vision includes encouraging robust and lasting industry and academic partnerships (e.g., consortia, joint industry partnerships), thereby creating a vital pipeline for innovative technologies and a skilled workforce in mining that will serve as a foundation for domestic mining innovation for many years to come. In addition, applicants must also propose a minimum of one (1) and no more than two (2) mining technology development projects to be conducted at the proving ground. These envisioned

mining technology development projects must demonstrate clear progression from laboratory and/or bench-scale validation to field-scale testing at the proving ground site by progressing the proposed technology by at least one TRL from the project(s) beginning. Initial mine technology projects can start anywhere from TRL 2 to TRL 6. Due to the accelerated schedule for this NOFO, if selected, the applicant may be asked to amend the initial projects further during the negotiation and/or definitization process. In summary, FE is requiring applications to include two distinct elements 1) establishment of proving ground and 2) mine technology project(s) that would utilize and demonstrate efficacy of the proving ground.

The proving grounds funded under this announcement will serve as critical platforms to reduce the technical and economic risks associated with novel mining technologies to be utilized by government agencies, industrial partners, and academic institutions. By advancing promising technologies through field-scale validation, the program will accelerate pathways to commercialization, thereby supporting secure, sustainable, and responsible U.S. mining operations.

The DOE aims for a diverse portfolio of proving ground facilities to demonstrate a broad range of mining technologies across various mineral types, geologic settings, and operational scales. The varied estimated award amounts for individual awards reflect DOE's desire to support diverse facility designs, allowing for proving grounds of varying scales, complexities, and capabilities, leveraging existing infrastructure, and enabling targeted technology demonstration across mining process stages.

C. Agency Contact Information

Office of Fossil Energy and Carbon Management
U.S. Department of Energy
1000 Independence Ave SW
Washington, D.C. 20585

For questions relating to this specific NOFO, please send emails to DE-FOA-0003390@netl.doe.gov.

II. Eligibility

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these eligibility requirements, it will be considered ineligible and removed from further evaluation and ineligible for any award. DOE will not make eligibility determinations for potential applicants prior to the date on which applications to this NOFO must be submitted. The decision whether to apply in response to this NOFO lies solely with the applicant. The information included here is specific to eligibility requirements for this NOFO. For eligibility requirements applicable to all NOFOs, please consult the NOFO Part 2, *Eligibility*.

A. Eligible Applicants

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these eligibility requirements, it will be considered ineligible and removed from further evaluation.

1. Domestic Entities

Domestic entities are eligible to apply as recipients or subrecipients. The following types of domestic entities are eligible to participate as a recipient or subrecipient of this NOFO:

- Institutions of higher education; (See Title 20 U.S.C. § 1001 for the definition);
- For-profit organization;
- Nonprofit organization;
- State and local governmental entities; and
- Indian Tribes, as defined in section 4 of the Indian Self-Determination and Education Assistance Act, 25 U.S.C. § 5304[1]

To qualify as a domestic entity, the entity must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States or under the laws of the United States; have majority domestic ownership and control; and have a physical place of business in the United States.

Participation of the following entities are limited as follows.

- DOE FFRDCs[2] are not eligible to apply for funding as a subrecipient but are not eligible to apply as a recipient.

[1] "**Indian Tribe**," for the purposes of this NOFO and as defined in in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. § 5304), means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act (85 Stat. 688) [43 U.S.C. § 1601, et seq.], which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

[2] FFRDCs are public-private partnerships that conduct research for the U.S. government. A listing of FFRDCs can be found at http://www.nsf.gov/statistics/ffrdclist/.

- Non-DOE FFRDCs are eligible to participate as a subrecipient but are not eligible to apply as a recipient.
- Federal agencies and instrumentalities (other than DOE) are eligible to participate as a subrecipient but are typically not eligible to apply as a recipient.
- NETL is not eligible for award under this announcement and may not be proposed as a subrecipient on another entity's application. An application that includes NETL as a recipient or subrecipient will be considered non-responsive.

2. Foreign Entity Participation

In general, foreign entities are not eligible to apply as either a recipient or subrecipient. In limited circumstances, DOE may approve a waiver to allow a foreign entity to participate as a recipient or subrecipient.

A foreign entity may submit an application to this NOFO, but the application must be accompanied by an explicit written waiver request. Likewise, if the applicant seeks to include a foreign entity as a subrecipient, the applicant must submit a separate explicit written waiver request in the application for each proposed foreign subrecipient. Please see NOFO Part 2, *Application Content Requirements* for the requirements for submission of a foreign entity waiver request. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

Performance of Work in the United States

All work for the awards under this NOFO must be performed in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the application. Absent an approved waiver, such costs will not be allowable under the award. The NOFO Part 2, *Application Content Requirements* lists the requirements for submission of a foreign work waiver request.

Ineligible Participants

The following entities are ineligible for participation in this NOFO as a recipient, subrecipient, or subcontractor.

- In accordance with 2 CFR 200.214, entities banned from doing business with the U.S. government such as entities debarred, suspended, or otherwise excluded from or ineligible for participating in federal programs.
- Entities identified on Department of the Treasury Office of Foreign Assets Control Treasury's Sanctions Program Specially Designated Nationals list are prohibited from doing business with the United States government and are not eligible. See OFAC - Sanctions List Service (treas.gov).
- Nonprofit organizations described in Section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply for funding.

Entity of Concern Prohibition

Entities of Concern are prohibited from participating in projects selected under this NOFO (see NOFO Part 2, *Eligibility, Other Eligibility Information, Entity of Concern Prohibition* section for details and definitions).

B. Limitation on Number of Applications Eligible for Review

An entity may submit more than one application to this NOFO, provided that each application describes a unique, scientifically distinct project.

C. Cost Sharing

Applicants are expected to follow through on estimated cost share commitments proposed in their applications if selected for award negotiations. Please refer to the NOFO Part 2, *Eligibility* for more information on Cost Sharing.

3. Cost Share Requirements

The cost share must be at least 20% of the total project costs[3] for research and development.[4] Applications that do not meet the minimum required cost share will be deemed ineligible during the initial compliance review and will not be further reviewed. The cost share must come from non-federal sources unless otherwise allowed by law.

The cost share percentage is calculated by dividing the cost share by the total allowable project costs for the award where the total allowable project costs include government share (including FFRDC costs if applicable) and cost share. To help applicants calculate proper cost share amounts, DOE has included a cost share information sheet and sample cost share calculation in the NOFO Part 2, *Eligibility—Cost Sharing, Cost Share Calculation Examples*.

4. Unallowable Cost Share Sources, NOFO Specific

The unallowable cost share sources identified here are specific to this announcement. Refer to NOFO Part 2, Eligibility--*Cost Sharing, Unallowable Cost Share Sources* for unallowable cost share sources applicable to all NOFOs. The recipient and subrecipient(s) may not use the following sources to meet cost share obligations:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., federal grants, equipment owned by the federal government); or
- Expenditures that were reimbursed under a separate federal program.

[3] Total project costs are the sum of the government share, including FFRDC costs if applicable, and the recipient share of project costs.
[4] Energy Policy Act of 2005, Pub. L. 109-58, sec. 988. Also see 2 CFR 200.306 and 2 CFR 910.130 for additional cost sharing requirements.

III. Program Description

A. Background and Context

The Office of Fossil Energy and Carbon Management, Critical Minerals and Materials Program is issuing this NOFO. Awards made under this NOFO will be funded, in whole or in part, with funds appropriated by the Infrastructure and Jobs Act (IIJA). Notably, under IIJA Section 41003, DOE plans to invest appropriations of approximately $80 million for the four (4) year project period for the Mine of the Future - Proving Ground Initiative.

The activities to be funded under this NOFO support Sections 7001(a) and 7002(g) of the Energy Act of 2020, as funded by IIJA Section 41003(c), as well as the broader government-wide approach to advance and potentially commercialize technology developed through the research, design, construction and operation of technologies that utilize unconventional resources to produce CMM for our Nation's energy, national security and domestic commodity needs. These provisions are focused on the following objectives:

- Rare Earth Mineral Security (42 U.S.C. 13344(a))
  - Developing and assessing advanced separation technologies for the extraction and recovery of other critical materials from coal and coal byproducts.
  - Determining if there are, and mitigate, any potential environmental or public health impacts that could arise from the recovery of rare earth elements from coal-based resources.

- Critical Material Innovation, Efficiency, and Alternatives (30 U.S.C. 1606(g))
  - Developing alternatives to critical materials that do not occur in significant abundance in the United States.
  - Promoting the efficient production, use, and recycling of critical materials, with special consideration for domestic critical materials, throughout the supply chain.
  - Ensuring the long-term, secure, and sustainable supply of critical materials.
  - Prioritizing work in areas that the private sector, by itself, is not likely to undertake due to financial or technical limitations.

This NOFO builds on prior Department of Energy (DOE), other government agency, and private sector investment, and implements Sections 7001(a) and 7002(g) of the Energy Act of 2020 and IIJA Section 41003(b)-(c) through the program's research and development activities by the creation of innovative methods and technologies for the efficient and sustainable provision of critical materials to the domestic economy and the expected activities under the program to mitigate the environmental and health impacts of the extraction, processing, manufacturing, use, recovery, and recycling of critical materials. Also, Section 7002(g) of the Energy Act of 2020 directs the establishment of a program of research, development, demonstration, and commercialization. This program will also support the broader government-wide approach to upgrading and modernizing infrastructure by strengthening critical domestic manufacturing and associated supply networks.

B. Program Purpose

The United States imports greater than 80% of its rare earth elements from non-domestic supplies. For example, domestic industrial and defense sectors are entirely reliant on China for more than 25% of our critical minerals[5]. Recent accounting of critical mineral flows[6] indicates that the U.S. continues to lose market share to other countries.

The CMM program, an initiative of the Department of Energy's Office of Fossil Energy and Carbon Management, is addressing this challenge through the release of this NOFO DE-FOA-0003390, titled "Infrastructure Investment and Jobs Act (IIJA) - Mine of the Future - Proving Ground Initiative." This NOFO aims to foster domestic investment in critical mineral and material production at an industrial scale, thereby strengthening all facets of the U.S. energy system. A core objective is the establishment of mining technology proving grounds. These facilities will accelerate the development of novel technologies for the U.S. mining sector. Competitive awards will fund infrastructure and technological advancements that will transform mining practice and facilitate the creation of secure and resilient domestic critical material supply networks. The NOFO will enable real-world testing and optimization of next-generation mining technologies for deployment across U.S. mine sites, concurrently serving as a training platform for disseminating essential skills, technologies, practices, and expertise. This program seeks to restore U.S. prominence in the mining sector through technological pathways that leverage both conventional and unconventional methods and resources.

President Donald Trump, recognizing the need to secure America's critical material supply networks, included "critical minerals" in the definition of EO 14156, *Declaring a National Energy Emergency,* which highlighted the role critical materials play in all parts of the U.S. energy system, including hydrocarbon energy production, refining, and other industrial uses.[7] President Trump also released EO 14241, *Immediate Measures to Increase American Mineral Production*,[8] which highlights the need to immediately increase domestic mineral production. Pursuant to sections 7001(a) and 7002(g) of the Energy Act of 2020,[9] sections 41003(b) to (c) of the IIJA,[10] and the EOs, this NOFO will leverage American mining leadership to secure materials vital for our future.

---

[5] Critical material as defined in 30 U.S.C. § 1606(a)(2), meaning (A) any non-fuel mineral, element, substance, or material that the Secretary of Energy determines (i) has a high risk of a supply chain disruption; and (ii) serves an essential function in 1 or more energy technologies, including technologies that produce, transmit, store, and conserve energy; or (B) a critical mineral. *See also* What Are Critical Materials and Critical Minerals? | Department of Energy.

[6] U.S. Geological Survey, 2025, Mineral commodity summaries 2025 (ver. 1.2, March 2025): U.S. Geological Survey, 212 p., https://doi.org/10.3133/mcs2025

[7] Exec. Order No. 14156 of January 20, 2025, *Declaring a National Energy Emergency,* 90 Fed. Reg. 8433 (Jan. 29, 2025), https://www.federalregister.gov/documents/2025/01/29/2025-02003/declaring-a-national-energy-emergency.

[8] Exec. Order No. 14241 of March 20, 2025, *Immediate Measures to Increase American Mineral Production*, 90 Fed. Reg. 13673 (March 25, 2025), https://www.federalregister.gov/documents/2025/03/25/2025-05212/immediate-measures-to-increase-american-mineral-production.

[9] Energy Act of 2020, Pub. L. 116-260, div. Z, title VII, §§ 7001(a) and 7002(g), Dec. 27, 2020, as amended, https://www.govinfo.gov/content/pkg/PLAW-116publ260/pdf/PLAW-116publ260.pdf.

[10] Infrastructure Investment and Jobs Act, Pub. L. 117-58, div. D, title X, § 41003(b)-(c), Nov. 15, 2021, https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf.

This NOFO establishes proving grounds to accelerate the transition of cutting-edge mining technologies from R&D to field deployment. These proving grounds will offer standardized testing, shared resources, controlled environments, and robust data analysis to de-risk and validate new technologies. They will also foster collaboration, ensure regulatory compliance, and assess market readiness. This NOFO specifically focuses on accelerating sustainable domestic critical mineral production, advancing innovation, developing a skilled workforce, and enhancing public perception of mining through demonstrated environmental stewardship and energy efficiency.

C. Program Goals and Objectives

This NOFO seeks applications to address the establishment of Mining Technology Proving Grounds and accelerate the development of innovative technologies for the U.S. mining sector. This initiative aims to re-establish U.S. leadership in mining by fostering real-world testing, optimization, and deployment of next generation mining technologies, addressing a critical need for secure and resilient domestic Critical Mineral (CM) supply networks.

The primary goal is to establish a field-scale mine proving ground in Budget Period (BP) 1 and BP 2. This facility will host one or two initial R&D envisioned projects in BP 3, focusing on technologies that have progressed beyond laboratory/bench-scale. The objective is to de-risk new mining technologies for commercialization and industry adoption. For purposes of this NOFO, Proving Ground and Facility are used interchangeably and indicate the site in which the envisioned project will be carried out. Additionally, initial mine technology projects can be used interchangeably with Projects, Envisioned Projects, and mine technologies and describe the projects carried out in the Facility in BP 3. Furthermore, for the purposes of this NOFO, Critical Minerals (CM) and Critical Minerals and Materials (CMM) are used interchangeably.

DOE envisions that, once established, these proving ground facilities will represent national assets that can accelerate technology innovation by serving as collaborative platforms for future DOE funded projects and as shared resources for industry, academia, and other partners, aligned with DOE mission priorities and subject to the availability of funding.

1. Strategic Aims

This program seeks to re-establish U.S. leadership in the mining sector by supporting R&D in both conventional and unconventional methods and resources. Technology areas include: ore body/resource exploration, appraisal, mining, processing, automation, energy management, and waste management. The proving grounds will facilitate field-scale testing and maturation of innovative technologies for responsible critical mineral mining, streamlining processes, and reducing risks and costs.

This competitive funding opportunity will support awards for infrastructure development and technologies that transform mining practices. The proving grounds should be designed to demonstrate the effectiveness of Mine Technology projects and will facilitate the maturation of advanced mining technologies. The Mine Technology projects can range from laboratory and/or bench-scale (TRL 2) to field-scale (TRL 6) and must be able to transition at least one TRL from the project's start. The proving ground will aid in overcoming the "valley of death" where promising technologies often stall due to a lack of suitable testing environments. These sites will also serve as vital training grounds for a new generation of skilled American miners.

2. Core Objectives of Proving Grounds

The proving ground facilities are designed to accelerate the entire exploration-to-production timeline, realizing the "Mine of the Future" vision by de-risking mining technology, developing new methods to reduce waste, and increasing co-product recovery from conventional mining. They will also enhance mineral recovery, emphasize small-footprint mining, foster low-impact tailings management, develop a skilled workforce, improve the sector's public image, and support regulatory agencies in adopting tested innovations.

3. Specific Proving Ground Competencies

Centralized testing facilities can play a vital role in innovation within the mining industry by streamlining processes, enhancing collaboration, ensuring compliance, and ultimately fostering the development of safer, more efficient, and environmentally friendly mining technologies. The Proving Ground should establish these competencies.

Proving Ground Competencies	Description
Standardization of Procedures	Establish standardized testing protocols and methodologies, ensuring consistent results across various innovations to aid in comparing outcomes and determining the effectiveness of new technologies.
Resource Optimization	Reduce barriers to smaller companies and startups through shared resources such as advanced equipment, instrumentation, and skilled personnel, leading to cost savings and increased efficiency. This will deliver the benefit from access to high-quality testing without the burden of establishing their own facilities and staff.
Controlled Environment	Provide controlled environments that minimize external variables that could affect test outcomes. This is particularly important for mining technologies, where factors such as geological conditions and environmental impacts can substantially influence performance.
Data Collection and Analysis	Support comprehensive data collection and analysis, facilitating better R&D practices and outcomes. This leads to faster iteration and improvement of technologies based on empirical evidence derived from extensive testing.
Collaboration and Knowledge Sharing	Serves as a hub for collaboration among various stakeholders, including academic institutions, industry leaders, and regulatory bodies. Facilitate anonymization and publication. Such collaboration can enhance knowledge sharing and accelerate innovation within the mining sector.
Regulatory Compliance	Aids new mining technologies in compliance with safety and environmental regulations. The testing facilities can ensure that all tests adhere to relevant standards, facilitating smoother certification processes and reducing the time to market for new technologies.

Proving Ground Competencies	Description
Market Readiness	Accelerates market readiness by validating new technologies against real industry standards and performance expectations. Through testing at the proving ground, companies and investors gain confidence that these innovations are ready for increased investment and large-scale adoption.
Risk Management	Identify potential risks and challenges associated with new technologies in a controlled environment before they are deployed at actual mining operations. This enhances safety and reduces the likelihood of costly failures.

4. Collaborative Approach and Investment

Successful R&D efforts and proving grounds will be built on partnerships between eligible entities providing training opportunities for future American miners. This initiative aims to accelerate R&D progress from development to commercialization in the field. It will address gaps that neither universities nor the private sector typically prioritize for investment.

5. Mine Technology Projects (TRL 2-6)

Applicants should propose high impact mining technology projects (TRL 2-6) that require field testing to advance to TRL 7 and beyond.
Projects are recommended, but not required to align with one of three technology development areas:

1. Resource Characterization and Exploration
2. Mining and Processing
3. Equipment and Productivity

An example list of Specific R&D Technology Areas of Interest that can fit into these three categories is below.

DOE will fund mining technology projects that can be developed past laboratory/bench-scale and subsequently tested and demonstrated in a field-scale proving ground. Proving ground test beds will be constructed within the first two budget periods of the award, with technology testing occurring in later years. To ensure the award of high-quality projects through the proving ground, applicants are required to propose at least one mine technology project for development and validation at the facility. A maximum of two proposed projects per applicant may be awarded. If the applicant's proposal is selected, these initial projects may be amended during negotiations and/or definitization.

In addition to these initial projects, once established, DOE anticipates that these proving ground facilities will serve as platforms to host other DOE funded R&D activities and collaborations, and will be made available as resources to industry, academia, and other research partners. Utilization of these facilities for additional efforts will be subject to DOE programmatic priorities, merit review, and the availability of future funding.

6. Research Focus: Innovative Critical Mineral Recovery

Projects will develop and test innovative mining technologies for recovery of CMM from domestic ores. The goal is to enhance efficiencies, reduce environmental impact, minimize waste, and improve recovery by integrating automation, selective recovery, and modular mobile infrastructure for sustainable mining operations.

7. Specific R&D Technology Areas of Interest

The following is a list of R&D technical areas of interest and is not comprehensive. Other relevant technologies may be included in applications.

Category	R&D Technology Focus	Description
Comminution & Rock Mechanics	Comminution Efficiency	Technologies to improve mineral ore comminution efficiency and reduce grinding energy consumption (physical, chemical, electrochemical).
	Rock Fracturing & Permeability	Techniques to improve rock fracturing, pore connection, and permeability, enhancing *in situ* critical mineral extraction efficacy (physical, mechanical).
Extraction	*In situ* Leaching	Methods for mineral extraction that minimize surface disruption and waste.
Automation & Robotics	Automation & Robotics	Technologies to automate manual mining tasks (e.g., visual inspection, sampling, material movement) using drones and robotics; development of subsurface hardware, sensors, and computational tools for automation and robotics in ore digging, hauling, extraction, and processing.
Data & Sensing	Advanced Drilling	Drilling technologies with real-time sensing capabilities.
	Real-time Material Tracking	Technologies to track and monitor mineralogy of feedstock/ore streams (solid, liquid, slurry) in real-time at the mine or processing plant.
	Artificial Intelligence (AI) & Machine Learning (ML)	Algorithms to optimize equipment efficiency, resource extraction, and processing; development of autonomous vehicles and machinery; internet of things (IoT) applications for remote operations and monitoring.
	Advanced Sensing	Methods or tools for detecting underground ore mineralization and low-grade mineral zones in tailings/refuse. Includes techniques for improved subsurface

Category	R&D Technology Focus	Description
		characterization for precision extraction, sensing while drilling, and exploratory drilling.
	Data Utilization	Collection and utilization of big data, neural networks, AI/ML for subsurface/deep ground resource mapping and mineral exploration, including 3-D volumetric assessment.

8. Key Objectives

- Assess mining technologies for efficiency, cost, and recovery.
- Develop methods to process low-grade ores, minimize waste rock, and reduce water use.
- Implement selective recovery and physical concentration techniques for ore and tailings.
- Create modular, reconfigurable units for flexible deployment and reduced site disturbance.

9. Technical Requirements

Applicants must provide/address the following:

For the Proving Ground Facility:

The Proving Ground must serve as a testbed for next-generation mining technologies, emphasizing modularity, data integration, and real-world validation of critical mineral extraction, processing, and environmental management solutions.

General Infrastructure Requirements:

- Location and Access: Must be within the United States with demonstrated access to mineralized materials or simulated deposits representative of CM (e.g., REEs, graphite, lithium, nickel, cobalt).
- Operational Readiness: Must include site utilities, safety infrastructure, and permitting to enable field-scale operations up to TRL 7.
- Modularity: Facility design must support plug-and-play testing of multiple technology platforms and allow for reconfiguration to accommodate different mineral systems and extraction processes.
- Scalability: Capable of expanding operations to accommodate future demonstration projects or partnerships. Designs, flowsheets, and plans for a scalable field test facility handling large quantities of materials at a pilot scale.
- Simultaneous Operation: Preference for proving grounds capable of operating multiple R&D projects simultaneously, even if only one is initially proposed.

Technical Capabilities and Instrumentation:

- Data Acquisition & Monitoring: Deploy a comprehensive digital monitoring system integrating geophysical, geochemical, and operational data into a unified platform (AI/ML-ready).
- Autonomous & Remote Operations: Infrastructure should support operation and testing of autonomous or teleoperated vehicles, robotic systems, and AI-enabled sensing.
- Environmental Monitoring: Real-time air, water, and soil monitoring systems must be included to assess environmental impacts and validate sustainable mining methods.
- Simulation & Digital Twin: Integration with a digital twin environment for real-time simulation, prediction, and validation of process performance.

Safety, Compliance, and Sustainability:

- Safety Protocols: Must adhere to applicable Mine Safety and Health Administration (MSHA) and Occupational Safety and Health Administration (OSHA) safety standards, with site-specific health and safety plans in place.
- Environmental Compliance: Must demonstrate conformance with National Environmental Policy Act (NEPA), Clean Water Act, and other applicable federal and state environmental regulations.
- Sustainability Metrics: Establish baselines for emissions, waste, and energy use; must include monitoring and reporting mechanisms for continuous improvement.
- Community and Workforce Integration: Include local workforce engagement and training opportunities.

Workforce and Collaboration Hub:

- Workforce and Training Integration: Should include provisions for hands-on training, workforce development, and educational use.
- Visitor and Collaboration Center: For engaging with government, industry, academia, and public.

For R&D Mine Technology Projects:

Each applicant must identify up to two (2) initial projects to be demonstrated at the developed proving ground to validate its functionality and de-risk new mining technologies. Proposed initial projects under this funding opportunity may be asked to be amended during negotiations if selected.

Technical Maturity:

- Readiness Level: Proposed technologies must be at TRL 2–6 at project start and demonstrate advancement increasing at least one TRL by project completion.
- Integration with Proving Ground: Must demonstrate compatibility with the facility's modular systems, safety framework, and data acquisition protocols.
- Performance Metrics: Include clear performance indicators (e.g., recovery efficiency, selectivity, energy intensity, environmental footprint) and justification of economic and technological advantages over conventional methods.

Environmental and Safety Considerations:

- Environmental Footprint: Each project must quantify reductions in waste, emissions, or water/energy consumption compared to baseline operations.
- Safety Plan: Provide a project-specific safety and hazard mitigation plan consistent with the Proving Ground's operational safety framework.

Collaboration and Commercialization:

- Industry and Academic Partnerships: Demonstrate engagement with industry and/or academia, to support commercialization and workforce development.
- Transition Plan: Include a post-demonstration pathway outlining next steps toward commercialization or follow-on pilot deployment.

10. Technology Readiness Level (TRL)

Research should begin between TRL 2-6 and aim to advance at a minimum of one TRL by the completion of work at the proving ground.

D. Expected Performance Goals

Applicants shall propose at a minimum, one and a maximum of two high impact applied Mine Technology (TRL 2-6, laboratory and/or bench-scale to small pilot scale) projects that require field testing to mature to a higher TRL and onward toward demonstration. These projects will be developed in budget period 3 of the effort after the proving ground facility is designed, built, and tested in budget periods 1 & 2. It is recommended, but not required, that the Mine Technology projects fit within the scope of one of three technology development areas 1) Resource Characterization and Exploration, 2) Mining and Processing, 3) Equipment and Productivity.

The project teams and proving ground capabilities shall consider R&D in the following areas, but are not limited to: (primary focus of increasing TRL from 2-6)

- Advanced drilling technologies
- Novel geophysical techniques and methods
- Digital subsurface applications (sensors, autonomous operations, robotics, real-time drilling and extraction)
- *In situ* mineral extraction (e.g., beneficiation, *in situ* recovery by solution mining or biomining)
- Novel processing (includes Run of Mine (ROM) and waste)
- Tailings management- safe and responsible processing, storage, and management of waste Includes the material itself, associated water and chemical products (additives) from processing and recovery circuits
- Terrestrial analogues to marine mineral recovery
- Mineral traceability

All analytical characterization data and information generated pertaining to samples, such as components and concentration information, will be delivered to NETL with unlimited rights. NETL

intends to make this information publicly available in NETL's Energy Data eXchange (EDX) database platform which can be found by accessing the following URL link: https://edx.netl.doe.gov/ree-cmm.

The Mine Technology projects developed under this NOFO are aimed to:

- Address key gaps in the technology and skilled worker development pipeline for the CMM supply network sector. Specifically, the challenges associated with advancing R&D progress from low TRL to field and demonstration scale, minimizing the technology valley of death. This represents the often-neglected TRLs 4-7, at which research moves to market. This is where neither universities nor private sectors prioritize investment.
- Research efforts to develop innovative methods to reduce the traditional mining footprint. Studies show nearly half of the mined rock goes to waste. This includes reducing waste rock, reducing energy consumption, reducing water usage, and using novel technologies and practices all in an effort to increase the ratio of economic fraction processed to total material mined. This may be accomplished with an overall reduction in total mined material or by finding new economic fraction(s) from other materials that traditionally were not separated from the mined rock. Due to low ore grades in unconventional deposits, the most likely situation is reduction of waste using innovative processing and co-production of other materials.
- Address lack of government federal participation with industry which was lost with closure of the U.S. Bureau of Mines (USBM) in 1996.

This NOFO aims to re-establish U.S. leadership in the mining sector by focusing on technology paths that use both conventional and unconventional methods and resources.

- The Mine technology areas include 1) Resource Characterization and Exploration, 2) Mining and Processing, and 3) Equipment and Productivity.
- The proving ground facilities will primarily support field-scale testing and maturation of innovative technologies and approaches for conducting responsible mining of CM, helping de-risk technologies, streamline complex processes and tasks while reducing risks and costs.
- It is preferred that the proving ground proposed can operate multiple and diverse Mine Technology projects simultaneously even if only one is being proposed as part of the project.

E. Teaming Partner List

DOE is compiling a Teaming Partner List to facilitate the formation of project teams for this NOFO. The Teaming Partner List allows organizations that may wish to participate on a project to express their interest to other applicants and explore potential partnerships.

The Teaming Partner List will be available on eXCHANGE and will be regularly updated to reflect new teaming partners who provide their organization's information, link provided on Key Facts section.

SUBMISSION INSTRUCTIONS: View the Teaming Partner List by visiting the eXCHANGE homepage and clicking on "Teaming Partners" within the left-hand navigation pane. This page allows users to view published Teaming Partner Lists. To join the Teaming Partner List, submit a request within eXCHANGE. Select the appropriate Teaming Partner List from the drop-down menu, and fill in the following information: Investigator Name, Organization Name, Organization Type, Topic Area, 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 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.

F. Topic Area

There is a single Topic Area in this NOFO:

Development of Mining Technology Proving Grounds & one or two Accelerated Mine Technology R&D Projects The overall objective of this project is to create field-scale mine proving grounds, in BP 1 and BP 2 of the award, that will be used to complete a minimum of one and maximum of two initial mine technology project(s) in BP 3. The proving ground projects will focus on R&D for technologies that can be developed past laboratory and/or bench-scale and subsequently be tested and demonstrated in the developed proving ground. This is necessary to de-risk adoption of new mining technologies for commercialization and adoption by the mining industry and will provide the opportunity for developing, demonstrating, and maturing advanced mining technologies at large scale to be deployed at domestic mine sites.

The proving ground test beds will be constructed during the first two budget periods of the project award and will be ready for technology testing in the latter years of the effort. A key to successful execution of this funding opportunity will be through the collaboration between government, industry/private sector, and academia to leverage expertise, infrastructure, and support for technology development and demonstration. The vision for these proving grounds will be to serve as the nation's premier field scale innovation platform for transforming how critical minerals are discovered, extracted, processed, and reclaimed. They will serve as a facility to accelerate the development and adoption of safe, sustainable, and intelligent mining technologies that strengthen America's critical mineral supply networks while minimizing impacts. Once established, DOE anticipates that these proving grounds will host other DOE funded research and be made available as resources to industry, academia, and other research partners subject to future funding and programmatic priorities.

Applicants shall propose high impact applied R&D (TRL 2-6, laboratory and/or bench-scale to small pilot scale) projects that require field testing to mature to higher TRL levels and onward toward demonstration. The projects are recommended, but not required to fit within the scope of one of three technology development areas 1) Resource Characterization and Exploration, 2) Mining and Processing, and 3) Equipment and Productivity.

Research Sought

Proving grounds developed under this Topic Area will be able to develop and test innovative mining technologies for recovery of CM from domestic ores. The goal is to enhance efficiencies, reduce environmental impact, minimize waste, and improve recovery. Efforts will integrate automation, selective recovery, and modular mobile infrastructure to enable sustainable, mining operations.

Examples of mining technology R&D of interest are listed below:

a) physical, chemical, and electrochemical technologies that can improve the comminution efficiency of mineral ores and reduce energy consumption for grinding;
b) physical and mechanical techniques that can be used to improve rock fracturing, pore connection, and permeability, improve the efficacy of the *in situ* extraction of CM;
c) technologies to reduce manual tasks associated with mining such as visual inspection, sampling, material movement which could be replaced through drone use and robotics;
d) development of hardware, sensors, and computational tools/software for automation and robotics for ore digging, hauling, extraction, and processing;
e) Electrification of mining equipment to reduce energy consumption and pollution
f) Advanced drilling technologies with real-time sensing capabilities;
g) innovative technologies to track and monitor mineralogy of feedstock/ore solid, liquid, or slurry streams in real-time and track material streams at the mine or processing plant;
h) *in situ* leaching methods for mineral extraction that cause less surface disruption and minimize waste;
i) artificial intelligence (AI) and machine learning algorithms to optimize equipment efficiency, resource extraction, and processing development of autonomous vehicles and machinery for drilling, excavation, and processing internet of things (IoT) applications for remote operations and monitoring;
j) advanced sensing methods or tools capable of detecting underground ore mineralization and low-grade mineral zones in tailings or refuse. Includes techniques to improve the subsurface characterization of ore deposits to allow for precision extraction of CM, including sensing while drilling and exploratory drilling technologies for discovery and volumetric estimates of in-place resources; and
k) data collection and utilization of big data, neural networks, machine learning and artificial intelligence techniques facilitate subsurface and deep ground resource mapping and mineral exploration. Use of ML and AI for resource mapping, resource assessment (including 3-D volumetric scale), automation, geophysical/geochemical/geological data collection and analysis.

G. Applications Specifically Not of Interest

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (Please also refer to the Responsiveness Review section below):

- Applications that fall outside the technical parameters specified in Background and Context above and the Topic Area section above.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- R&D strictly related to Acid Mine Drainage (AMD) or produced water sites.
- R&D at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites, abandoned, or reclaimed mine sites and impoundments.
- Applications that propose use or inclusion of Mines without permits.
- Proving Grounds that are constructed and operated outside of the U.S.
- Proving Grounds that cannot be operated sustainably for a minimum of 10 years.

H. Statement of Substantial Involvement

DOE anticipates awarding cooperative agreements under this NOFO, which include a statement of DOE's "substantial involvement" in the work performed under the resulting awards. For cooperative agreements, DOE does not limit its involvement to the administrative requirements of the award. Instead, DOE has substantial involvement in the direction and redirection of the technical aspects of the project. DOE's substantial involvement in resulting awards may include the following:

A. DOE shares responsibility with the recipient for the management, control, direction, and performance of the project.
B. DOE may intervene in the conduct or performance of work under this award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.
C. DOE may redirect or discontinue funding the project based on the outcome of DOE's evaluation of the project at the Go/No-Go decision point(s).
D. DOE participates in major project decision-making processes.
E. Conducting annual project review meetings and monthly status meetings to ensure adequate progress and that the work accomplishes the program and project objectives. Recommending alternate approaches or shifting work emphasis, if needed.
F. DOE may be involved with external usage of the established Proving Ground once the initial Mine Technology project(s) are completed. DOE's authorized representatives have the right to make site visits upon reasonable notice at a mutually agreeable time established by the parties to review project accomplishments and management control systems and to provide technical assistance, if required. You must provide, and must require your subawardees to provide, reasonable access to facilities, office space, resources, and assistance for the safety and convenience of the government representatives in the performance of their duties. All site visits and evaluations shall be subject to the health, safety and environmental policies required of all visitors and shall be performed in a manner that does not unduly interfere with or delay the work.

I. Statutory Authority

The programmatic authorizing statutes are:

- Section 7001(a) of the Energy Act of 2020 (42 U.S.C. 13344(a))
- Section 7002(a)(2) of the Energy Act of 2020 (30 U.S.C. § 1606(a)(2))
- Section 7002(g) of the Energy Act of 2020 (30 U.S.C. 1606(g))
- DOE Organization Act (42 U.S.C. 7101, *et seq.*)

Awards made under this announcement will fall under the purview of 2 CFR Part 200 as adopted and supplemented by 2 CFR Part 910.

IV. Application Content and Form

This section includes application information specific to this NOFO Part 1. Refer to the NOFO Part 2, *Application Content and Form* for standard information that applies to all DOE NOFOs such as formatting and content requirements, and funding restrictions.

A. Information Sharing

IMPLEMENTATION OF PRESIDENTIAL MEMORANDUM SIMPLIFYING THE FUNDING OF ENERGY INFRASTRUCTURE AND CRITICAL MINERAL AND MATERIAL PROJECTS

Pursuant to this Presidential Memorandum, the Department of Energy may share and use within the Government any application information provided by or on behalf of the applicant. Accordingly, in accordance with applicable law and notwithstanding any other provisions herein, by submitting an application or agreeing to a financial assistance arrangement with the Department of Energy under this NOFO, the applicant is providing consent for any properly marked trade secret, confidential, proprietary, privileged or otherwise sensitive application information provided by or on behalf of the applicant to be disclosed to the Executive Office of the President and relevant Agencies offering loans, grants, equity, guarantees or other federal funding, for the purposes of the Presidential Memorandum on Simplifying the Funding of Energy Infrastructure and Critical Mineral and Material Projects.

B. Summary

The application process includes one submission phase: application.

Application Submission Phase	Eligibility for Submission
Application	Must be submitted by the specified due date and time to be eligible for comprehensive merit review.

C. Application Content Requirements

Each application must be limited to a single concept. Applications must conform to the following requirements and must not exceed the stated page limits. Please refer to the NOFO Part 2, *Application Content and Form* for a complete list of application requirements. Detailed guidance on the content and form of NOFO-specific requirements is provided following the Summary of Application Requirements table below.

1. Covered Individual Definition, Designation, and Responsibility

Several of the Application Content Requirements listed below and in the NOFO Part 2 are required of covered individuals.

For the purposes of this NOFO, a Covered Individual means an individual who (a) contributes in a substantive, meaningful way to the development or execution of the scope of work of a project proposed for funding by DOE, and (b) is designated as a covered individual by DOE. Consultants,

graduate students, and those with a postdoctoral role also may be considered covered individuals if they meet this definition.

DOE designates as covered individuals any principal investigator (PI); project director (PD); co-principal investigator (Co-PI); co-project director (Co-PD); project manager; and any individual regardless of title that is functionally performing as a PI, PD, Co-PI, Co-PD, or project manager.

The applicant is responsible for assessing the applicability of (a) above, against each person listed on the application. Further, the applicant is responsible for identifying any such individual to DOE for designation as a covered individual, if not already designated by DOE as described above.

The applicant's submission of a current and pending support disclosure and/or bio sketch/resume for a particular person serves as an acknowledgment that DOE designates that person as a covered individual.

DOE may further designate covered individuals during award negotiations or the award period of performance.

If selected, throughout the life of the award, the recipient has an ongoing responsibility to submit: 1) current and pending support disclosure statements and resumes/bio sketches for any new covered individuals, and 2) updated disclosures if there are changes to the current and pending support or resume/bio sketch previously submitted to DOE.

2. Summary of Application Requirements

Component	File Format	Page Limit	File Name
Application for Federal Assistance (SF-424)	PDF	N/A	ControlNumber_LeadOrganization_424
Technical Volume	PDF	15	ControlNumber_LeadOrganization_TechnicalVolume
Impacted Indian Tribes Documentation	PDF	N/A	ControlNumber_LeadOrganization_ImpactedTribes
Statement of Project Objectives	MS Word	8	ControlNumber_LeadOrganization_SOPO
Project Management Plan	PDF	5	ControlNumber_LeadOrganization_PMP
Budget Information Non-Construction Programs (SF-424A)	PDF	N/A	ControlNumber_LeadOrganization_SF-424A
Waiver for Foreign Entity Participation	PDF	N/A	ControlNumber_LeadOrganization_FEW
Transparency of Foreign Connections	PDF	N/A	BusinessSensitive_ControlNumber_LeadOrganization_TFC
Potentially Duplicative Funding Notice	PDF	N/A	ControlNumber_LeadOrganization_PDFN
Performance of Work in the United States (Foreign Work Waiver)	PDF	N/A	ControlNumber_LeadOrganization_FWW
Resumes (Research and Development (R&D))	PDF	3 pages each	ControlNumber_LeadOrganization_Resumes

Current and Pending Support (for each covered individual)	PDF	N/A	ControlNumber_LeadOrganization_CPS
Digital Persistent Identifier (for each covered individual)	N/A	N/A	Include in Current & Pending Support
Research Security Training Requirement (for each covered individual)	N/A	N/A	Include in Current & Pending Support
Location(s) of Work	Excel	N/A	ControlNumber_LeadOrganization_LOW
Environmental Questionnaire	PDF	N/A	ControlNumber_LeadOrganization_ENV
Disclosure of Lobbying Activities, if applicable (SF-LLL)	PDF	N/A	ControlNumber_LeadOrganization_SF-LLL
Certification Regarding Lobbying (OMB 4040-0013)	PDF	N/A	ControlNumber_LeadOrganization_Cert Lobbying
Summary for Public Release	PDF	1	ControlNumber_LeadOrganization_Summary
Photographs & Schematics of Existing Proving Ground	PDF	N/A	ControlNumber_LeadOrganization_Photos
Technology Maturation Plan	PDF	5	ControlNumber_LeadOrganization_TMP
Project Summary Data Sheet	Excel	N/A	ControlNumber_LeadOrganization_SummaryTable

3. Technical Volume

The Technical Volume must conform to the following content and form requirements. This volume must address the technical review criteria as discussed in Technical Review Criteria. DUPLICATION OF APPLICATION REQUIREMENTS WITHIN THE TECHNICAL VOLUME IS DISCOURAGED DUE TO PAGE LIMITS. For instance, please do not add the full PMP into the technical volume.

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

The Technical Volume to the application may not be more than fifteen (15) pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all information below. The applicant should consider the weighting of each of the technical review criteria (see Technical Review Criteria) when preparing the Technical Volume.

The Technical Volume should clearly describe and expand upon information requested in the preceding sections.

Technical Volume Content Requirements Overview	
Section	**Approximate Percent Content of the Technical Volume**
Cover Page	N/A
Project Overview	10%

Technical Description, Innovation, and Impact	30%
Workplan in Statement of Project Objectives	40%
Technical Qualifications and Resources	20%

Cover Page:
The cover page must include all of the following:

- The project title
- Technical and business point of contacts (POCs)
- The project team, including recipient name, entity type and names of all team member organizations
- The project location(s)
- The proposed federal funding level, cost share and period of performance
- Senior/key personnel and other covered individuals
- Statements regarding confidentiality
- Technology development area 1) Resource Characterization and Exploration, 2) Mining and Processing, and 3) Equipment and Productivity

Project Overview (Approximately 10% of the Technical Volume)
The Project Overview should contain the following information:

- **Background:** The applicant should discuss the background of its organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the application.
- **Project Goal:** The applicant should explicitly identify the targeted improvements to the baseline technology and the critical success factors in achieving that goal.
- **DOE Impact:** The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.
- **Budget:** The applicant must provide a budget table, similar to the table below, that includes a yearly breakdown of the following costs: labor, travel, equipment, supplies, contractual, construction, other direct costs, and indirect charges. An additional table must be provided for each subrecipient with total costs over $500,000.

Category	Year 1	Year 2	Year 3	Year 4	Total
Labor					
Travel					
Equipment					
Supplies					
Contractual					
Construction					
Other Direct Costs					
Indirect Charges					
Federal Total					
Cost Share					
Total					

Technical Description, Innovation, and Impact (Approximately 30% of the Technical Volume)
The Technical Description should contain the following information:

- **Relevance and Outcomes:** The applicant should provide a detailed description of the technology or focus area, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the NOFO, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project.
- **Feasibility:** The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. This section should also address the project's access to necessary infrastructure (e.g., transportation, water, electricity transmission), including any use of existing infrastructure, as well as to a skilled workforce.
- **Innovation and Impacts:** The applicant should describe the current state-of-the-art in the applicable field, the specific innovation of the proposed technology or focus area, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful. The applicant should describe how their proving ground will also serve as vital training grounds for a new generation of skilled American miners.

Workplan (Approximately 40% of the Technical Volume)
The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Project Tasks, Milestones, Go/No-Go decision points, and project schedule. A detailed statement of project objectives (SOPO) is separately requested as part of the application. The Workplan should contain the following information:

- **Project Objectives:** The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes.
- **Technical Scope Summary:** The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by budget periods that are separated by discrete Go/No-Go decision points. The applicant should describe the specific expected end result of each budget period.
- **WBS and Task Description Summary:** The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of three budget periods, tasks and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this NOFO. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks.
- **Milestone Summary:** The PMP (separately requested) should provide a summary of appropriate milestones consistent with the SOPO covering the entirety of the project to demonstrate progress and success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable,

Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the NOFO, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the PMP.

- **Go/No-Go Decision Points:** The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. At a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period of the project. See the Key Facts section above for Go/No-Go and budget period information. The applicant should also provide the specific technical criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone.
- **End of Project Goal:** The Workplan should include a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.
- **Project Schedule:** The applicant should provide a Gantt chart for the entire project, including task and subtask durations, any milestones, and any Go/No-Go decision points.
- **Build America Buy America (BABA) Requirements for Infrastructure Projects:** Within the first two pages of the Workplan, include a short statement on whether the project will involve the construction, alteration, maintenance and/or repair of public infrastructure in the United States. See Build America, Buy America | Department of Energy and 2 CFR 184 for applicable definitions and other information regarding Infrastructure Projects and the Buy America Preference.
- **Project Management:** The applicant should discuss the team's proposed management plan, including the following (a brief description of these sub-bullets can be included in the Technical Volume, but duplication of the separate PMP is not necessary):
    - The overall approach to and organization for managing the work;
    - The roles of each project team member;
    - Any critical handoffs/interdependencies among project team members;
    - The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices;
    - The approach to project risk management, including a plan for securing a qualified workforce and mitigating risks to project performance including but not limited to conflicts related to siting;
    - Approach to addressing permits and other approvals, including compliance with any current permits, and any permits and natural or cultural resource issues that could require discretionary permits or approvals;
    - A milestone table;
    - A description of how project changes will be handled;
    - If applicable, the approach to Quality Assurance/Control;
    - How communications will be maintained among project team members.

Technical Qualifications and Resources (Approximately 20% of the Technical Volume)

The Technical Qualifications and Resources should contain the following information:

- A description of the project team's unique qualifications and expertise, including those of key subrecipients;

- A description of the project team's existing equipment and facilities, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project;
- Relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives;
- The time commitment of the key team members to support the project;
- The skills, certifications, or other credentials of the construction and ongoing operations workforce;
- For multi-organizational projects, describe succinctly:
    - The roles and the work to be performed by the project manager and Senior/Key Personnel at the recipient and sub levels;
    - Business agreements between the applicant and sub;
    - How the various efforts will be integrated and managed;
    - Process for making decisions on technical direction;
    - Publication arrangements;
- Strategy to address known resource, including intellectual property and real property, constraints or challenges; and
- Communication plans.

4. Biographical Sketch

As part of the application, each covered individual at the applicant and subrecipient level must submit a biographical sketch ("*Biosketch*"). Use SciENcv (Science Experts Network Curriculum Vitae) to produce a DOE compliant PDF version of the *Biosketch*. Note that there is no page limitation for the *Biosketch*, though some fields in SciENcv have character limitations for consistency.

Consistent with the instructions in NSPM-33 Implementation Guidance Pre- and Post-award Disclosures Relating to the Biographical Sketch and Current and Pending (Other) Support[11] and the **DOE NOFO-Specific Biosketch Instructions** below, the *Biosketch* and *CPS Common Forms* must together include a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. All connections with malign foreign talent recruitment programs must be identified.

Please note the following:

- With the exception of "covered individual", which is defined in the NOFO Part 1, *Application Content and Form—Application Content Requirements, Covered Individual Definition, Designation and Responsibility*, all other definitions of terms used in the *Biosketch* are available at: NSPM-33 Definitions.
- If there is any conflict between NSPM-33 Implementation Guidance Pre- and Post-award Disclosures Relating to the Biographical Sketch and Current and Pending (Other) Support and the **DOE NOFO-Specific Biosketch Instructions** below, follow the DOE NOFO-Specific Biosketch Instructions.

[11] This table supersedes in its entirety, Table 2a and Paragraph 7 of the Disclosure Requirements and Standardization Section of the NSPM-33 Implementation Guidance.

DOE/NNSA NOFO-Specific Biosketch Instructions	
Persistent Identifier (PID) of the Covered Individual	The PID field is required for all NOFOs and Awards that encompass R&D activities, or technical assistance to support R&D activities. For NOFOs and Awards that do not meet the criteria above, the PID field is optional.
Appointments and Positions Reporting Timeframe	Identify all domestic and foreign professional appointments and positions, both inside and outside the primary organization. There should be no lapses in time over the past 10 years or since age 18, whichever period is shorter.
Products: Limitation on number provided	List up to 10 products most closely related to the proposed project.

5. Current and Pending Support

Current and pending (other) support ("*CPS Common Form*") is used to identify potential duplication, overcommitment, potential conflicts of interest or commitment, and all other sources of support.

As part of the application, each covered individual at the prime applicant and subrecipient level must submit a *CPS Common Form*. Use SciENcv (Science Experts Network Curriculum Vitae) to produce a DOE compliant PDF version of the *CPS Common Form*. Note that there is no page limitation for the *CPS Common Form*, though some fields in SciENcv have character limitations for consistency.

Consistent with the instructions in NSPM-33 Implementation Guidance Pre- and Post-award Disclosures Relating to the Biographical Sketch and Current and Pending (Other) Support[12] and the DOE NOFO-Specific CPS Instructions below, the *CPS Common Form* and *Biosketch Common Form* must together include a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. All connections with malign foreign talent recruitment programs must be identified in current and pending support.

Please note the following:

- With the exception of "covered individual", which is defined in the NOFO Part 1, *Application Content and Form—Application Content Requirements, Covered Individual Definition, Designation and Responsibility*, all other definitions of terms used in the *CPS Common Form* are available at: NSPM-33 Definitions.
- If there is any conflict between NSPM-33 Implementation Guidance Pre- and Post-award Disclosures Relating to the Biographical Sketch and Current and Pending (Other) Support and

[12] This table supersedes in its entirety, Table 2a and Paragraph 7 of the Disclosure Requirements and Standardization Section of the NSPM-33 Implementation Guidance.

the DOE/NNSA NOFO-Specific CPS Instructions below, **follow the DOE NOFO-Specific CPS Instructions**.

DOE/NNSA NOFO-Specific CPS Instructions	
Persistent Identifier (PID) of the Covered Individual	The PID field is required for all NOFOs and Awards that encompass R&D activities, or technical assistance to support R&D activities. For NOFOs and Awards that do not meet the criteria above, the PID field is optional.
Reporting Timeframe for Proposals, Projects, and In-Kind Contributions	Disclose only **current** and **pending** support, as defined in the "Status of Support" field of the SciENcv CPS Common Form.
Types of Proposals and Active Projects to Disclose	In addition to the guidance listed above, consulting activities must be disclosed under the proposals and active projects section of the form when any of the following scenarios apply: • The consulting activity will require the covered individual to perform research as part of the consulting activity; • The consulting activity does not involve performing research, but is related to the covered individual's research portfolio and may have the ability to impact funding, alter time or effort commitments, or otherwise impact scientific integrity; or • The consulting entity has provided a contract that requires the covered individual to conceal or withhold confidential financial or other ties between the covered individual and the entity, irrespective of the duration of the engagement.
Disclosure Instructions for In-Kind Travel	Follow the disclosure instructions for travel in NSPM-33 Implementation Guidance Pre- and Post-award Disclosures Relating to the Biographical Sketch and Current and Pending (Other) Support.
Current and Pending (Other) Support Addendum	The Current and Pending (Other) Support Addendum is **not** required for this NOFO.

6. Statement of Project Objectives

Applicants are required to use the template provided in eXCHANGE for their Statement of Project Objectives (SOPO) and follow all instructions in the template. The SOPO must not exceed 8 pages. The Statement of Project Objectives must contain a clear, concise description of all activities to be completed during project performance. It shall not contain proprietary or confidential business information.

Specific elements of the document are:

- Objectives
- Scope of Work
- Tasks to be Performed
- Deliverables

All deliverables listed in the template must be included, such as:

- A Technology Maturation Plan
- EDX Characterization data for all materials analyzed
- Access to samples; samples should be kept by the applicant for 1 year after project completion
- Process Flow Diagrams for Mine Technology project(s)
- Piping and Instrumentation Diagrams for Proving Ground; if available

The SOPO template also includes other requirements, such as a Kickoff meeting, annual project briefings, and monthly status updates.

7. Project Management Plan

Applicants are required to use the template provided in eXCHANGE for their Project Management Plan (PMP) and follow all instructions in the template. The PMP must not exceed 5 pages. Specific elements of the document are:

- Executive Summary
- Project Organization and Structure
- Risk Management Plan
- Milestone Log
- Costing Profile
- Project Timeline
- Success Criteria

8. Photographs/Schematics of Existing Proving Ground

Applicants are required to submit photograph(s)/schematic(s) of their existing mine facility that clearly show existing infrastructure and capabilities related to their application. Photo(s) should include a caption with a description of what is shown and reference gauges for dimension (e.g., a quarter, a person).

9. Technology Maturation Plan

Applicants are required to submit a Technology Maturation Plan (TMP). The TMP must not exceed 5 pages. The plan must identify the pathway for near-term technology deployment by 2030. If the beginning TRL is 2, additionally provide a detailed plan on how the technology will be advanced to TRL 6. Supporting processing data/information, anticipated operational timelines (e.g., minimum of 5 years), roadmap, and potential offtake agreements are to be included. If selected for award, the Recipient will update their TMP annually and will provide their final TMP at the conclusion of the executed project.

10. Project Summary Data Sheet

Applicants are required to use the template provided in eXCHANGE to complete a Project Summary Data Sheet. This document must describe the (1) proposed project, (2) R&D technology area(s), (3) beginning and ending TRLs of the proving ground & R&D project(s), (4) proposed Federal costs and cost share, (5)

proposed facility location, (6) projected timelines, and (7) and applicant contact information. An update will be required at conclusion of the award.

11. Summary of Post Selection Requirements (not due with the application)

- **Letters of Commitment** from all subrecipients and from all third-party cost share providers.
- **Budget Justification** that will include all work to be performed by the recipient and its subrecipients and contractors.
- **Subrecipient Budget Justification** for each subrecipient that is expected to perform work estimated to be more than $500,000 of the total proposed budget.
- **Data Management and Sharing Plan (DMSP)** In general, a DMSP should address the requirements on the DOE Requirements and Guidance for Digital Research Data Management website: https://www.energy.gov/datamanagement/doe-requirements-and-guidance-digital-research-data-management.
- **Environmental Impact Volume** should describe the proposed action, its alternatives, and the existing environment.
- **Equity Considerations for Negotiation:** DOE may be interested in obtaining equity interests in recipient entities now or in the future. Entities may indicate in their application whether they would consider offering equity interests. Such equity considerations may be offered and addressed during negotiations. Applicants' decision to indicate the availability of equity interests will not be a factor in the merit review or selection process.

D. Funding Restrictions

Program-specific funding restrictions applicable to awards funded under this NOFO are identified below. Standard funding restrictions are described in the NOFO Part 2, *Funding Restrictions* section.

Applicable Funding Restrictions		
Title	**Location**	**Additional Information**
Allowable Costs	NOFO Part 2	Applicable to awards made under this NOFO
Pre-Award Costs	NOFO Part 2	Applicable to awards made under this NOFO
Performance of Work in the United States (Foreign Work Waiver Requirement)	NOFO Part 2	Applicable to awards made under this NOFO
Foreign Travel	NOFO Part 2	Foreign Travel is allowed for awards made under this NOFO with the prior written approval of the Grants Officer assigned to the award.
Lobbying	NOFO Part 2	Applicable to awards made under this NOFO
Equipment and Supplies	NOFO Part 2	Purchasing American-made equipment and supplies is applicable to this award.
Davis-Bacon Act Requirements	NOFO Part 2	Applicable to awards made under this NOFO

Buy America Preference for Infrastructure Projects	NOFO Part 1	Applicable to awards made under this NOFO

1. Buy America Preference for Infrastructure Projects

Awards funded through this NOFO that are for, or contain, construction, alteration, maintenance, or repair of public infrastructure in the United States undertaken by applicable recipient types, require that:

- All iron, steel, and manufactured products used in the infrastructure project are produced in the United States; and
- All construction materials used in the infrastructure project are manufactured in the United States.

Please refer to the Standard Terms and Conditions and 2 CFR Part 184 to determine whether the Buy America Preference applies and if they should consider the application of the Buy America Preference in the proposed project's budget and/or schedule. (Note that the Buy America Preference does not apply to prime recipients that are for-profit entities.)

V. Submission Requirements and Deadlines

There are several one-time actions applicants must take before applying to this NOFO. Some of these may take several weeks, so it is vital applicants build in enough time to complete them. Failure to complete these actions could interfere with application or negotiation deadlines or the ability to receive an award if selected. These requirements are outlined in detail in the NOFO Part 2, *Get Registered*.

A. Required Registrations

1. Unique Entity Identifier (UEI) and System for Award Management (SAM)

You must have an active account with SAM.gov. This includes having a Unique Entity Identifier (UEI). SAM.gov registration can take several weeks. To register, go to SAM.gov Entity Registration and click Get Started. From the same page, you can also click on the Entity Registration Checklist for the information you will need to register.

Each applicant must:

1. Be registered in SAM.gov before submitting an application;
2. Provide a valid Unique Entity Identifier in the application; and
3. Continue to maintain an active registration in SAM.gov with current information at all times during which you have an active federal award or an application or plan under consideration by a federal agency.

DOE may not make a federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, the 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.

2. eXCHANGE

Register and create an account in the eXCHANGE site identified in the Key Facts section of the NOFO Part 1. This account can be used to apply to open NOFOs in eXCHANGE. To view and submit applications to open opportunities under a specific DOE office(s), you must access the applicable instance of the system. You may need to be registered in more than one instance to submit applications for opportunities managed by different DOE offices.

Each organization or business unit, whether acting as a team or a single entity, should use only one account as the contact point for each submission. Applicants must also designate backup points of contact. **This step is required to apply to this NOFO.**

3. Grants.gov Registration

You must have an active Grants.gov registration to receive automatic updates when modifications to this NOFO are posted. Doing so requires a Login.gov registration as well. Step-by step instructions for applicants at How to Apply for Grants website https://www.grants.gov/applicants/grant-applications/how-to-apply-for -grants

B. Application Package

1. eXCHANGE

The application package requirements are outlined in the Application Content and Form section above. Several templates for application requirements are included in eXCHANGE. To access these materials, select the appropriate NOFO on the Funding Opportunity page of eXCHANGE.

Note: The maximum file size that can be uploaded to the eXCHANGE website is 50MB. Files larger than 50MB cannot be uploaded and hence cannot be submitted for review. If a file is larger than 50MB but is still within the maximum page limit specified in the NOFO, it must be broken into parts and denoted to that effect. For example:

- TechnicalVolume_Part_1
- TechnicalVolume_Part_2

DOE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 50MB.

In addition to eXCHANGE, the application forms and instructions are available at https://netl-exchange.energy.gov/.

Electronic Authorization of Applications and Award Documents
Submission of an application and supplemental information under this NOFO through electronic systems used by the DOE, including eXCHANGE, constitutes the authorized representative's approval and electronic signature.

C. Submission Date and Times

All required submissions must be submitted to the eXCHANGE site identified in the Key Facts section of NOFO Part 1 no later than 5 p.m. ET on the dates provided on Key Facts section.
There may be more than one deadline, depending on whether a letter of intent and a concept paper is required.

Applicants are strongly encouraged to submit all required application documents at least 48 hours in advance of the submission deadline. Under normal conditions (i.e., at least 48 hours before the submission deadline), applicants should allow at least one hour to submit application documents. Once the application documents are submitted in the eXCHANGE site identified in the NOFO Part 1, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made to any of these documents, the applicant must resubmit them before the applicable deadline. DOE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

D. Intergovernmental Review

This NOFO is not subject to Executive Order 12372, Intergovernmental Review of Federal Programs.

VI. Application Review Information

A. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this NOFO and the guidance provided in the "DOE Merit Review Guide for Financial Assistance," effective October 1, 2020, which is available at: https://energy.gov/management/downloads/merit-review-guide-financial-assistance-and-unsolicited-proposals-current.

B. Responsiveness Review

The following applications will be deemed nonresponsive and will not be reviewed or considered:

- Project concepts or approaches identified specifically as NOT of interest (see the Applications Specifically Not of Interest section above).
- Applicant/Applications that do NOT meet the Eligibility Criteria in NOFO Parts 1 and 2.

C. Review Criteria

1. Compliance Criteria

All applicant submissions for applications must:

- Comply with the applicable content and form requirements listed in Application Content Requirements and Submission Requirements and Deadlines of the NOFO Part 1 and 2;
- Include all required documents;
- Be uploaded successfully in eXCHANGE site indicated in the Key Facts section above including clicking the "Submit" button; and
- Comply with the submission deadline stated in Key Facts.

DOE will not review or consider submissions submitted through means other than the eXCHANGE site indicated in Key Facts, submissions submitted after the applicable deadline, or incomplete submissions.

If required in the Key Facts section, applicants must submit a letter of intent by 5:00 p.m. ET on the due date listed on the Key Facts section to be eligible to submit an application. If required, applicants who do not submit a letter of intent are not eligible to submit an application.

Applicants are strongly encouraged to submit all required application documents at least 48 hours in advance of the submission deadline. Under normal conditions (i.e., at least 48 hours before the submission deadline), applicants should allow at least one hour to submit application documents. Once the application documents are submitted in the eXCHANGE site identified in the Key Facts section, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made to any of these documents, the applicant must resubmit them before the applicable deadline. DOE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

2. Technical Review Criteria

Applications

Applications will be evaluated against the technical review criteria shown below.

The following evaluation criteria will be utilized by the Technical Evaluation Committee and Federal Merit Review Panel members in conducting their evaluations of applications subjected to comprehensive merit review.

Review Criterion Overview	
Criterion	**Weight**
Scientific Merit and Technical Review of the Proving Ground	45%
Scientific Merit and Technical Review (Initial Mine Technology Projects)	10%
Technical Approach and Understanding	30%
Applicant/Team Capabilities	15%

Criterion 1: Scientific Merit and Technical Review of the Proving Ground (45%)
This criterion evaluates the suitability and capability of the proposed proving ground for testing mining technologies.

1. Extent to which the proposed proving ground supports the topic area objectives;
2. Extent to which the project has secured buy-in from all necessary stakeholders (e.g., local communities, regulatory bodies, industry partners) to ensure successful establishment and operation of the proving ground;
3. Degree to which siting and environmental constraints are thoroughly considered and addressed for the deployment and operation of the proving ground;
4. Sufficiency of existing and proposed infrastructure to support the addition of demonstration and testing activities, including, but not limited to, the thoroughness of the applicant's facilities descriptions, photographs, mine plans, site schematics, inventory of existing infrastructure, and documentation with sufficient details regarding the type, size, and availability of material and equipment to be used for the proving ground;
5. Adequacy of the maintenance and replacement schedule for components, systems, and supporting infrastructure of the proving ground;
6. Reasonableness of the existing/planned proving ground's proximity to the source of material relevant to the mining technologies being tested;
7. Quality of the identification of risks specific to the proving ground's development and operation, including labor and community opposition or disputes, and "timely" and appropriate strategies for mitigation and resolution;
8. Extent to which the proving ground can be used as a training ground for dissemination of skills, technology, practices, expertise for a new generation of skilled American miners.

Criterion 2: Scientific Merit and Technical Review of the Initial Mining Technologies (10%)
This criterion assesses the technical merit and potential impact of the individual novel mining technologies proposed for testing at the proving ground facility;

1. Degree to which the current state of the proposed novel mining technology and its anticipated advancement through testing at the proving ground are clearly described;

2. Extent to which mining technology supports the topic area objectives;
3. Degree to which key manufacturing and supply network challenges associated with the mining technology are considered for viable scale-up and expansion;
4. Extent to which the application specifically and convincingly demonstrates how the applicant will move the state of the art for each proposed technology;
5. Sufficiency of technical detail in the application to assess whether each proposed technology is scientifically meritorious and revolutionary, including relevant data, calculations, and discussion of prior work with analyses that support the viability of the proposed work; and
6. Quality of the identification of risks specific to the development and testing of each mining technology and the reasonableness of any proposed mitigation strategies.

Criterion 3: Technical Approach and Understanding (30%)

1. Feasibility of the applicant's overall technical approach to achieving the funding opportunity announcement's objectives encompassing both the proving ground and the mining technology to be tested;
2. The degree to which the applicant's proving ground is capable of simultaneously accommodating multiple and diverse mining technologies;
3. The degree to which the statement of project objectives (SOPO) is appropriate, rational, and structured so that there is a logical progression of work for development of the proving ground and maximum proving ground utilization, including mining technology development;
4. The extent of the applicant's discussion regarding any limitations imposed by their Proving Ground and the reasonableness of any proposed mitigation strategies;
5. Adequacy of the applicant's discussion of their awareness of the range and types of technologies that may be tested at their test facilities; and
6. Degree to which the applicant addresses each category in the budget table in alignment with the project proposal.

Criterion 4: Applicant/Team Capabilities (15%)

1. Appropriateness and strength of the integrated project team to identify and perform characterization, exploration, and recovery of CMs from primary, secondary, and unconventional sources, including, but not limited to, unmineable coal seams, low grade ore bodies, and mine refuse/waste;
2. Technical capability of the principal investigator (PI) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
3. Level of planned participation by all project participants and how well they are integrated into the Workplan;
4. Demonstrated experience in operating and maintaining mining facilities relevant to the proposed proving ground;
5. Reasonableness of the Technology Maturation Plan; and
6. Demonstrated knowledge and experience of the processes necessary for the design, installation/modification, permitting, NEPA process, and operation of mining equipment and facilities required for conducting testing of technologies at various scales and conditions.

D. Other Selection Factors

In addition to the above criteria, the Selection Official may consider the following program policy factors in determining which applications to select for award negotiations:

1. The degree to which the proposed project exhibits technological diversity when compared to the existing DOE project portfolio and other projects selected from the subject NOFO;
2. The degree to which the proposed project, including proposed cost share, optimizes the use of available DOE funding to achieve programmatic objectives;
3. The level of industry involvement and demonstrated ability to accelerate demonstration and commercialization and overcome key market barriers;
4. The degree to which the proposed project is likely to lead to increased high-quality employment and manufacturing in the United States;
5. The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
6. The degree to which the proposed project, or group of projects, represent a desired geographic distribution (considering past awards and current applications);
7. The degree to which the proposed project will employ procurement of U.S. iron, steel, manufactured products, and construction materials;
8. The degree to which the proposed project contributes to the variety of organizations and organization types and sizes selected from the subject NOFO when compared to the existing DOE project portfolio;
9. The degree to which the proposed project avoids duplication/overlap with other publicly or privately funded work;
10. The degree to which the proposed project supports complementary efforts or projects, which, when taken together, will best achieve the research goals and objectives;
11. The degree to which the proposed project enables new and expanding market segments; and
12. The degree to which the project's solution or strategy will maximize deployment or replication.

VII. Selection and Award Notices

Please see the NOFO Part 2, *Selection and Award Notices* for information on notifications for Applications, Award Negotiations, and Post-Selection Information Requests.

VIII. Award Administration Information

A. Post-Award Requirements and Administration

DOE requires all award recipients to follow and accept requirements governed by laws and policies – both federal government-wide and DOE or program specific. These post-award requirements include all National and Administrative Policy Requirements; financial assistance general Certifications and Representations; Buy America requirements; Davis-Bacon Act requirements; Infrastructure Investment and Jobs Act-Specific Requirements; Fraud, Waste and Abuse requirements; Safety, Security, and Regulatory requirements; and Environmental Review in Accordance with National Environmental Policy Act requirements.

Post-Award requirements and administration applicable to awards funded under this NOFO are identified below. Detailed descriptions of standard funding restrictions are provided in the NOFO Part 2, *Post-Award Requirements and Administration* section. Detailed descriptions of program specific funding restrictions are provided below the table.

Applicable Post-Award Requirements and Administration	
Title	**Location**
Award Administrative Requirements	NOFO Part 2
Subaward and Executive Reporting	NOFO Part 2
National Policy Requirements	NOFO Part 2
Applicant Representations and Certifications	NOFO Part 2
Statement of Federal Stewardship	NOFO Part 2
Uniform Commercial Code (UCC) Financing Statements	NOFO Part 2
Interim Conflict of Interest Policy for Financial Assistance	NOFO Part 2
Whistleblower Protections	NOFO Part 2
Fraud, Waste, and Abuse	NOFO Part 2
Participants and Collaborating Organizations	NOFO Part 2
Current and Pending Support	NOFO Part 2
Prohibition Related to Malign Foreign Talent Recruitment Programs	NOFO Part 2
Foreign Collaboration Considerations	NOFO Part 2
U.S. Manufacturing Commitments	NOFO Part 2
Subject Invention Utilization Reporting	NOFO Part 2
Intellectual Property Provisions	NOFO Part 2
Go/No-Go Review	NOFO Part 2
Conference Spending	NOFO Part 2
Invoice Review and Approval	NOFO Part 2
Cost-Share Payment	NOFO Part 2

Implementation of Executive Order 13798, Promoting Free Speech and Religious Liberty	NOFO Part 2
Human Subjects Research	NOFO Part 2
Real Property and Equipment	NOFO Part 1
Cybersecurity Plan	NOFO Part 1
Rights in Technical Data	NOFO Part 1
Energy Data eXCHANGE	NOFO Part 1

1. Real Property and Equipment

Real property and equipment purchased with project funds (federal share and recipient cost share) are subject to the requirements at 2 CFR 200.310, 200.311, 200.313, and 200.316 (non-federal entities, except for-profit entities) and 2 CFR 910.360 (for-profit entities).

For resulting awards under this NOFO, the recipients may (1) take disposition action on the real property and equipment; or (2) continue to use the real property and equipment after the conclusion of the award period of performance with Grants Officer approval. The recipient's written request for Continued Use must identify the property and include: a summary of how the property will be used (must align with the authorized project purposes); a proposed use period, (e.g., perpetuity, until fully depreciated, or a calendar date when the recipient expects to submit disposition instructions); acknowledgement that the recipient shall not sell or encumber the property or permit any encumbrance without prior written DOE approval; current fair market value of the property; and an estimated useful life or depreciation schedule for equipment.

When the property is no longer needed for authorized project purposes, the recipient must request disposition instructions from DOE. For-profit entity disposition requirements are set forth in 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316. In addition, pursuant to the FY23 Consolidated Appropriations Act (Pub. L. No. 117-328), Division D, Title III, Section 309, at the end of the award period the Secretary or a designee of the Secretary, at their discretion, may vest unconditional title or other property interests acquired under this project regardless of the fair market value of the property.

2. Cybersecurity Plan

In accordance with IIJA section 40126, applicants selected for award negotiations must submit a cybersecurity plan to DOE prior to receiving funding.[13] These plans are intended to foster a cybersecurity-by-design approach for IIJA efforts. The Department will use these plans to ensure effective integration and coordination across its research, development, and demonstration programs. A cybersecurity plan is **not** required as part of the application submission for this NOFO, but all projects selected under this NOFO will be required to submit a cybersecurity plan during the award negotiation phase.

DOE recommends using open guidance and standards, such as the National Institute of Standards and Technology's (NIST) Cybersecurity Framework (CSF) and the DOE Cybersecurity Capability Maturity

[13] 42 U.S.C. § 18725

Model (C2M2).[14] The cybersecurity plan created pursuant to IIJA section 40126 should document any deviation from open standards, as well as the utilization of proprietary standards where the awardee determines that such deviation is necessary.

Please note:

- Cybersecurity plans should be commensurate to the threats and vulnerabilities associated with the proposed efforts and demonstrate the cybersecurity maturity of the project.
- Cybersecurity plans may cover a range of topics relevant to the proposed project—e.g., software development lifecycle, third-party risks, and incident reporting.
- At a minimum, cybersecurity plans should address questions noted in IIJA section 40126 (b), Contents of Cybersecurity Plan.[15]

Supplementary guidance on the cybersecurity plan requirement is available at https://www.energy.gov/ceser/bipartisan-infrastructure-law-implementation.

3. Rights in Technical Data

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

"LIMITED RIGHTS DATA": The U.S. government will not normally require delivery of confidential or trade-secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

GOVERNMENT RIGHTS IN TECHNICAL DATA PRODUCED UNDER AWARDS: The U.S. government retains unlimited rights in technical data produced under government financial assistance awards, including the right to distribute to the public. One exception to the foregoing is that invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

INTELLECTUAL PROPERTY AND DATA SECURITY FOR CRITICAL AND EMERGING TECHNOLOGY AREAS: DOE has determined that awards under this NOFO are in critical and emerging technology areas with implications for United States national and economic security. DOE's risk assessment for projects under this NOFO will include criteria such as the risk of misappropriation of subject inventions and copyright (collectively, "Intellectual Property") and non-public data ("Data") generated under the award. Accordingly, consistent with section 4(g) of National Security Presidential Memorandum 33 and 2 CFR § 200.206(b), DOE reserves the right to require recipients to implement restrictions on providing access to Data and licensing, assigning or otherwise transferring Intellectual Property generated under

[14] NERC critical infrastructure protection (CIP) standards for entities responsible for the availability and reliability of the bulk electric system. NIST IR 7628: 2 Smart grid cyber security strategy and requirements. NIST SP800-53, Recommended Security Controls for Federal Information Systems and Organizations: Catalog of security controls in 18 categories, along with profiles for low-, moderate-, and high-impact systems. NIST SP800-82, Guide to Industrial Control Systems (ICS) Security. NIST SP800-39, Integrated Enterprise-Wide Risk Management: Organization, mission, and information system view. AMI System Security Requirements: Security requirements for advanced metering infrastructure. ISO (International Organization for Standardization) 27001, Information Security Management Systems: Guidance on establishing governance and control over security activities (this document must be purchased). IEEE (Institute of Electrical and Electronics Engineers) 1686-2007, Standard for Substation Intelligent Electronic Devices (IEDs) Cyber Security Capabilities (this document must be purchased). DOE Cybersecurity Capability Maturity Model (C2M2).

[15] 42 U.S.C. § 18725

an award to entities with foreign ownership, control, or influence by a government or entity located in a Country of Risk (as defined in section 18912 of title 42 and currently Iran, North Korea, Russia, China, and Belarus), without preapproval in writing from the DOE. Any access or transfer of rights in violation of this requirement will be immediately null and void, represents non-compliance under the award, and will require that steps be taken to secure and prevent further dissemination of award Intellectual Property and Data.

TECHNOLOGY PROTECTION PLAN

If selected for award, the Recipient must submit a Technology Protection Plan within 60 days of award setting out the Recipient's policies and procedures for identifying, accessing, handling, controlling, and releasing the following under this Award: (1) Recipient's proprietary information, including non-public technical information, trade secrets and other confidential business information, including but not limited to information, know-how, methods or processes that give the Recipient a competitive advantage in the marketplace; (2) information that is subject to U.S. export control laws or regulations; (3) information that has been designated as classified or controlled unclassified information (CUI) by DOE; (4) any other information designated by DOE as sensitive throughout the period of performance. During the life of the award, the Recipient must meet the stated objectives set forth in its Technology Protection Plan. The Recipient must notify the Department of any revisions to the Technology Protection Plan or the proposed security approach. A report on the Recipient's progress toward meeting the objectives and milestones set forth in the Technology Protection Plan must be included in any continuation application. The Technology Protection Plan and any revisions to the plan and all related deliverables must be emailed securely to the point of contact designated by DOE.

Any DOE and/or National Laboratory review comments or feedback provided to the Recipient does not constitute an endorsement or approval of any specific elements within the Technology Protection Plan or the proposed security approach. Therefore, such feedback should not be referenced or used in marketing or promotional materials.

MATERIAL SUPPLY PLAN

If selected for award negotiations, the selectee must submit a Material Supply Plan to DOE prior to award. The Material Supply Plan must set out the selectee's strategy and approach for materials supply, including a new supply chain for North American and European suppliers, in form and substance satisfactory to DOE. During the life of the award, the recipient must meet the stated objectives set forth in its Material Supply Plan. The recipient must notify the Department of any revisions to the Material Supply Plan. A report on the recipient's progress towards meeting the objectives and milestones set forth in the Material Supply Plan must be included in any continuation application. The Material Supply Plan and any revisions to the plan and all related deliverables must be emailed securely to the point of contact designated by DOE.

THREAT BRIEFING

If selected for award, the Recipient and DOE shall meet, at a later determined time, to discuss, at an unclassified level, the current threat environment related to economic espionage, intellectual property theft, insider threats, and other relevant topics. DOE, in its sole discretion, may invite other U.S. Government representatives, to participate in these briefings and discussions. The parties may also meet additionally during the period of performance, at DOE's discretion, to continue these briefings and discussions.

SECURITY OFFICER

1. If selected for award, within thirty (30) calendar days following the award date, the Recipient shall nominate in writing to DOE an employee of the Recipient as a Security Officer (the "Security Officer") who will be responsible for ensuring the Recipient's compliance the terms and conditions related to research, technology and economic security (RTES). The appointment of the Security Officer shall be subject to prior written approval by DOE. If DOE does not object within twenty (20) calendar days following receipt of a proposed nomination and of the information pursuant to paragraph D, to ensure that the nominee can effectively perform the functions of the position, the lack of action shall constitute a non-objection. If DOE objects to a nominated Security Officer, the Recipient shall nominate an alternate nominee within ten (10) calendar days of its receipt of any such objection, subject to the same approval and objection procedures as the initial nomination. The Recipient shall appoint the nominated Security Officer within three (3) days following approval or non-objection by DOE.

2. The Security Officer shall be a U.S. Citizen with the appropriate senior-level authority and necessary skills and resources across the Recipient's corporate structure to fulfill the responsibilities of his or her position and to ensure compliance with the RTES requirements of this Award. The Recipient shall provide DOE with a written nomination for each Security Officer. The Recipient shall provide a curriculum vitae or similar professional synopsis of each nominee.

ACCESS RESTRICTIONS

The Recipient (including its employees, directors, officers, managers, agents, contractors, or other representatives, and includes the respective successors or assigns of the foregoing) shall not disclose any information that is not publicly available (including technical data, subject inventions, or any other information that is not publicly available or required to be made public under applicable law or regulation) developed under the DOE-funded project with any Recipient subsidiary, affiliate, investor, supplier, licensee at any tier, manufacturer for Recipient end customers, or joint development partner that has a place of incorporation or a principal place of business in a Foreign Country of Risk. The Recipient shall also ensure that its subsidiaries or affiliates under its control adhere to this same restriction.

The Recipient shall provide on an annual basis and upon request of the DOE Contracting Officer (CO), a certificate of compliance with this term to the CO or designee.

OFFTAKE PARTNER PLAN

If selected for award negotiations, the selectee must submit an Offtake Partner Plan to DOE prior to the award start date. The Offtake Partner Plan will be incorporated into the Award.

The Offtake Partner Plan must include the following:

A. The proposed offtake partners, the intended use of the offtake, and a proposed level of commitment from the Recipient and the offtake partner(s) for domestic offtake use;
B. Recipient's strategy and approach for material offtake;
C. Recipient's strategy to give preference to non-FEOC (foreign entity of concern) offtake partners;
D. How the Recipient will incorporate U.S. economic and national security considerations in its strategy and approach for material offtake;
E. Milestones to measure progress and success of the Offtake Partner Plan.

The Recipient must meet the stated objectives and milestones set forth in its Offtake Partner Plan. DOE will evaluate the Recipient's progress during the award period of performance, including as part of the Go/No-Go review process. A report on the Recipient's progress towards meeting the objectives and milestones set forth in the Offtake Partner Plan must be included in any continuation application.

The Recipient must provide DOE advance written notice of proposed changes to its offtake partners. The Offtake Partner Plan and any revisions to the plan and all related deliverables must be emailed securely to the point of contact designated by DOE.

4. Cost Share Payment

DOE requires recipients to contribute the cost share amount incrementally over the life of the award. The terms and conditions of the award will specify the recipient's cost share interval, such as by billing period or on a budget period basis. The recipient's cost share for each interval must always reflect the overall cost share ratio negotiated by the parties (e.g., the total amount of cost sharing on each invoice when considered cumulatively with previous invoices must reflect, at a minimum, the cost sharing percentage negotiated). When FFRDC funding will be provided directly to the FFRDC(s) by DOE, recipients will be required to provide project cost share at a percentage commensurate with the FFRDC costs, on a budget period basis, resulting in a higher interim invoicing cost share ratio than the total award ratio.

In limited circumstances, and where it is in the government's interest, the DOE Grants Officer may approve a request by the recipient to meet its cost share requirements on a less frequent basis than required by the terms and conditions of the award. Regardless of the interval requested, the recipient must be up to date on cost share at each interval. Such requests must be sent to the Grants Officer during award negotiations and include the following information: (1) a detailed justification for the request; (2) a proposed schedule of payments, including amounts and dates; (3) a written commitment to meet that schedule; and (4) such evidence as necessary to demonstrate that the recipient has complied with its cost share obligations to date. The Grants Officer must approve all such requests before they go into effect.

5. Energy Data eXchange (EDX) Requirements

The DOE is required to improve access to federally funded research results, proper archiving of digital data, and expanded discovery and reuse of research datasets per DOE and Executive Orders. The Energy Data eXchange (EDX) is a data laboratory developed and maintained by NETL to find, connect, curate, use, and re-use data to advance fossil energy and environmental R&D.

Data products generated under the resulting award will be required to be submitted in the EDX at https://edx.netl.doe.gov/. Data products include but are not limited to software code, tools, applications, webpages, portfolios, images, videos, and datasets.

EDX uses federation and web services to elevate visibility for publicly approved assets in the system, including connections with DOE's Office of Scientific and Technical Information (OSTI) systems, Data.gov, and Re3Data. This ensures compliance with federal requirements, while raising visibility for researcher's published data products to promote discoverability and reuse.

EDX supports a wide variety of file types and formats including: 1) data, 2) metadata, 3) software/tools, and 4) articles (provided that there is an accompanying Government use license). A partial list of file formats accepted by EDX is provided below, however, EDX is designed for flexibility and accepts all types of file formats.

- Common Data Product Submission Formats: ASC, AmiraMesh, AVI, CAD, CSV, DAT, DBF, DOC, DSV, DWG, GIF, HDF, HTML, JPEG2000, JPG, MOV, MPEG4, MSH/CAS/DAT, NetCDF, PDF, PNG, PostScript, PPT, RTF, Surface, TAB, TIFF, TIFF Stacks, TXT, XLS, SML, Xradio, ZIP, and others.
- Geographic Formats: APR, DBF, DEM, DLG, DRG, DXF, E00, ECW, GDB, GeoPDF, GeoTIFF, GML, GPX, GRID, IMG, KML, KMZ, MOB, MrSID, SHP, and others.

Information provided to EDX will be made publicly available, unless authorized under the resulting award. Additional information on EDX is available at https://edx.netl.doe.gov/about.

When data products are submitted to EDX, the data product will need to be registered with a digital object identifier (DOI) through OSTI to ensure more visibility in other search repositories (i.e., osti.gov, data.gov, Google Scholar, etc.). The OSTI DOI can be established through an application programming interface (API) by completing just a few additional fields.

The recipient or subrecipient should coordinate with the Project Manager on an annual basis to assess if there is data that should be submitted to EDX and identify the proper file formats prior to submission. All final data products shall be submitted to EDX by the recipient prior to the completion of the project.

6. Critical Materials Collaborative (CMC)

To help ensure a secure domestic supply of CMM, the DOE is attempting to accelerate production of CMMs from a diverse set of sources (e.g., secondary, unconventional, conventional) and working with other government and private agencies as part of a government-wide CMM strategy.

As part of this strategy, the DOE has established a Critical Materials Collaborative (CMC) to be a centralized entity for multidisciplinary, collaborative, critical materials applied research, development, and demonstration (RD&D). The CMC will coordinate CMM innovation across the DOE, other government agencies, industry, and academia, as well as providing enabling technologies to reduce commercialization time and risk.

All selected projects from this NOFO are required to participate as a member of the CMC to:

• Align the DOE research portfolio to achieve administration goals and crosscutting S&T objectives;
• Advance crosscutting applied RD&D related to CM and materials;
• Accelerate the adoption and deployment of innovation;
• Nurture and expand the innovation ecosystem; and
• Facilitate scientific and technical exchange and discussion.

The Recipient's principal investigators or a member of their research team are expected to participate in coordination efforts including, but not limited to, an in-person annual symposium, virtual coordination meetings, and periodic presentations on research progress. There are no membership fees associated with participation in the CMC.

The proposed Recipients to this NOFO should take into consideration possible collaboration with the programs supported by other DOE program offices. Projects funded as a result of this NOFO will be encouraged to explore opportunities to coordinate with projects funded by other DOE offices and federal agencies through the CMC in order to maximize the scientific and technological impact.

Recipients are expected to participate in the CMC through the end of the period of performance and may be invited to participate in the CMC up to one year after the project has concluded. Participation after the project has concluded is optional.

B. Questions and Support

1. Questions

Upon the issuance of a NOFO, DOE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the NOFO except through the established question and answer process described below. Questions regarding this NOFO must be submitted to DE-FOA-0003390@netl.doe.govno later than three (3) business days prior to the application due date and time. Please note, feedback on individual concepts will not be provided through Q&A.

All questions and answers related to this NOFO will be posted on the eXCHANGE site listed in the Key Facts section above. **You must first select the NOFO Number to view the questions and answers specific to this NOFO**. DOE will attempt to respond to a question within three (3) business days unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the eXCHANGE site listed in the Key Facts. should be submitted to NETL-ExchangeSupport@hq.doe.gov.

2. Support

Grants.gov

Grants.gov provides 24/7 support. You can call 1-800-518-4726 or email support@grants.gov. Hold on to your ticket number.

SAM.gov

If you need help, you can call 866-606-8220 or live chat with the Federal Service Desk.

IX. Other Information

Please see the NOFO Part 2, *Other Information* for additional information and requirements that apply to all DOE NOFOs.