U.S. Department of Energy
Office of Technology Commercialization
Technology Commercialization Fund

Base Annual Appropriations

National Laboratory Call for Proposals
Core Laboratory Infrastructure for Market Readiness (CLIMR): Technology Specific Topics

DE-LC-000L130

Fiscal Years 2026 & 2027

This lab call is being issued as part of the Technology Commercialization Fund Base Annual Appropriations by the U.S. Department of Energy's (DOE's) Office of Technology Commercialization, the Office of Critical Minerals and Energy Innovation, Office of Cybersecurity, Energy Security, and Emergency Response, Hydrocarbons and Geothermal Energy Office, Office of Electricity, and the Office of Nuclear Energy. This call solicits proposals from DOE National Laboratories, plants, and sites, in collaboration with partners across the DOE National Laboratory complex, to advance technology-specific laboratory intellectual property to market.

Table of Contents

Lab Call Modification History

Modifications will appear here as well as being [HIGHLIGHTED]* in the body of the lab call. Modifications will be distributed via email to the points of contact in Appendix B.

Mod. No.	Date	Modification Description

Questions

All communications to DOE including questions regarding this lab call must be sent to TCF@hq.doe.gov. To ensure fairness across all National Labs, plants, and sites, individual DOE staff cannot answer questions while the lab call remains open for applications, and any questions directed to individual DOE staff will be forwarded to TCF@hq.doe.gov for processing. DOE will post all questions and answers on Exchange.

To view lab call-specific questions and answers, applicants must visit the Exchange website and select the specific lab call number. The Q&A spreadsheet can be found under the documents section, with the date in the file name to indicate the most recent version. DOE will attempt to respond to a question within three business days unless a similar question and the answer have already been posted on the website. It is the expectation of DOE that applicants to this lab call will review the Q&A spreadsheet before submitting a question. If you have any questions or technical problems with Exchange, please use the Funding Opportunity Exchange (Exchange) Help Center.

Answers to frequently asked questions for the Exchange system can be found at https://eere-exchange.energy.gov/FAQ.aspx. Should applicants experience problems with Exchange, the applicant should contact the Exchange Help Center for assistance prior to the submission deadlines.

For all email inquiries, please include the lab call title and number in the subject line.

I. Background and Context

This lab call represents the combined effort of five distinct United States (U.S.) Department of Energy (DOE) program offices and the Office of Technology Commercialization (OTC). The DOE Technology Commercialization Fund (TCF) was established by Congress through the Energy Policy Act of 2005[1] and reauthorized by the Energy Act of 2020 to "promote promising energy technologies for commercial purposes."[2] The DOE TCF is a primary component of DOE's ongoing effort to commercialize the cutting-edge technologies in which DOE invests. These technologies, developed with taxpayer funding, comprise a portfolio of energy-related technologies that have the potential to improve the lives of Americans and solve many of our country's most pressing economic, energy security, and national security challenges.

Within DOE, OTC is charged with leading programs related to technology commercialization, including TCF. The goal of TCF is to improve America's energy dominance, reliability, and security by accelerating commercialization and shepherding critical energy technologies from the lab to the market, where the private sector will continue to innovate.

This lab call offers an opportunity for external parties to partner with DOE's National Labs, plants, and sites to advance DOE technologies[3] toward commercialization and to reduce the barriers to commercializing DOE lab-developed technologies and intellectual property (IP). The intent is to increase the volume, speed, and effectiveness with which lab-developed technologies are converted into tangible outcomes that demonstrate a positive return on investment to America's taxpayers.

From this point on, "lab" or "National Lab" implies all DOE National Laboratories, plants, and sites. Additionally, where "technology" is referenced, it can include IP, data, and software.

II. Vision for FY26 and FY27 TCF and Moving Forward

For Fiscal Year 2026 (FY26) and Fiscal Year 2027 (FY27), DOE continues to implement and improve upon the previous year's (FY25) approach for TCF, addressing persistent barriers to commercialization, bridging known gaps that deter the commercialization of laboratory technologies, and identifying where improvements are still needed.

---

[1] Energy Policy Act of 2005, Public Law 109–58, 109th Cong. (August 8, 2005), *Improved technology transfer of energy technologies*, 42 U.S. Code § 16391 (a).
[2] Consolidated Appropriations Act, 2021, Public Law 116–260, Div. Z, Title IX, §§ 9001, 9003 (December 27, 2020), https://www.congress.gov/116/plaws/publ260/PLAW-116publ260.pdf.
[3] To be considered a "National Lab-developed technology," at least 50% of the research and development (R&D) must have been conducted at a National Laboratory, plant, or site.

The goal for FY26 and FY27 is to continue to commercialize lab-developed technologies. TCF commercialization success may include increasing the number of licenses, cooperative research and development agreements (CRADAs), receiving follow-on funding, or other tangible outcomes that enable greater commercialization benefit from DOE's research and development (R&D) investments.

For FY26 and FY27, DOE will release two CLIMR lab calls. The first, released in February 2026, was exclusively for the Commercialization Enabling Topic. The second, this document, is exclusively for the Technology Specific Topics. Across the two lab calls, DOE will use funds from FY26 and FY27, subject to Congressional appropriations.

For this lab call, DOE is seeking proposals from DOE's National Labs to advance the commercialization of individual energy-related technologies with commercialization partner(s). DOE TCF funding for this lab call is directly distributed to DOE National Laboratories to enable the commercialization of National Laboratory developed technologies. Examples of projects funded in FY25 can be found on DOE's TCF website.[4]

This lab call is being issued by DOE's OTC, Office of Cybersecurity, Energy Security, and Emergency Response (CESER); the Office of Electricity (OE); the Office of Nuclear Energy (NE); the Hydrocarbons and Geothermal Energy Office (HGEO), and the Office of Critical Minerals and Energy Innovation (CMEI).

Lessons learned from this cycle will be incorporated into future fiscal year TCF lab calls. The goal for the TCF lab calls and resulting projects or programs, as set forth in TCF's authorizing statute, will continue to be "promoting promising energy technologies for commercial purposes."[5]

III. Key Considerations and Requirements

i. Timeline

KEY DATES	
Lab call release date	September 24, 2026
PROPOSAL DEADLINE AND DECISION DATES	
Submission deadline* for concept papers (see Section V.ii)	November 3, 2026, 3 PM ET

[4] DOE's TCF website

[5] Energy Policy Act of 2005, Public Law 109–58, 109th Cong. (August 8, 2005), *Improved technology transfer of energy technologies*, 42 U.S. Code § 16391.

Encourage/Discourage decisions on concept papers back to labs	January 14, 2027
Submission deadline* for full applications (see Section V.iii)	March 1, 2027, 3 PM ET
Anticipated date for selection notifications	Q4 FY27

*Exchange is designed to enforce the deadlines specified in this lab call. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines.

ii. Available Funding and Number of Selections

The FY26 budget was signed into law on January 23, 2026, and the FY27 budget has not been passed at the time of lab call publication. The budget below is an estimate and is subject to a final accounting of FY26 and FY27 funding, including FY27 Congressional appropriations. The total funding amount available for this lab call will be applied once OTC and the DOE Chief Financial Officer have received and vetted all program office TCF assessment calculations. Approximately 50% of the FY26 funds will be used for the Commercialization Enabling lab call selections (DE-LC-000L129), and the remaining FY26 funding and all of FY27 funds, subject to Congressional appropriations, will be used for this lab call's selections, if there are sufficient meritorious proposals.

Estimated DOE funding available: $33 – 41 million based on the FY26 budget and subject to FY27 Congressional appropriations. The table below shows the estimated funding range per program office.

Program Office	Estimated DOE funding range*
CMEI	$13 million – 16 million
CESER	$0.6 million – 0.75 million
HGEO	$6 million – $7.4 million
NE	$11 million – $14 million
OE	$2.2 million – $2.8 million

** subject to FY27 Congressional appropriations*

Estimated budget per project: There is no specific amount for what a proposal may request for DOE funding; however, proposals should not request funding that is greater than the available program office(s) budget(s).

Estimated number of selected projects: 30–50

Estimated project duration: 1–3 years

The number of selections and the total budget will depend on the number of meritorious proposals and the availability of congressionally appropriated funds in DOE program

offices participating in this lab call. The budget level, tasks, scope, and duration of proposed projects can be adjusted by DOE during selections and negotiations but should be submitted and considered finalized at the time full applications are submitted.

iii. Lab and External Partnerships

DOE encourages proposals that bring together multiple National Labs to meet the strategic goals of this lab call and leverage multiple lab capabilities. To the extent possible and appropriate, DOE also seeks projects that involve industry engagement or partners to enhance the market pull aspects for commercialization. Industry partners must agree to engage in activities that focus on commercializing or deploying technologies in the marketplace and are highly encouraged to provide cost-share. Non-DOE Federal laboratories and entities may partner with a DOE lab; however, they are not eligible to receive TCF funding or contribute cost-share. Partners may find the Lab Partnering Service (LPS)[6] or the Visual Intellectual Property Search (VIPS)[7] resources helpful to find National Lab innovations.

All partnerships between the labs and outside partners must comply with individual lab requirements under their management and operating (M&O) contracts. CRADAs are not required by DOE; however, the DOE lab, plant, or site is required to follow both DOE and their respective policies and procedures with respect to any potential partnering mechanism they pursue e.g., CRADAs, Strategic Partnership Projects (SPPs) agreements, or similar mechanisms. Applicants are encouraged to discuss specific cases with their technology transfer office and/or general counsel at the lab, plant, or site. Applicants should work with lab partners to address any lab IP requirements.

To facilitate multi-lab or external partnerships, Appendix B includes all National Lab Technology Transfer Office (TTO) points of contact (POCs) for TCF.

External Teaming Partners:

DOE is compiling a Teaming Partner List (TPL) on Exchange to allow organizations that may wish to participate in an application, to express their interest in partnering with National Labs.

The TPL will be regularly updated to reflect new interested partners who provide their organization's information. Updates to the TPL will be available on the Exchange website as requesting parties are approved.

[6] Lab Partnering Service | Department of Energy
[7] Visual Intellectual Property Search (pnnl.gov)

TPL Submittal Instructions:

Any organization that would like to be included on this list should find the TPL for this solicitation (TPL-0000077) on Exchange and submit the following information: organization name, organization type, website, contact name, contact address, contact email, contact phone, area of expertise, brief description of capabilities, and applicable topic. Please refer to the Manuals section on Exchange for more detailed instructions on using the TPL.

Disclaimer: By submitting a request to be included in the TPL, the requesting organization consents to the publication of the submitted information. By enabling and publishing the TPL, DOE is not endorsing, sponsoring, nor otherwise evaluating the qualifications of the individuals and organizations that are identifying themselves for placement on this TPL. DOE will not pay for the provision of any information, nor will it compensate any applicants or request organizations for the development of such information.

iv. Cost-Share

This lab call is subject to Section 988 of the Energy Policy Act of 2005 regarding cost-share, which requires 50% cost-share for demonstration and commercial application projects.[8] Cost-share, sometimes referred to as "match" and "nonfederal share," is the portion of the costs of a federally assisted project or program not borne by the Federal government.

As an example, a proposal with 20% cost-share commits to a nonfederal cost-share of 20% of the total budget; if the total project budget is $1M, the cost-share from the nonfederal partner is $200K and the federal funding requested is $800K.

Given the importance of having shared "skin in the game" for any lab-industry partnership, DOE prefers all funded projects to meet the 50% cost-share requirement. However, DOE acknowledges that some potentially high-impact proposed projects may not be able to do so. As a result of this, DOE has approved a cost-share waiver so that National Labs may apply with less than 50% cost-share following the requirements by subtopic below. The scoring criteria reflect that providing cost-share will increase the likelihood of selection. DOE will evaluate the level of external industry engagement and collaboration as evidenced by cost-share to ensure maximum impact of the selected projects.

Cost-share partner(s) can be any nonfederal entity, including private companies, state or local governments (or entities created by a state or local government), colleges, universities, tribal entities, nonprofit organizations and foundations, or private funders. Cost-share partners must agree, at a minimum, to engage in activities that focus on commercializing or deploying technologies in the marketplace.

[8] Energy Policy Act of 2005, https://www.federalregister.gov/documents/2019/04/01/2019-06263/cost-sharing-energy-policy-act-of-2005

Cost-share

Subtopic	Cost-share	Eligibility
a	50% or more	All applicants are eligible.
b	Less than 50%	To be eligible for this subtopic, National Labs must be partnered with only the following: small business as defined by the U.S. Small Business Administration[9]; domestic institution of higher education; domestic nonprofit entities; U.S. state, local, or tribal government entities; or/and an early-stage startup company from the Lab Embedded Entrepreneurship Program (LEEP).

For subtopic b, DOE may negotiate the cost-share amount. This may include re-categorizing a proposal from subtopic b to subtopic a if DOE deems there is insufficient cost-share. In addition, the selection official may establish a negotiation strategy that involves increasing cost-share for subtopic b proposals that lack adequate cost-share given the commercial and/or demonstrative nature of the project activities. In such cases, project selection would be contingent on the lab(s) committing to the negotiated cost-share amount or percentage for the project. If the lab(s) decline, DOE may elect not to fund the project.

For subtopic b, where multiple partners are involved in a project, if any partner is involved that does not qualify for the lower than 50% cost-share subtopic, then the entire proposal's total required cost-share defaults to subtopic a with a required 50% cost-share.

Some cost-share is required for commercial application and demonstration projects.

DOE recommends having a consistent cost-share percentage over the life of the project. The final cost-share requirements for each project will be set at the time of award and can only be adjusted following the modification process which requires DOE approval.

For additional information on cost-share, see Appendix A.

v. Considerations for Applications

Lab Embedded Entrepreneurship Program

DOE is also seeking proposals for funding for maturation and commercialization of National Lab-developed technology that leverages LEEP. Proposals under this category must be partnered with a previously selected participant in LEEP and must involve

[9] U.S. Small Business Administration, "Size Standards." https://www.sba.gov/federal-contracting/contracting-guide/size-standards.

National Lab-developed technology. All applications must focus on how the project will further the commercialization of National Lab-developed technology, through new scope beyond the base project. Applicability to multiple AOIs and topics is highly encouraged. Applications must specify which AOI(s) and topic(s) for which they are applying. Applications are not limited to the labs with existing LEEP node programs; all DOE labs are eligible to submit proposals as prime awardees. TCF funds can only be used to fund the National Lab and cannot be used to fund the innovator's associated start-up company. A portion of TCF funds may be used to pay a fellowship stipend so long as the fellow performs specified commercialization activities under the project, and the project budget includes financial support necessary for the fellow to perform those activities. A recommended total budget for projects applying to this option is $250,000–$500,000.

Cross-cutting Priorities

DOE also seeks proposals that support cross-cutting DOE priorities, such as the topics and AOIs in this lab call as they correlate to the Genesis Mission and Science: A New Golden Age. The Genesis Mission[10] is a national effort to accelerate the application of Artificial Intelligence (AI) for transformative scientific discovery, strengthening national security, securing energy dominance, enhancing workforce productivity, and furthering America's technological dominance and global strategic leadership.[11] The Office of Science and Technology Policy (OSTP) published a report, Science: A New Golden Age[12], that has direct ties to DOE priorities such as onshoring strategic supply chains, opening America's laboratories, and unleashing American Innovations.

IV. Technology Specific Topics

DOE seeks to commercialize specific technologies that have been developed by the National Labs. Proposals must be focused on working towards commercialization of National Lab-developed technology or technologies[13] and must be at a stage that generates private sector interest. Unless otherwise stated in a topic or AOI, technologies must be at a minimum Technology Readiness Level (TRL) of 4 at the time of writing a concept paper, using TRLs defined by the DOE[14]. Proposals must use the Adoption

[10] https://genesis.energy.gov/
[11] See Executive Order 14363, "Launching the Genesis Mission," November 24, 2025.
[12] Science-A-New-Golden-Age.pdf
[13] To be considered a "National Lab-developed technology," at least 50% of the R&D have been developed at a National Laboratory, plant, or site.
[14] Technology Readiness Level, https://www.directives.doe.gov/terms_definitions/technology-readiness-level

Readiness Level (ARL) framework[15,16] to evaluate technology risks, ecosystem economics, and private sector uptake potential, and must show an increase in ARL during the project period of performance.

Proposed projects must do ALL of the following:

- Focus on commercialization, with tasks included throughout the work plan that involve commercialization (which may inform further research and development of the lab-developed technology),
- Demonstrate clear evidence of commercial potential that combines technology progress with market pull or interest,
- Address what the project intends to accomplish to advance the technology's readiness for commercialization, including current and end project targeted ARL and TRL,
- Clearly demonstrate the market need the technology will meet, differences that make the technology more competitive than similar technologies, and the feasibility of moving the technology to market, and
- Address one or more of the topics or Areas of Interest (AOIs) in the lab call and demonstrate how the proposed project addresses the needs of the topic and AOI areas.

Applications including team members or technologies who have completed DOE Energy I-Corps (EIC), U.S. National Science Foundation (NSF) I-Corps, the Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) programs, or similar programs are strongly encouraged. Applicants with active TCF projects seeking additional funding to complete their original scope of work are excluded from applying unless a new scope of work is proposed that meets the intent of this lab call. Determining what that could mean (a phase II effort, a different market, etc.) is at DOE's discretion, but the intention is that applicants cannot use this lab call to ask for additional funding on an existing project.

Applicants may apply to one or more AOIs and topics and must specify which AOI(s) and topic(s) they are applying to on the title page. Applicants are encouraged to apply to multiple AOIs and topics when applicable. DOE reserves the right to move proposals to a single or to multiple topics and AOIs.

The subtopic cost-share categories for the lab call are outlined in section III.iv.

The lab call topics are as follows:

[15] https://www.energy.gov/technologycommercialization/adoption-readiness-levels-arl-framework?nrg_redirect=466798
[16] ARL training recording: Adoption Readiness Levels - Overview

i. Office of Critical Minerals and Energy Innovation (CMEI)

Overview:

The U.S. DOE's Office of Critical Minerals and Energy Innovation (CMEI) is advancing America's critical minerals supply chains and accelerating next-generation energy technologies to strengthen our nation's energy security and power our future. CMEI aims to:

- Accelerate mining activities, diversify supply chains for critical minerals and metals, expand battery and magnet research, stimulate innovation in processing and metallurgy, and facilitate the recycling of black mass, battery materials, and other critical minerals.
- Lead the world in research and development for cutting-edge energy and transportation technologies, fuels, chemicals, and hydropower, driving the commercialization and deployment of technologies that enhance energy systems. across the United States and reduce the cost of energy for American ratepayers
- Promote innovation and the adoption of new and beneficial technologies for buildings and industrial applications.

Areas of Interest (AOIs):

1. **Technologies for Affordable, Next-Generation Buildings**

   Summary of AOI #1:

   Technologies and approaches that can lower both the up-front cost of new energy-saving technologies and operational energy use for consumers.

   Key Challenges in the AOI:

   Simplifying dual-fuel heating, ventilation, and air conditioning (HVAC), including on-board, building-level, and utility-level controls, and streamlining system optimization, improving fuel switchover logic, enhancing energy system flexibility, and reducing commissioning and maintenance burden.

   Improved control and modeling technologies that use artificial intelligence (AI) or machine learning to save time and money for customers, and technologies that allow consumers to export data and leverage third-party platforms, making their data easier to use.

   Software that simply aggregates third party data or displays it (e.g. an analytic or dashboard application) is not of interest, nor are AI-enabled information systems that do not have integrated controls or data collection.

2. **State-of-the-Art Technologies for Industrial Competitiveness**

Summary of AOI #2:

Advancing and commercializing state-of-the-art technologies that strengthen America's industrial sector and advance global competitiveness of U.S. industry through step-change improvements in energy productivity, process efficiency, and performance, cost, and other relevant areas.

Key Challenges in the AOI:

- **Energy-Intensive Industries:** Sector-specific process innovation for the largest industrial consumers of energy: Chemicals & Refining, Iron, Steel, & other Commodity Base Metals, Food & Beverage, Forest Products, and Cement, Concrete, & other Building Materials.
- **Cross-Sector Technologies:** Innovation on common unit operations applicable across most industrial sectors: Thermal processes (combustion and other process heating systems, electro-technologies, heat exchangers, and thermal energy storage), Non-thermal processes (membranes and comminution), the Water-Energy Nexus (water supply, wastewater treatment, and Per- and Polyfluoroalkyl Substances (PFAS) destruction), and Industrial AI.
- **Data Center and Other Large Loads:** Innovation that enables the integration of data centers and other large loads into the energy systems: Data Center Technologies, Load Flexibility, and Onsite generation & combined heat and power (CHP).

The following types of technologies are specifically not of interest for this AOI:

- Technologies that do not address a specific industrial need or are not directly relevant to one or more industrial focus areas.
- Technologies that are primarily relevant for non-industrial sector applications (e.g., power generation sector).
- Further development of technologies that are mature or commercially available.
- New system designs, configurations, and/or integration that primarily incorporate commercially available or mature technologies.
- Innovations in carbon capture and storage.
- Innovations in hydrogen production and transportation.

3. **Battery Technologies for Dual-Use Applications**

Summary of AOI #3:

Development and cell-level demonstration of innovative secondary batteries with near-term prospects for commercial use (e.g., consumer electronics, transportation, battery backup unit/grid storage) and justification of defense-related use (e.g., unmanned aerial systems (UAS), unmanned undersea vehicles (UUV), soldier-carried systems).

Key Challenges in the AOI:

- Focus on improved materials and processes, components, electrodes, cell design, and/or high-energy density material scale-up.
- Address risks and challenges manufacturing, scale-up, and supply chain considerations and how these can be mitigated or overcome.
- Discuss suitability and ease of adaptation of technology to dual use, including cell safety and performance (energy density, rate, temperature range, cycle life).
- Cell testing should meet minimum threshold in the table below and feasibility of achieving the performance requirements for large-format cells.
- Electrochemical test data must include details of temperature, applied pressure, cycling rate, anode active material/ cathode active material (AAM/CAM), electrode loading, V range, and cell size and format.

Proposed battery technologies should be able to meet or exceed all minimum standards:

	Minimum Performance Value	
Characteristic (Cell-level)	**Performance at baseline beginning of life**	**Projected for large-format cell**
Specific energy* (Wh/kg)	250	400
Energy density (Wh/L)	500	800
Peak power density (W/kg)	500	800
Cycle life**	250	1,000

*Specific energy measured at C/2; **Cycle life for 1C discharge, C/2 charge, 80% initial capacity and power

Non-responsive: technologies incapable of meeting all thresholds set above and those far from commercial realization.

4. **Advanced Transportation Technologies and Fuels Production**

Summary of AOI #4:

Advancement of innovative transportation and fuel solutions and complementary technologies to enhance the security and reliability of energy networks, lower energy costs for Americans, and provide consumers with more options.

Key Challenges in the AOI:

- Production of Chemicals and Fuels from Alternative Feedstocks: Novel production or process intensification of cost-competitive organic chemicals, fertilizers, and strategic liquid fuels from hydrogen, biomass, and waste (e.g., municipal or industrial waste or resource recovery from nuclear power plants, data centers, mine tailings, wastewater, end-of-life tires, etc.)
- Fuel Cell System Technologies: Fuel cell systems (e.g. solid oxide fuel cell (SOFC), proton exchange membrane fuel cell (PEMFC)) that efficiently convert gaseous fuels (e.g. hydrogen, natural gas or biogas) into electricity to provide affordable, MW-scale prime and/or backup power for U.S. data centers and other growing electrical loads. Innovative concepts to improve performance and durability, and lower costs of fuel cell materials, components, and balance of plant. Technology advancement should demonstrate potential to meet 2030 stationary fuel cell targets including 80,000 hours durability and a capital cost of $1000/kW for systems operating on natural gas and $600/kW with direct hydrogen.
- Fuels and Feedstocks Delivery and Storage: Hydrogen delivery and storage technologies that support large-scale hydrogen transfers. Novel concepts to reduce capital or operating cost, increase durability, and improve performance of components and systems. Concepts should compare the proposed approach to current state-of-the-art technologies.
- Automotive Materials: AI-driven smart polymer matrix composite material systems to enable early detection of battery thermal runaway and electromagnetic interference (EMI) shielding through optimization of material interfaces, load transfer, and multifunctionality, embedded sensing and AI-driven diagnostics that will enhance public safety. The smart composites are anticipated to provide the following functionalities, aiming for an EMI shielding effectiveness >30 dB, a battery thermal runaway detection threshold ≤130 °C, and a fiber-to-resin load transfer efficiency >87%.
- Advanced Motors and Power Systems: Advancements in cost-effective traction motors and power electronics for vehicle traction drives that reduce reliance on foreign supply chains, including rare earth elements and other relevant critical minerals. There is especially an interest in heavy rare earth (HRE)-free magnets for use in electric motors designs that can meet vehicle minimum requirements.

Solutions must meet these minimum electric drive requirements for a full hybrid vehicle (HEV): bus voltage: 200-400 V; peak power: 40-100 kW; power density: ≥50 kW/L.

- Off-Road, Rail, Marine and Aviation: Develop and demonstrate a powertrain optimization software tool which improves efficiency and reduces criteria emissions for hybrid electric off-road or mining vehicles. The tool may provide energy efficiency calculations for hybrid powertrains, route/cycle optimizations (with or without automation), and/or inter-vehicle connectivity. The final product should be available for integration in representative off-road or mining vehicles.
- Energy Efficient Mobility Systems: Improvements in vehicle automation, traffic management, intermodality, or other technologies that improve system wide energy performance and affordability of passenger or freight transportation. Examples include, but are not limited to, cooperative adaptive cruise control/vehicle platooning, traffic signal optimization and/or traffic signal vehicle to infrastructure (V2I) applications, and mixed mode delivery fleet assignment and dispatch management software. Non-responsive examples included, but are not limited to, software applications that merely connect customers to transportation providers and tracking systems that merely provide emissions and fuel-use data to customers.

Specific technologies not of interest:

- Fuel cells and batteries for on-road transportation applications
- Reversible fuel cells for energy storage applications
- Liquid-fueled fuel cells.

5. **Cutting-Edge Energy Generation and Power Management Technologies**

Summary of AOI #5:

Development of energy solutions that enhance grid reliability and resilience, foster U.S. technological leadership, and reduce the cost of energy for Americans.

Key Challenges in the AOI:

- **Aero Mechanical Energy Systems**
  - Innovations for economical recycling of wind energy technologies that would reduce waste, recover critical minerals, and/or reduce the cost of wind component recycling[17].

[17] https://www.energy.gov/cmei/systems/wind-turbine-recycling-assessment-report-guide-recycling-industry

  - Innovations for maximizing performance and/or reliability of existing wind energy assets[18].

- **Thermal Energy Systems**
  - Innovations to reduce costs and improve the reliability of solar-thermal components and integrated systems for deploying Solar Heat for Industrial Processes (SHIP) with thermal energy storage. Key applications include produced water thermal-desalination, remote mining, fuel conversion, growth of the food and beverage industry, manufacturing and other high temperature industries.
  - Innovations that streamline operations, enhance reliability, and boost performance across solar-thermal fields and plants[19].
- **Advanced Photovoltaics**
  - Innovations for low-cost, reliable space photovoltaic (PV) panels that are less reliant on critical materials and have the potential to be fabricated with high-volume-manufacturing-compatible methods. Innovations include but are not limited to advancements in III-V wafer reuse, high-performance durable silicon PV for space deployment, perovskite manufacturing and stability, and perovskite manufacturing equipment and metrology development.
  - Technologies and innovations for economical recycling of PV technologies that will increase the volume and value of recovered minerals and materials, particularly silver, silicon, copper, tellurium, glass, aluminum, and steel.
  - Innovations for maximizing performance and/or reliability of existing PV cells, modules, and fleets.
- **Systems Integration, Interconnection, and Analysis**
  - Innovations to address potential cybersecurity threats to integrated energy systems arising from distributed energy resources and their supply chains.
  - Innovations in power electronic system control technologies to improve grid stability and reduce system outages.
- **Permitting and Impact Reduction**
  - Innovations that increase the safety of plug-in PV systems, including those that address the technical issues of breaker masking and back-feed.
  - Innovations that can track and monitor permitting processes, and/or increase capacity for state and local governments and/or developers to improve permitting timelines and outcomes.

[18] https://www.energy.gov/cmei/systems/articles/blade-and-drivetrain-testing-advance-wind-turbine-efficiency-and-reliability

[19] Gifford, Jeffrey, et al. First Solar Thermal Energy Planner (STEP 1) and Nationwide Industrial Heat and Power Analysis. No. NLR/TP--5700-96614. National Laboratory of the Rockies (NLR), 2026.

- **Hydropower and Pumped Storage**
- **Marine Energy**
  - Co-development of marine energy technologies with end users.
  - Innovations in marine energy subsystems and components.
- **Integrated Energy-Water Technology Solutions**

  Technologies that are specifically not of interest for this AOI include:

  - Carbon capture
  - Hydrogen production
  - Offshore wind technologies, including hybrid wind/marine energy generation systems
  - Non-concentrating solar-thermal systems
  - Geothermal energy technologies, fossil energy technologies, or nuclear energy technologies
  - Battery chemistry.

6. **Advanced Technologies for Domestic Critical Mineral Extraction, Midstream Processing, and Recycling**

   Summary of AOI #6:

   Advancing technologies and approaches for beneficiation, separation, extraction, impurity control, and intermediate-product finishing methods that can be demonstrated at bench scale using a real feedstock supplied by a resource provider. Technologies may include physical beneficiation, gravity separation, magnetic or electrostatic separation, flotation, roasting, acid or alkaline leaching, chlorination, carbochlorination, solvent extraction, ion exchange, selective precipitation, crystallization, calcination, hydrometallurgical flowsheets, pyrometallurgical upgrading, or hybrid processes.

   Key Challenges in the AOI:

   Improving processing efficiency for “small market” minerals that may be strategically important but are often overlooked because they are byproducts of primary production, technically complex, available only in limited volumes, or not yet connected to a qualified downstream customer. Responsive projects may address, for example, vanadium-bearing feedstocks; zircon- and hafnium-bearing heavy mineral sands; bauxite residue or red mud; slags, tailings, residues, or other underutilized mineral streams that can be processed into intermediates for use in specialty-grade materials for energy, defense, aerospace, nuclear, semiconductor, grid, industrial, or high-performance alloy supply chains. Vanadium, hafnium, and zirconium are included on the 2025 U.S. Critical Minerals List - which reflects supply-risk and national/economic

security considerations - and are representative of the small global markets targeted by this AOI. Proposals addressing other target elements or minerals with comparable global market sizes are also responsive.

Not of interest: Out of scope are proposals that pursue multiple unrelated feedstocks, multiple unrelated elements, or "recover everything" approaches without a single defined target intermediate and measurable product specification. Projects using only synthetic feedstocks, simulated ores, reagent screening unconnected to a named resource provider, or generic separations chemistry without a clear mineral source would not meet the objectives of this AOI. This AOI does not seek mining equipment development, final alloy development, end-use component testing, battery or electrolyte formulation, bulk commodity production, nor construction of a full processing facility. Cementitious reuse of red mud, construction-material applications, or waste stabilization without specialty metal recovery are also not of interest.

7. **Innovations In Manufacturing and Scale Up for Energy Applications**

Summary of AOI #7:

Advancing innovations that expedite the scaling up of manufacturing for materials, components, devices, equipment, and production processes essential for energy applications. Proposals in this AOI are intended to enhance any manufacturing pathway relevant to energy where technical innovation can lead to improvements in manufacturability, production readiness, domestic supply capability, quality, cost, throughput, reliability, or energy productivity. Targeted areas include batteries and energy storage, power electronics and semiconductors, advanced conductors, magnets, grid hardware, components for power generation systems (such as gas, nuclear, hydropower, and geothermal), recycling and remanufacturing, as well as other energy-related materials, parts, or systems. A particular area of interest is the advancement of high throughput "micro-scale" manufacturing. At present, photolithography on thin films for semiconductor chip manufacturing is the only widely established micro-scale technology. This technique has provided significant benefits to both the U.S. and global economies. However, recent draft R&D roadmaps from CMEI highlight the need to scale up additional micro-scale manufacturing techniques. Such advancements would support industries including microelectronics, power electronics, battery manufacturing, and associated equipment.

Key Challenges in the AOI:

- Scale-up of advanced manufacturing processes for energy materials, components, and devices

  - Illustrative technologies: advanced forming, joining, welding, coating, casting, additive manufacturing, powder processing, machining, roll-to-roll processing, electrochemical processing, separations, critical-materials refining, recycling, remanufacturing, thermal processing, semiconductor and power-electronics manufacturing, battery electrode and cell manufacturing, and manufacturing approaches for large, complex, high-performance, or safety-critical energy components. Proposals must include measurable target metrics related to the scale-up bottleneck they are addressing, such as throughput (units or mass per hour); first-pass yield; defect or scrap rate; cost per accepted unit; energy use per accepted unit; material utilization; or qualification/certification timeline.
- Modular, flexible, and retrofit-ready manufacturing platforms that reduce the time and cost of moving from prototype to pilot or early production
  - Illustrative technologies: modular or reconfigurable tooling, retrofit kits or interfaces for legacy production equipment, flexible platforms supporting multiple product variants or rapid changeover, and standardized modular units for pilot-to-production scale-up. Proposals must include target metrics related to reduction of the time and cost of moving from prototype to pilot or early production, such as reduction in prototype-to-pilot transition time; reduction in retrofit or changeover cost; reduction in capital cost per unit of production capacity; or increase in the number of product variants or process conditions supported without major re-tooling.
- Smart manufacturing tools that enable real-time process understanding, quality control, digital qualification evidence, and secure supply-chain visibility
  - Illustrative technologies: in-line metrology, nondestructive evaluation, multimodal sensing, robotics and automation tied to a manufacturing process, machine vision, edge analytics, digital twins, physics-informed models, AI-enabled design of experiments, closed-loop process control, secure data infrastructure, digital-thread architectures, and traceability or provenance systems. Proposals must include target metrics related to real-time process understanding, quality control, digital qualification evidence, and secure supply-chain visibility, such as reduction in defect escape rate; reduction in inspection or qualification time; improvement in process capability; reduction in unplanned downtime; or a measurable increase in the share of process data captured in a machine-readable, standards-compliant, and traceable format. Where digital or AI-enabled systems are proposed, applicants must also address model validation, data quality, uncertainty, cybersecurity, operator usability, and integration with existing equipment or legacy manufacturing environments.

Not of interest: Technologies demanding classified operations, unsafe autonomous controls for critical systems, unsupported claims of market readiness, or digital solutions like blockchain or large language models used independently rather than integrated into a manufacturing solution.

ii. Office of Cybersecurity, Energy Security, and Emergency Response (CESER)

Overview:

CESER's mission focuses on securing the Nation's energy infrastructure from cyber, physical, and operational threats; improving resilience of grid systems; advancing cybersecurity technologies for critical energy systems; and supporting emergency response for energy disruptions.

These mission areas emphasize industrial control system (ICS) security, operational technology (OT) hardening, grid infrastructure modernization, supply chain risk management, and dynamic real-time information sharing with industry stakeholders to enhance energy sector reliability, resilience, and security.

Areas of Interest (AOIs):

1. **Advanced OT/ICS Cybersecurity Technologies for Critical Energy Infrastructure**

   Summary of AOI #1:

   CESER seeks technologies that advance cybersecurity for OT and ICS used across electric generation, transmission, distribution, and pipeline operations.

   These technologies should demonstrate strong potential for commercialization, especially those at TRL 4 or higher and able to attract private-sector adoption.

   Potential applications include:

   - Autonomous anomaly detection in power plant control systems
   - Tools that secure distributed control systems (DCS) and SCADA upgrades (e.g., similar to systems referenced across CESER-supported plant modernization projects)
   - Edge-based AI/ML models for predictive OT threat detection
   - Technologies that protect turbine, boiler, generator, and substation control interfaces

   Key Challenges in AOI #1:

- Ensuring National Lab-developed ICS security technologies integrate with legacy plant equipment (commonly seen across CESER's infrastructure work)
- Achieving rapid commercialization in a risk-averse energy sector
- Hardening OT networks without impacting operational reliability
- Scaling solutions for diverse energy environments (coal, gas, nuclear, renewables, microgrids)
- Demonstrating strong cybersecurity ROI to utilities and plant operators.

2. **Secure Energy Supply Chain Technologies for Critical Infrastructure**

Summary of AOI #2:

CESER seeks technologies that strengthen the cyber, physical, and operational security of the energy sector supply chain, with a focus on commercial-ready solutions that can be broadly adopted by utilities, independent power producers, pipeline operators, and energy equipment manufacturers.

Potential applications include:

- Hardware/software tools that validate authenticity and integrity of OT/ICS components (e.g., PLCs, sensors, control modules)
- Technologies that detect or prevent insertion of compromised components into energy generation or transmission systems
- Risk analytics platforms that help operators evaluate supply chain exposure for critical energy equipment
- Technologies ensuring provenance of firmware updates

Key Challenges in AOI #2:

- Complex, global vendor ecosystems: Energy systems rely on multistage, internationally distributed manufacturing chains, complicating verification of component authenticity.
- Increasing exposure of OT/ICS devices: Adversaries increasingly target OT supply chain pathways.
- Utility adoption barriers: Solutions must integrate with legacy plant equipment and procurement workflows without imposing operational burden.

iii. Hydrocarbons and Geothermal Energy Office (HGEO)

Overview:

Projects must demonstrate a clear path to technology transfer, partnering with industry to transition laboratory-scale quantum sensing breakthroughs into field-deployable

commercial solutions that optimize recovery factors, prevent casing failures, and secure national baseload energy reliability.

Areas of Interest (AOIs):

1. **Quantum Sensing for Subsurface Applications**

   Summary of AOI #1:

   To advance the Department of Energy's Hydrocarbons and Geothermal Energy Office (HGEO) priorities of enhancing coal, oil and gas, and geothermal energy recovery, this AOI seeks laboratory-led proposals to support the commercialization of quantum sensing technologies for deep subsurface environments. Relevant technologies could include, but are not limited to, quantum gravimeters, magnetometers, and quantum inertial sensors. Proposals should call out the challenges in the application of such sensors in subsurface environments—identify relevant extreme conditions (including high pressure, high temperature, electromagnetic, acoustic, corrosive, and abrasive)—and how or whether the applicant plans to address these challenges. Applications of interest include, but are not limited to, wellbore, casing, cement, and caprock-integrity monitoring; monitoring of pressure, temperature, strain, vibration, chemical conditions, and fluid property variations; fluid movement or subsurface mass redistribution or changes along faults, fractures, or geological structures during high energy events or stimulation; and reservoir performance tracking in Enhanced Geothermal Systems (EGS) and superhot-rock formations.

2. **Byproduct Recovery and Beneficial Use From Coal Mining, Processing and Power Generation**

   Summary of AOI #2:

   Historically, coal-related operations have generated massive legacy and active waste streams—including coal combustion residuals (CCR) like fly ash and bottom ash, coal preparation plant refuse, tailing impoundments, and acid mine drainage (AMD). Rather than treating these streams purely as environmental liabilities, this AOI focuses on bridging the gap between national laboratory innovation and commercial adoption to transform them into high-value domestic assets. Projects must demonstrate a clear path to technology transfer, transitioning laboratory-scale separation, extraction, and chemical or physical processing innovations into robust, modular, and economically viable industrial solutions. Specific technologies and application areas of interest include, but are not limited to:

   - Beneficial Use of Coal Combustion Residuals (CCRs): Advanced processing techniques to convert fly and bottom ash into high-performance, low-carbon

cementitious materials, geopolymer concrete, engineered synthetic aggregates, or specialized additives for infrastructure and manufacturing applications.

- Wastewater Reclaim and Thermal Plant Byproduct Recovery: Scalable systems integrated into existing coal-fired power plants to recover valuable chemical co-products (such as pure gypsum, high-purity sulfur, and critical salts) from flue-gas desulfurization (FGD) systems and wastewater streams, while simultaneously driving down the net cost of zero-liquid discharge (ZLD) operations.
- Mineral and Structural Product Synthesis from Coal Tailings: Transforming physical coal-refuse materials and processing fines into high-strength structural materials, synthetic zeolites, agricultural soil amendments, or feedstocks for ceramic fabrication.

Ideal applications will address feedstock heterogeneity and regulatory challenges, as well as produce technoeconomic and market analyses to aid in commercialization.

3. **Innovative Production Technologies of Graphite/Cabon Fiber Precursors from Coal**

   Summary of AOI #3:

   Coal is increasingly recognized as a vital precursor to advanced carbon materials, including graphite, pitch, coke, carbon fiber, foams, composites, decking, and batteries. DOE is seeking applications for innovative production technologies that transform coal and coal wastes into high-quality synthetic graphite and carbon fiber precursors. Specifically, projects of interest include those focusing on cost-effective, scalable purification processes and chemical conversion pathways that yield highly consistent, battery-grade materials. Other applications for innovative production technologies for materials listed above may also be considered.

   HGEO especially seeks proposals that can help address the key technology challenges inherent to the development of carbon products from coal: 1) feedstock variability, 2) upgrading and purification costs, 3) process scalability, and 4) multi-scale modeling deficits.

4. **Advanced Technologies of Air Separation Unit (High Purity Oxygen) for Modular Gasification and Oxy-Combustion**

   Summary of AOI #4:

   Efficient oxygen production is crucial for optimizing small modular gasification processes that generate electricity and high-value products such as liquid transportation fuels, ammonia, and various chemicals. Current methods, primarily cryogenic air separation, involve significant capital expenditure and high operating

costs, limiting their applications for supporting the current market interest for large scale-gasification systems.

DOE is soliciting proposals focused on advancing oxygen production methods or technologies that demonstrate superior technoeconomic performance over conventional technologies. Applications specifically not of interest would include any current commercially available oxygen separation technology, and approaches that do not build upon or extend the state of the art in continued advancement in efficiency and cost reductions of oxygen separations that can be leveraged to distributed gasification systems.

Some key challenges that HGEO seeks proposals to address include achieving high energy efficiency in a compact design; scaling purification and compression technology; and integrating modular units into modular gasification applications.

5. **Deployment of Advanced Sensor Technology for Quantitative Fracture Characterization**

Summary of AOI #5:

The need for advanced sensors abounds in hydrocarbon and geothermal energy-related applications, stretching from the sensors targeting the subsurface, to pipelines and transport to energy generating facilities. Some key commonalities between all of these systems is the need to function for long lifetimes and in extreme and/or corrosive environments. Some of the key applications of interest include:

- Look-Ahead Sensing and Detection while Drilling: Advanced downhole sensors and geophysical methods (such as electromagnetic, acoustic, or seismic tools) integrated into the drilling assembly or at the surface to identify fractures, fluid-bearing zones, lithological boundaries, or high-pressure hazards ahead of the drill bit before physical intersection.
- Sensing to improve subsurface fracture characterization and geomechanical conditions: Understanding the spatial architecture, connectivity, and conductivity of subsurface fracture systems is the cornerstone of modern reservoir engineering and drilling operations. Without precise fracture characterization, operators are essentially blind to the true pathways of fluid transport. This lack of visibility leads to highly inefficient operations, such as fluid bypassing trapped resources, premature thermal breakthroughs in geothermal wells, and costly containment breeches in natural gas storage sites. By resolving exact fracture geometry, mechanical compliance, and aperture distributions, researchers can construct high-fidelity predictive models that ensure the safe, efficient, and reliable utilization

of the subsurface ecosystem. This area of interest focuses on transitioning subsurface diagnostics from qualitative monitoring to highly precise, quantitative structural mapping, analyzing raw sensor data to enable real-time quantification of critical engineering parameters including fracture aperture (width), compliance, spatial orientation, and fluid-flow conductivity.

- Advanced pipeline monitoring and integrity: The United States relies on a vast, aging network of transmission pipelines to deliver natural gas. These networks face escalating threats from internal and external corrosion, geohazards, third-party intrusion, and dynamic fatigue caused by fluctuating operating pressures. To address these vulnerabilities, this AOI seeks laboratory-led proposals to support the commercialization of continuous and highly precise pipeline monitoring and integrity technologies. Projects must demonstrate a clear path to technology transfer, partnering with industry to transition laboratory-scale sensor systems and computational models into field-deployable commercial solutions. The ultimate goal is to enable predictive, proactive maintenance strategies that maximize the safety, lifespan, and transport efficiency of both legacy and modern pipeline materials. Technologies can be relevant to retrofitting legacy infrastructure or outfitting new infrastructure. Technologies of interest include, but are not limited to continuous long-range sensor networks, such as Distributed Acoustic Sensing (DAS)/ Distributed Temperature Sensing (DTS)/ Distributed Strain Sensing (DSS), in-situ and non-invasive degradation monitoring, digital twins and real-time predictive maintenance.
- Advanced sensors and materials for advanced gas turbines: This area of interest is focused on the development of novel sensors suitable for use in the high temperatures and conditions found in gas turbines. Sapphire Optical Fibers can replace traditional, fragile thermocouples in extreme sensing environments. Sapphire fibers operate in extreme environments up to 2000°C without degrading or requiring active cooling. Sapphire fibers traditionally lack a protective outer layer (cladding), making them hard to build. Proposals are encouraged for industrialization of such technology to create functional claddings during the crystal growth process and enable sensor field testing. Additionally, sensors that can provide detailed rapid compositional measurements of gaseous fuel blends are of great interest, especially technologies that are ready to provide rapid analysis of fuel gas blends at system pressures up to 1000 psi, which enables optimal control of gas turbines, solid oxide fuel cells (SOFCs), and industrial systems based responding to fuel composition changes in real time.

6. **AI-enhanced Drilling to Optimize Unconventional Oil and Gas Recovery**

Summary of AOI #6:

Unconventional reservoirs such as tight shale and carbonate formations, as well as geothermal reservoirs (especially deep, high-temperature Enhanced Geothermal Systems), are characterized by their low porosity and nanometer-scale pore throat structures, resulting in a near-absence of connected pathways for fluids to flow naturally. Maximizing contact with these ultra-tight reservoirs requires horizontal wells that must be drilled with extreme spatial precision.

Traditional directional drilling and manual geosteering methods struggle to quickly resolve localized structural changes, leading to wellbore misplacement, higher frictional drag, and extensive drilling non-productive time (NPT). AI-enhanced drilling may be a novel technic which can address these critical bottlenecks by using advanced machine learning, reinforcement learning, and physics-informed models. By continuously processing high-frequency downhole sensor data, AI can automate closed-loop decision-making in real-time; including autonomous dynamic steering corrections and the prediction of mechanical drilling hazards. Projects of interest target improving drilling speed, material durability, and wellbore integrity. Key areas of interest include:

- Targeting the geomechanical “sweet spot”: Enabling a precision-targeted approach based on subsurface geomechanics that will enhance the total recovery factor of oil, gas, or heat while significantly reducing drilling cycles and capital expenditures, directly lowering the break-even cost of domestic energy development.
- HT Drilling Tools: Directional drilling technologies, steerable bottom-hole assemblies, and trajectory navigation tools that enable precise path control through hard, fractured, or abrasive igneous and metamorphic rock formations to target specific geothermal reservoirs.

7. **Efficient, Low-cost Technologies for High Sulfur Content Natural Gas**

Summary of AOI #7:

A primary barrier to unlocking vast domestic natural gas reserves is the presence of high concentrations of hydrogen sulfide (H_2S) and other sulfur-containing compounds (sour gas). Processing sour gas conventional options often suffer from high capital expenditures, high operating footprint, intensive water use, and significant parasitic energy loads.

To expand the utilization of underutilized sour gas reservoirs and leverage existing midstream infrastructure, this AOI seeks laboratory-led proposals to support the commercialization of novel, low-cost downstream processing technologies. Successfully funded proposals will demonstrate a clear path to technology transfer, bridging the gap between national lab-scale breakthroughs and field-deployable commercial solutions that process highly acidic gas streams efficiently, minimize emissions, and maintain superior technoeconomic viability. Technologies of interest include, but are not limited to advanced membrane separations, non-aqueous solvents, and regenerable sorbents.

8. **Advanced Technologies to Improve Turbine Reliability, Flexibility, and Efficiency**

Summary of AOI #8:

This AOI is focused on commercializing technologies that can improve the performance of existing turbines, especially Wire Arc Additive Manufacturing (WAAM) systems. While Directed Energy Deposition (DED) and WAAM both utilize wire-based feedstock, WAAM specifically employs an electric arc as an energy source to restore high-temperature hardware. Future WAAM development focuses on achieving higher precision through path planning and real-time monitoring to address typical repair defects. The United States Army is actively evaluating WAAM for battlefield sustainment, signaling a transition toward advanced metal Additive Manufacturing (AM) repair technologies. This topic seeks proposals focused on the commercialization of WAAM technologies developed at National Laboratories to enhance the repair of turbine components. By transitioning laboratory-scale repair processes to industrial applications, partners can reduce maintenance downtime and eliminate the need for critical replacement materials. The integration of Artificial Intelligence (AI)-driven process control and digital twin models can further support the adoption of these technologies by industrial end-users, ensuring high-quality restoration of high-temperature hardware. Other technologies of interest include SOFC–embedded gas turbine (SOFC-GT) hybrid systems. By leveraging advanced cyber–physical emulation facilities at National Laboratories, such technology could provide industry partners with predictive tools and high–fidelity platforms to validate transient performance, thermal–mechanical stressors, and control–system responses without the safety hazards and capital costs of full–scale physical testing. Furthermore, technology could be accelerated by bridging the gap between National Laboratory research and commercial industrial turbine developers and facilitating the transfer of specialized emulation and control technologies to the private sector. Work supporting the establishment of industry safety standards by validating reliable system operations under dynamic, data–center–

relevant loading profiles, ensuring that next–generation hybrid systems meet stringent grid and industrial safety requirements is also of interest.

9. **Geothermal Exploration and Characterization**

Summary of AOI #9:

HGEO is interested in advancing the accuracy, precision, and efficiency of subsurface mapping and reservoir characterization to reduce upfront resource risk. This technical area focuses on novel methods to image, monitor, and model critical subsurface parameters before, during, and after stimulation or production. Key areas of interest include:

- Fracture Imaging and Monitoring: Advanced methods, including quantum sensing, for high-resolution imaging for exploration and real-time tracking of active fracture networks, fluid movement, and shearing events.
- Geothermometry and Geochemical Kinetics: High-accuracy geochemical modeling tools and chemical kinetic research to predict reservoir temperatures and fluid-rock interactions.
- Advanced Data Integration: Machine learning algorithms and/or advanced geophysical inversion techniques for multi-physics data fusion (e.g., joint inversion of electromagnetic, seismic, and gravity data) to map geothermal reservoirs or improve exploration survey design.

10. **Geothermal Power Generation**

Summary of AOI #10:

HGEO is interested in optimizing surface plants and conversion cycles to maximize power output, handle extreme fluid chemistry, reduce parasitic loads, and improve overall system reliability. This area focuses on converting geothermal heat into grid-ready electricity at a lower levelized cost of electricity (LCOE). Key areas of interest include:

- Plant Repowering: Technologies and retrofitting strategies to upgrade legacy geothermal facilities, optimize turbine efficiency, and maximize power output from existing thermal assets.
- Parasitic Losses: Innovative methods, fluids, and auxiliary equipment designs to reduce internal power consumption from pumps, cooling fans, and other in-plant systems, thereby increasing net electricity delivered to the grid.

- Power Cycle R&D and Working Fluids: Development of next-generation thermodynamic cycles and environmentally benign, high-efficiency working fluids.
- Cooling Systems and Air-Cooled Condensers (ACCs): Advanced heat exchangers, materials, and dry/hybrid-cooling designs to maintain plant performance during peak summer ambient temperatures while minimizing impact to water resources.

11. **Other Geothermal Mission-supporting Technologies**

Summary of AOI #11:

HGEO is interested in other high impact technologies that support the mission of accelerating of the discovery and development of gigawatt-scale geothermal energy and the positioning of geothermal as a competitive domestic source for reliable baseload electricity generation.

iv. Office of Electricity (OE)

Overview:

The Office of Electricity (OE) leads the Department's efforts in developing new technologies to strengthen, transform, and improve electricity delivery infrastructure so consumers have access to resilient, secure, and sustainable sources of electricity. OE provides solutions to technical, market, institutional, and operational failures that go beyond any one utility's ability to solve. To accomplish this critical mission, OE engages stakeholders throughout the sector on a variety of innovative technology solutions to modernize the electric grid and enhance key characteristics of the U.S. electric transmission and distribution systems:

- Reliability—consistent and dependable delivery of high-quality power
- Affordability—more optimal deployment of assets to meet system needs and minimize costs
- Resilience—the ability to cope with and quickly recover from disruptions and maintain critical function, while maintaining capacity for adaptation and transformation
- Security—protecting the grid from cyber and physical threats
- Flexibility—the ability to accommodate changing supply and demand patterns and new technologies
- Efficiency—low losses in electricity delivery and more optimal use of system assets.

Areas of Interest (AOIs):

1. **Transmission and Distribution (T&D) Circuit Digital Twins for Preventive Maintenance and Load Interconnection Support**

   Summary of AOI #1:

   Utilities must mitigate a wide range of issues, from wildfires to long load queues. Digital twins, or the digital model of an intended or actual real world physical product, is not a new technology. However, the application of digital twins to the electrical industry is new and innovative. By creating a digital twin of a utilities T&D circuit, future component failures can be modeled before they happen to provide the industry with a crucial preventive tool. In addition, a digital twin of the circuit can also help utilities identify the circuit's component constraint for increasing capacity which will help utilities with making upgrades which wouldn't provide the necessary capacity increases.

   Key Challenges in AOI #1:

   - Collecting and synthesizing the correct data to build out the digital twin models.
   - Identifying how granular the digital twins should be.
   - Refining the digital twins while balancing real-world accuracy with time investment.

2. **Federated and Privacy-Preserving Learning Architecture for OT and Grid Cybersecurity**

   Summary of AOI #2:

   As utilities and grid operators collect growing volumes of operation technology (OT) data, the need to share insights without exposing sensitive information has become critical. This topic area focuses on developing and demonstrating federated and privacy-preserving machine-learning (ML) architectures that enable collaborative cybersecurity analytics across utilities, vendors, and national laboratories. Research should address how distributed learning models can improve anomaly detection, intrusion response, and system resilience while maintaining compliance with data-protection, regulatory, and reliability requirements. Solutions are expected to bridge the gap between laboratory prototypes and field-ready implementations that utilities can trust and adopt.

   Key Challenges in AOI #2:

   - Improving data homogeneity between OT and grid datasets across vendors, systems, and formats to aid portability of ML models.

- Developing novel training strategies for edge and substation devices that lack the power or bandwidth to train or exchange model parameters efficiently.
- Securing shared model updates between utility systems to preserve sensitive operational data integrity.
- Protecting federated systems targeted by poisoning, spoofing, or interference attacks.
- Demonstrating that privacy-preserving analytics can coexist with existing control systems and regulatory constraints.

3. **Commercializing Innovations to Reduce Cost and Complexity of Energy Storage Safety Monitoring and Mitigation Technologies at the System Level**

Summary of AOI #3:

Grid-scale energy storage systems (ESS), vital for modernizing electricity infrastructure and supporting grid reliability and security, present unique safety considerations that span their entire lifecycle. Currently deployed technologies such as Li-ion ESS present inherent risks associated with high-density energy containment, including the potential for thermal runaway, fire, and the release of hazardous materials. While advancements and improved best practices articulated through industry standards have led to significant declines in recent failure incidents[20], considerable safety concerns persist. Consequently, proposed projects are subject to intense scrutiny and, in many localities across the country, are being prohibited[21]. The OE Energy Storage Division continues to conduct cutting edge research and advancement of innovations to address safety concerns. However, significant challenges persist, particularly concerning the rapid evolution of emerging storage technologies, the necessity for robust real-time monitoring and early warning systems, and the assurance of adequate emergency response capabilities for incidents that can escalate quickly and affect surrounding communities.

Key Challenges in AOI #3:

In this topic area, OE is interested in supporting commercialization of DOE national lab innovations that can have a significant real-world impact in addressing ESS level safety concerns. Areas of interest include:

- Scaling innovations demonstrated at the cell or module level, such as ultrasonic diagnostics[22] and enhanced temperature and gas emission monitoring[23], by

[20] BESS Failure Incident Database - EPRI Storage Wiki
[21] Tracking Local Moratoria and Other Key Considerations for Battery Energy Storage Siting
[22] Ultrasonic nondestructive diagnosis of lithium-ion batteries with multiple frequencies - ScienceDirect
[23] Thermal Runaway Database Development and Development of Thermally Sensitive Paint

enabling ease of integration into already operational ESS, reducing cost to implement, and improving incident detection accuracy

- Advancing innovations that address key safety concerns for emerging ESS technologies including sodium-ion, zinc, solid-state, flow batteries, and other non-lithium technologies.

4. **Quantum-Enabled Sensing and Timing with Reduced SWaP-C for Grid Resilience**

Summary of AOI #4:

The electric grid requires accurate and reliable time synchronization for monitoring, protection, and control, and many power-sector timing systems depend on GPS signals[24,25]. GPS-based timing may be disrupted or compromised by jamming, spoofing, interference, or loss of signal, creating a need for resilient, GNSS-independent timing sources[26].

Quantum-enabled technologies offer potential alternatives. Atomic clocks can provide local precision timing when GPS is unavailable, while atomic magnetometers have demonstrated non-contact measurement of magnetic fields and electric current[27]. However, many high-performance systems remain difficult to deploy outside laboratories because of environmental sensitivity, shielding or isolation requirements, size, cost, and supporting hardware[28]. At the same time, chip-scale atomic clocks and magnetometers demonstrate that compact, low-power quantum devices are technically feasible[29].

Key Challenges in AOI #4:

This topic seeks quantum-enabled sensing and timing solutions that measurably reduce system-level size, weight, power, and cost (SWaP-C) while maintaining performance required for grid applications. Proposed technologies should have a credible path toward field deployment, scalable manufacturing, and integration with utility communications and control infrastructure. Areas of interest include:

[24] Timing Challenges in the Smart Grid | NIST
[25] An Evaluation of Dependencies of Critical Infrastructure Timing Systems on the Global Positioning System (GPS) | NIST
[26] A Resilient Architecture for the Realization and Distribution of Coordinated Universal Time to Critical Infrastructure Systems in the United States: Methodologies and Recommendations from the National Institute of Standards and Technology (NIST) | NIST
[27] Chip-Scale Atomic Magnetometers | NIST
[28] Taking quantum sensors out of the lab and into defense platforms | DARPA
[29] Chip-Scale Clocks | NIST

- Reducing the size, weight, power, and cost of the complete sensing or timing system, including photonics, lasers, vacuum packages, shielding, electronics, controls, and thermal management, while enabling scalable production[30].
- Maintaining reliable performance under temperature and humidity variation, vibration, electromagnetic interference, motion, and other utility field conditions.
- Developing compact timing sources and distribution approaches that provide accurate holdover, integrity monitoring, and secure operation during GNSS jamming, spoofing, interference, or outage.
- Demonstrating interoperability with existing monitoring, protection, communications, and control infrastructure, and establishing repeatable laboratory and field-testing methods for performance, reliability, and operational value[31].

v. Office of Nuclear Energy (NE)

Overview:

The Office of Nuclear Energy's (NE) mission is to advance nuclear energy science and technology to meet U.S. energy, environmental, and economic needs. Specifically, NE has identified the following goals to address the challenges in the nuclear energy sector: enabling the continued operation of the nation's existing commercial nuclear fleet, accelerating development and deployment of advanced nuclear reactor concepts, securing and sustaining the global nuclear fuel cycle, and expanding international cooperation while maintaining U.S. leadership in nuclear energy technology.

With the TCF, NE aims to directly advance the commercialization of nuclear technologies as well as promote the development of commercialization enabling technologies. Direct commercialization involves the advancement of products that can be sold on the market today or in the near-term future. However, considering the large number of technical, regulatory, construction, workforce and financial barriers that the nuclear industry faces, a broad set of tools are required to enable the deployment of nuclear energy technologies. This category of innovations includes the establishment of risk and safety assessment methods, accurate cost analysis tools, granular workforce projections and materials characterization models, among many others.

Achieving the Trump Administration's aggressive nuclear energy deployment goals necessitates a robust and highly skilled workforce across the nuclear sector, encompassing design, construction, engineering, operations and maintenance, and research and development. To meet this rapidly growing demand for expertise in nuclear science and engineering and ensure the nation's continued leadership in nuclear technology development, it is essential to cultivate a strong pipeline of talent. As a result,

[30] Next-Generation Chip-Scale Atomic Clocks | NIST
[31] Smart Sensors and Standard-based Interoperability in Smart Grids | NIST

TCF applicants are strongly encouraged to consider strengthening national laboratory partnerships with academic institutions, including four-year universities, community colleges, technical institutions, and skilled trades programs, to promote meaningful nuclear workforce development opportunities (e.g., establishing credentials, certificates, internships, fellowships or apprenticeships).

The recommended parameters for all submissions under this topic area:

- Minimum Technology Readiness Level (TRL)[32] of 5
- Within the Adoption Readiness Level (ARL)[33] tool, the 'License to Operate' core risk area (section D) should not contain any 'high risks' for deployment/ commercialization
- Demonstrate applicability or use in at least one, but preferably multiple, existing reactor designs for AOIs 1, 2, and 4

Areas of Interest (AOIs):

1. **Reactor Concepts Research, Development and Demonstration (Reactor Concepts RD&D) (NE-RCRDD)**

   Summary of AOI #1:

   The Reactor Concepts Research, Development, and Demonstration (RD&D) program supports conducting RD&D on existing and advanced reactor designs and technologies to enable industry to address technical and regulatory challenges associated with optimizing the existing fleet of nuclear reactors, promoting the development of a robust pipeline of advanced reactor designs and technologies and associated supply chains, and progressing these advanced reactor designs and technologies towards demonstration when deemed appropriate. Program activities are focused on addressing technical, economic, regulatory, safety and security enhancement challenges associated with the existing commercial light water reactor fleet and advanced reactor technologies, covering large, small, and micro-sized designs and an array of reactor types including space reactors, fast reactors using liquid metal coolants and high temperature reactors using gas or molten salt coolants.

   The key challenges in this AOI include improving the economics of nuclear energy technologies, optimizing nuclear power plant performance, enhancing safety and reducing technical and regulatory risks, minimizing proliferation and security risks of nuclear materials and improving the economic outlook for the U.S. nuclear industry through expansion of nuclear energy products.

[32] Technology readiness levels for advanced nuclear fuels and materials development
[33] Adoption Readiness Levels (ARL) Framework | Department of Energy

Commercialization Priorities in AOI #1:

NE has identified the following activities as priorities to enable the successful commercialization of technologies for the optimization of the existing reactor fleet and development of advanced reactors for commercial, data centers/artificial intelligence, space, maritime or defense applications:

- Advanced construction materials and methods
- Advanced materials qualification, materials monitoring and repair, characterization and testing that support high temperature radiological operations, enable novel coolants such as liquid metals and molten salts, and extend operation life of nuclear power plants
- Commercial reactor digitization to support the maintenance and performance optimization of the existing reactor fleet
- Advanced technologies for more efficient and cost-effective methods to address challenges facing advanced reactor vendors in the areas of physical security, cybersecurity, and material control & accounting
- Advanced reactor fuel development, production, testing and/or validation (e.g., Tri-structural ISOtropic (TRISO), nitride, metallic, molten salts)
- Application of lab-developed tools to develop feasibility studies, technical analyses and/or assessment frameworks enabling the determination of suitable locations for siting nuclear reactors
- Development of novel artificial intelligence technologies to accelerate the design, licensing, manufacturing, construction, and operation of nuclear reactors

2. Fuel Cycle Research and Development (NE-FCR&D)

Summary of AOI #2:

The Fuel Cycle Research and Development (FCR&D) program presently has three focus areas. In the first, the program conducts applied R&D on advanced fuel cycle technologies that have the potential to enhance safety, improve resource utilization and energy generation, reduce waste generation, and limit proliferation risk. Advancements in fuel cycle technologies support the enhanced availability, economics, safety, and security of nuclear-generated electricity in the U.S., further enhancing U.S. energy independence and economic competitiveness. In the second area, the program conducts system analyses of advanced fuel cycle options to help guide decision-making and prioritization of R&D activities. In the third focus area, the FCR&D program also contributes to the Department's policies and programs for ensuring a secure, reliable, and economic nuclear fuel supply for both existing and future reactors.

The key challenges in this AOI include enhancing fuel cycle safety and reducing technical and regulatory risk, strengthening domestic nuclear fuel supply chain capabilities, improving resource utilization and energy generation, developing

advanced recovery and reuse technologies, reducing waste generation, and limiting proliferation risk.

Commercialization Priorities in AOI #2:

NE has identified the following activities as priorities to enable the successful development of the U.S. nuclear fuel cycle:

- Enhance and expand domestic nuclear fuel supply chain capabilities including reducing associated costs and increasing throughput in mining, milling, conversion, enrichment, deconversion, fuel fabrication, and recycling and reuse of valuable components from used nuclear fuel
    - Advanced uranium mining technologies
    - Advanced uranium conversion or deconversion technologies
    - Low enriched uranium (LEU) and high-assay low enriched uranium (HALEU) production
    - Laser uranium enrichment
    - Develop advanced recovery and reuse technologies of used nuclear fuel, reducing waste generation, and limiting proliferation risk
- Conduct reactor physics testing in Material Test Reactors, criticality/physics test beds, etc.
- Improve resource utilization, including the development of advanced recovery and reuse technologies to enable increased fuel resource availability
- Advance the technology readiness of nuclear fuels, cladding, and material compositions for current commercial light-water reactor (LWR), non-LWR, and advanced reactors
    - Key focus areas include, but are not limited to, improved (i.e., faster throughput, reduced waste, reduced cost) fabrication technologies for metallic fuel forms, molten salt fuel, silicon carbide (SiC) cladding, and Tri-structural ISOtropic (TRISO) particle fuel
- Enhance nuclear materials control and accounting for domestic fuel cycle
- Perform fuel cycle system analysis and options
- Support Lead Test Assemblies (LTA) in commercial reactors
- Support higher enrichment levels in commercial reactors

3. Used Nuclear Fuel and High-Level Waste Disposition R&D (NE-UNFHLWD)

Summary of AOI #3:

DOE is committed to fulfilling its legal mandate under the Nuclear Waste Policy Act (NWPA) of 1982, as amended, to ensure the safe, secure, and environmentally responsible long-term management, storage, transportation, and eventual permanent disposal of the nation's commercial used nuclear fuel (UNF) and high-level radioactive waste (HLW).

To accelerate this mission and reduce long-term federal liabilities, NE is leveraging the Nuclear Lifecycle Innovation Campuses (Campuses) initiative. This transformative, nationwide effort reestablishes U.S. leadership in nuclear energy by building integrated regional ecosystems that modernize the full nuclear fuel cycle, including disposition of UNF and HLW.

Through collaborative, milestone-based state partnerships, Campuses integrate advanced waste disposition systems directly with other vital sectors of the nuclear lifecycle. By funding innovative infrastructure and leveraging cutting-edge commercial-ready solutions, the program aims to streamline storage over decades, simplify complex transportation logistics, and prepare the nation for secure disposition of UNF and HLW. The UNFHLWD program incentivizes commercial-ready solutions that reduce federal liabilities, simplify transport logistical complexities, and enhance safety margins during extended storage (i.e., greater than 100 years) prior to permanent geologic disposal.

Commercialization Priorities in AOI #3:

To advance this mission, NE has identified the following activities as priorities to ensure the development of a reliable, safe and robust program for transporting, storing, and disposing of UNF and HLW:

- Establishing Campuses that include a federal staging facility and a permanent repository for used nuclear fuel
- Developing approaches, tools, and technologies for evaluation and consideration of siting of Campuses
- Developing technologies and leveraging artificial intelligence tools that would facilitate the development of a future application for a construction and operation license for one or more nuclear waste management facilities
- Demonstration tests highlighting the safety of UNF storage and transportation systems
- Developing models and field tests to understand the fate and transport of relevant radioactive isotopes within crystalline, argillite, and/or salt host rocks and to inform the Environmental Performance Assessment for disposal
- Developing technologies, models, and/or analytical approaches for qualifying existing UNF dry storage canisters for ultimate disposal
- Developing models and technologies that reduce the need for overly conservative assumptions in licensing activities for disposal
- Developing technologies for investigating the environmental and/or structural internals of UNF dry storage canisters
- Developing technologies for verifying acceptability of disposal for UNF or high-level waste packages
- Developing durable instrumentation for long-term geologic characterization measurements (e.g., temperature, pressure, acoustic measurements) in harsh environments (i.e., high temperature or caustic environments)

- Demonstrating innovative technologies that could automate the non-destructive evaluation of used nuclear fuel canister surfaces, with an emphasis on using technologies that have been developed to support other areas of the nuclear fuel cycle
- Developing technologies for specialized and alternative disposal concepts for UNF and HLW, including deep borehole disposal technologies

4. **Nuclear Energy Enabling Technologies (NE-NEET)**

Summary of AOI #4:

The Nuclear Energy Enabling Technologies (NEET) program conducts research and development (R&D) and makes strategic investments in research capabilities to develop innovative and crosscutting technologies that resolve nuclear technology development issues to enable the continued operation of existing U.S. nuclear reactors, deployment of advanced nuclear reactors, and development of advanced nuclear fuel cycles. The NEET program is organized into five subprograms: (1) Advanced Materials and Manufacturing Technologies (AMMT), (2) Advanced Sensors and Instrumentation (ASI), (3) Nuclear Energy Advanced Modeling and Simulation (NEAMS), (4), Nuclear Science User Facilities (NSUF), and (5) Gateway for Accelerated Innovation in Nuclear (GAIN).

The key challenges in this AOI include the demonstration and deployment of advanced sensors and instrumentation, enhancement of domestic supply chain capabilities, demonstration of advanced materials and manufacturing technologies, and application or demonstration of modeling and simulation tools to accelerate nuclear technology deployment.

Commercialization Priorities in AOI #4:

NE has identified the following activities as priorities to facilitate the widespread deployment of nuclear energy technologies:

- Commercialization of novel, enhanced, and/or radiation hardened sensors and instrumentation for existing and advanced reactor designs including temperature, in-core radiation flux, pressure, flow rate, thermal conductivity, vibration, and/or displacement. Some of these sensors and instrumentation may leverage novel physical phenomenon including quantum effects.
- Commercialization of advanced control and monitoring system technologies for the existing fleet and future advanced reactors
- Enhancement of domestic commercial supply chain capabilities for sensors, instrumentation, and control systems
- Development of advanced and next-generation manufacturing and assembly methods, which includes additive manufacturing, robotics, and automation

- Enhancement of domestic supply chain capabilities for advanced materials including but not limited to powder production, weld wire fabrication, casting, and forging
- Commercialization of in-process monitoring capability for advanced manufactured materials and components
- Commercialization of high throughput non-destructive examination capabilities
- Commercialization of advanced materials
- Application of technologies to improve the efficiency and security of manufacturing (e.g., cyber security, digital twins and AI) and accelerate the discovery-to-insertion timeline for advanced materials
- Increased commercialization of NE's advanced modeling and simulation tools (https://neams.inl.gov/code-descriptions/) addressing industry needs for increased adoption and use by light-water reactor (LWR) or non-LWR reactor industries
- Integration of advanced computing, software, and data resources – especially those that make use of cutting-edge developments – to enable end-to-end application workflows supporting commercialization of advanced nuclear technologies, which could include applications geared toward commercially available cloud resources
- Commercialization of tools to automate the curation of machine-readable data from experimental, modeling and synthetic sources to support advanced nuclear energy technologies
- Commercialization of national laboratory-developed technologies through enhancing or establishing mechanisms for transferring legacy research outcomes and data to industry

V. Application Submission Information

The application process will include two required phases: a concept paper phase and a full application phase. At each phase, DOE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of the lab call. DOE will not review or consider submissions that do not meet the eligibility requirements.

DOE will not extend deadlines for applicants who fail to submit required information and documents due to server/connection congestion.

i. General Information

Eligibility

Only DOE National Laboratories, plants, and sites are eligible to receive funding from this lab call. All concept papers and full applications must either be 1) submitted to DOE from each lab's respective Office of Research and Technology Application (ORTA)[34] TTOs or 2) must include a letter of support from the TTO if submitted by someone outside of the TTO.

[34] 15 USC 3710.

A TTO letter of support may either be included in the concept paper and full application addendums or emailed to TCF@hq.doe.gov prior to both the concept paper and full application deadlines. If the TTO is emailing a letter of support, it is allowable to include multiple proposals in a single letter; when doing so, please identify the proposals by Exchange ID. A letter of support from the TTO is only required if the TTO is not the person submitting the concept paper or full application. Replies to reviewer comments may be submitted by someone other than a Lab TTO.

Only applicants who have submitted an eligible concept paper and received an "encourage" determination from DOE will be eligible to submit a full application.

There are no limits on the number of concept papers each National Laboratory can submit.

If there is a partner lab on a proposal, only the prime lab applicant needs to submit a concept paper and full application on behalf of the proposal team. Applicants can apply to multiple AOIs and topics within the same application.

The concept paper, full application, and reply to reviewer comments must conform to the form and content requirements described in Sections V.ii and V.iii. If applicants exceed the maximum page lengths stated in Sections V.ii or V.iii, DOE will review only the authorized number of pages and will disregard any additional pages.

Submission Process

To apply to this lab call, lab personnel must register and sign in with their lab email address and submit application materials through Exchange. The Exchange system has fields which must be completed as part of the submission process; however, many of the fields are not required to apply to this lab call as they are either not applicable or are captured elsewhere in the application process. Please see supplemental guide (in the documents section for this lab call, DE-LC-000L130, on Exchange) for instructions on how to complete a concept paper or full application submission on the Exchange System for this lab call.

Applicants are strongly encouraged to submit their concept papers, full applications, and replies to reviewer comments at least 48 hours in advance of the submission deadline.

The concept paper, full application, and reply to reviewer comments must conform to the following requirements:

- Must be submitted via Exchange.
- Must be submitted by the applicable deadline.
- Must be written in English.
- Must be submitted in Adobe PDF format unless stated otherwise.
- A control number will be issued when an applicant begins the Exchange application process. The control number must be prominently displayed on the top right corner of the header on every page.

- Page numbers must be included in the footer of every page.
- All pages must be formatted to fit on 8.5 x 11-inch paper with margins not less than one inch on every side. Use Calibri, Times New Roman, or Aptos typeface, black font color, and a font size of 11 point or larger (except in figures or tables, which may be 10-point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirements still apply.
- Must not exceed the specified maximum page limit when printed using the formatting requirements.
- All proprietary information must be marked following the guidance below.

Proprietary Information

Applicants should not include trade secrets or commercial or financial information that is privileged or confidential in their proposals, unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in this solicitation. Proposals that contain trade secrets or commercial or financial information that is privileged or confidential and that the applicant does not want disclosed to the public or used by the government for any purpose other than proposal evaluation must be marked as described below.

A cover sheet (preceding the title page), which does not count against the page limits, must be marked as follows and must identify the specific pages that contain trade secrets or commercial or financial information that is privileged or confidential:

> **Notice of Restriction on Disclosure and Use of Data:**
> Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is confidential and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the government. The government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains trade secrets or privileged commercial or financial information must be marked as follows:

“May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure.”

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets and highlighted in yellow.

The above-referenced markings enable DOE to follow the provisions of 10 C.F.R. §1004.11(d) in the event a Freedom of Information Act (FOIA) request is received for information submitted with a proposal. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under a FOIA request or otherwise. The U.S. government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose.

Subject to the specific FOIA exemptions identified in 5 U.S.C. §552(b), all information submitted to DOE by an applicant is subject to public release under the Freedom of Information Act, 5 U.S.C. §552, as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. It is the proposer's responsibility to review FOIA and its exemptions to understand:

1. What information may be subject to public disclosure.
2. What information applicants submit to the government that is protected by law.

In some cases, DOE may be unable to make an independent determination regarding which information submitted is releasable and which is protected by an exemption. In such cases, DOE will consult with the applicant in accordance with 10 C.F.R. §1004.11 to solicit the proposer's views on how the information should be treated.

Artificial Intelligence (AI) Application Use

Applicants must indicate in the project description of both the concept paper and full application the extent to which, if any, generative Artificial Intelligence (AI) technology was used and how it was used to develop the application or proposal.

All submissions to DOE are subject to information and disclosure statutes and regulations, including the Freedom of Information Act, Privacy Act, and 10 C.F.R. § 1004.11. Applicants are responsible for the accuracy, authenticity, and authorship represented of their proposal submission under consideration for merit review, including content developed with the assistance of generative AI tools. The applicant is responsible for ensuring that they are fully capable of performing the work described in the application and that the submission of the application does not and will not infringe or violate any rights of any third party or entity.

Applicants should be aware that the use of generative AI may introduce significant risks, including, but not limited to, research misconduct resulting from fabrication, falsification, or plagiarism when proposing, performing, or reviewing research, or in reporting research results. Federal regulations governing procedures for handling of research misconduct allegations concerning research supported by DOE grants, cooperative agreements, and management and operations (M&O) contracts, are specified in 10 § C.F.R. 733.

ii. Concept Papers

Applicants are required to submit the concept paper in Exchange no later than November 3, 2026, at 3 PM ET.

DOE will review the concept paper, and applicants will receive an official determination, "encourage" or "discourage". The intent is to help the National Labs focus their efforts on the concepts with the highest potential under this lab call. **Only labs that receive an "encourage" determination on the concept paper phase will be eligible submit a full application.**

The concept paper must conform to the following content and length requirements:

Title Page (1 page maximum)

- The Title Page is required to include the template table(s) provided in Appendix C.

Project Description (3 pages maximum)

- Describe the project in enough detail that it may be evaluated for its innovation, impact, and relevance to the topic and AOI objectives.
- Describe relevant background information that helps demonstrate the need for this project, including the problem statement or major challenges and barriers being overcome through the project and the approach to solving the problem.
- Develop a commercialization plan that outlines the approach towards maximizing impact of DOE funding on the relevant field and application.
- Describe how the proposed project, if successfully accomplished, would clearly meet the objectives stated in the lab call.
- Applicants may provide graphs, charts, or other data to supplement their project description.
- Provide an explanation of the starting and ending TRL and ARL. Please note there is a minimum starting TRL requirement of 4 for all proposals; however, there may be additional requirements in each of the program office topic or AOI descriptions, when listed.

Team and Required Resources (2 pages maximum)

- Describe the qualifications, skill, expertise, capabilities, and experience that the project team has to execute the project plan successfully. Describe any additional skills that may be needed.
- Explain whether the applicant has worked together with their teaming partner(s) on prior projects or programs.

- Explain whether the applicant has adequate access to equipment and facilities necessary to accomplish the effort or clearly explain how they intend to obtain access to the necessary equipment and facilities.

Addendum (No page limit)

- References.
- Letters of support are required from all third-party cost-share provider(s). Letters of support are encouraged by non-cost-sharing project partner(s), including partner labs. Letter(s) must include an explanation of why they are partnering on the proposal,1-page maximum per letter.
- For any proposals applying to subtopic b, provide evidence for eligibility of applying in this category.
- For proposals involving a LEEP fellow, include evidence of participating in LEEP (e.g., a copy of the selection memo, a letter of support from the LEEP node).
- No supplemental technical information or project information is allowed in this section.

Please note, a separate file titled "TS Concept Paper Template" can be found on Exchange under this lab call, containing the complete concept paper requirements in a template format.

iii. Full Applications

If labs receive an "encourage" determination from DOE at the concept paper stage, they are eligible to further expand their encouraged concept into a full application. **Only labs that receive an "encourage" determination on the concept paper phase will be eligible to submit a full application**. Full applications are required to be eligible for selection under this solicitation. Applicants are required to submit the full application materials in Exchange no later than March 1, 2027, at 3 PM ET.

Each full application shall be limited to a single concept. Unrelated concepts shall not be consolidated in a single full application.

Full applications must conform to the requirements below and contain a Technical Volume, Budget Spreadsheet, and Summary Slide.

Technical Volume

Please note, a separate file titled "TS Technical Volume Template" can be found on Exchange under this lab call, containing the complete Technical Volume requirements in a template format. The template also contains helpful examples when developing the full application.

Technical Volumes should be no more than 12 single-spaced pages total. Please refrain from fulfilling the full allotted page limit if not necessary. The Title Page and the Addendum of the Technical Volume do not contribute toward the 12-page limit. It is preferred that applicants use the headings corresponding to the bullet titles and content below. The Technical Volume must include the following sections:

Title Page (1 page maximum)

- The Title Page is required to include the template table(s) provided in Appendix C.

Glossary

- Spell out acronyms the first time they are used and add them to the glossary.

Executive Summary

- A short explanation of the proposed project.
- Clearly defined, easily communicated, end-of-project goal(s).
- A discussion on the impact that DOE funding would have on the proposed project, specifically explaining how DOE funding—relative to prior, current, or anticipated funding from other public and private sources—is necessary to achieve the project objectives.

Project Description

- Describe the project in enough detail that it may be evaluated for its innovation, impact, and relevance to the topic and AOI objectives.
- Describe the specific innovation of the proposed project, the advantages over current and emerging processes, and the overall impact on advancing the baseline if the project is successful.
- Describe relevant background information that helps demonstrate the need for this project, including the problem statement.
- Include a brief explanation of why DOE TCF Base funding is necessary to achieve the objectives of the proposal.
- If applicable, indicate whether the project is related to other current or recently completed DOE-funded, lab-funded, or externally funded projects, and how they differ.
- Provide justification for the optimal budget proposed. Please provide justification for the cost-share amount.
- Long-Term Viability
    - Please include the project plan for impact without long-term, continued, direct funding from DOE. If the project is successful, include how it could continue or be maintained after receiving DOE funding if applicable.

Potential Commercialization Advances

- Identify root causes (inside and outside of the labs) of the existing commercialization challenges and barriers that, if addressed, will result in significant advances for commercializing the technology.
- Describe the expected path for the proposed project toward commercialization successes, including the anticipated timeline for market entry or increased market adoption for technologies involved in the proposal.
    - Discuss how the technology solves a market need (e.g., lower energy costs, lower operational costs, faster algorithms, creation of a new supply chain, solves a known problem with no known solution yet, etc.).
    - Provide justification on the starting and ending TRL and ARL.
        - Note: TRL and ARL values should be provided quantitatively as a number, not qualitatively nor as a range.
- Identify and address key risks to achieving stated goals and the steps to be taken to minimize or mitigate those risks.
- Identify and discuss key barriers to commercial adoption (e.g., barriers that relate to technology areas, market entry, supply chain, etc.) and how they can be overcome.

Project Metrics

- Describe how the proposed project would measure success during and after the period of performance, all projects must incorporate clear impact-tracking strategies.
- The metrics table is for metrics that measure impact and progress for the life of the project and the reporting period (five-year reporting period starting at the time of the award or for three years after the period of performance ends, whichever date is later). Consider short-, medium-, and long-term goals. Applicants should strive to include at least five metrics, and they should be specific, measurable, ambitious, relevant, and time-bound (SMART). The metrics table follows the definitions below:
    - Type: Activity, output, or outcome
    - Reporting Location: Quarterly reports, continuation applications, final reports, etc.
    - Minimum Frequency: What is the minimum frequency to measure or evaluate this metric? e.g., quarterly, four times over life of project, etc. Can indicate if only measured during specific tasks or subtasks.
    - Expected Frequency: What is the typical/expected frequency to measure or evaluate this metric? e.g., monthly, six times over life of project, etc. Can indicate if only measured during specific tasks or subtasks.

  - Project Target (Total): What is the target achievement for the metric? e.g., targeting five end users, three interns hired, etc. If something is additive, list the total for the end of the project.

- Acceptable outcome-focused metrics could include but are not limited to: 1) number of CRADAs or other partnering arrangements that come out of the labs, 2) number of licensed lab technologies, 3) number of tangible improvements to lab-related activities based on customer discovery, 4) private funds invested in solutions, 5) number and value of established industry and incubator partnerships, 6) number of inquiries for new partnerships, 7) innovation and IP generation, 8) annual revenue from commercialized technologies, etc.
- Unacceptable metrics include but are not limited to 1) general reports describing activities, 2) exploratory experiments that lack a goal, 3) unverifiable data, 4) time spent on project, 5) attending conferences, 6) producing papers and 7) other subjective, vague, or ambiguous metrics.
- Define each metric passing and failing criteria.
- *See Technical Volume template for examples*.

Work Plan

- List the key project tasks and provide brief descriptions for each task including approximate time to completion.
- When possible, tasks and subtasks should be SMART and tied to the project metrics.
- Please indicate which tasks would be taken away or added for the low- and high-budget scenarios.
- Some applicants may find it helpful to include a Gantt chart.
- *See Technical Volume template for examples of commercialization-focused tasks*.

Team and Required Resources

- Describe the proposed project team, including industry partners, and explain how the team is qualified and capable of successfully completing the project.
- Describe the expected resources (from each: prime lab, partner labs, cost-share partners, non-cost-share partners), including proposed work areas, and any facility/equipment needs. Include specific locations and laboratories to be used.
- Identify any areas where additional resources may be needed and the plan to address the gap(s).
- Include a description of each performer's role and responsibility, and their full-time equivalent (FTE). This table should include individuals from all involved parties.

Industry Partners:

- List industry partners and add the total project cost-share amounts (in-kind and cash) for each partner if applicable.

Subcontracting Entities:

- List name of subcontracting companies and entities or services provided.

Addendum (No page limit)

- References.
- Team Resumes. Resumes of key project participants must be included and should not exceed one page per participant.
- Letters of commitment are required from all third-party cost-share provider(s) and project partner(s). Letter(s) of commitment must include an explanation of why they are partnering on the proposal; 1-page maximum per letter.
- For any proposals applying to subtopic b, provide evidence for meeting the cost-share requirements in this category.
- For proposals involving a LEEP fellow, include evidence of participating in LEEP (e.g., a copy of the selection memo, a letter of support from the LEEP node).
- Letter(s) of support from lab technology transfer officer (TTO) if the proposal is not submitted by a TTO and if the letter is not emailed to TCF@hq.doe.gov.
- No supplemental technical information or project information is allowed in this section.

Budget Spreadsheet

For this lab call, DOE requires that all applicants provide a low, optimal, and high-budget level with the associated tasks and scope outlined at each proposed budget level in order to expedite project awardee negotiations. **The low budget should be at least 20% less than the optimal funding, and the high budget should be at least 20% more than the optimal funding requested.**

The Budget Spreadsheet is a separate file which should be included in the application. There is a template that should be used for the budget spreadsheet, and it can be found on Exchange under this lab call, "TS Budget Template." All sections should be filled out according to the instructions in the spreadsheet.

During the review and selection process, DOE reserves the right to negotiate an award with a modified project scope and budget. See Appendix A for additional cost-share information and requirements.

Summary Slide

The summary slide is a separate file which should be included in the application. Format the slide to be in Widescreen slide size (e.g., 16:9 ratio, not Standard 4:3 ratio) and submit the file as a PowerPoint file. It must not exceed one PowerPoint slide, and it must be suitable for dissemination to the public. This slide must not include any proprietary or business-sensitive information because DOE may make it available to the public if the proposal is selected for award. The summary slide requires the following information:

- Proposal title, prime lab, partner lab(s), Principal Investigator (PI) name(s), topic(s), subtopic(s), AOI(s).
- A proposal summary.
- A description of the proposal's impact and goals.
- A brief explanation of why DOE TCF funding is necessary to achieve the objectives of the proposal.
- State the requested optimum-level of federal funding, proposed cost-share amount, total project budget, and period of performance (months).
- Key graphics and images (illustrations, charts, and tables).

VI. Merit Review and Selection

i. Concept Paper Merit Review

Concept papers are evaluated based on consideration of the following factors. All sub-criteria are of equal weight.

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

This criterion involves consideration of the following factors:

- The applicant clearly describes the project in enough detail that it may be evaluated for its innovation, impact, commercialization potential, and relevance to meeting the lab call objectives.
- The applicant clearly describes relevant background information that helps demonstrate the need for this project, including the problem statement or major challenges and barriers being overcome through the project (both technical and commercialization related), and the approach to solving the problem.
- The applicant clearly identifies the topic(s), AOI(s), and subtopic for which they are applying and how they meet the required elements of the subtopic and topic(s)/ AOI(s) when applicable.
- The applicant has shown the impact that DOE TCF funding and the proposed project would have on the relevant field and application.

- The applicant has the qualifications, experience, capabilities, and other resources necessary to complete the proposed project.

ii. Full Application Merit Review

Full applications are evaluated based on the following criteria (please note the weighting).

Criterion 1: Innovation and Commercial Impact (40%)

How innovative and impactful is the project, assuming the stated outcomes can be achieved as written?

This criterion involves consideration of the following factors:

- Relevancy—Extent to which the proposal is relevant to meeting the objectives of the lab call, the topic(s), and the AOI(s) to which the proposal is applicable to.
- Innovative—Extent to which the proposed project or solution is innovative. Degree to which the proposed project integrates market pull into its thinking and program design, forming a conduit of market insight and awareness.
- Impactful—Extent to which the proposed project or solution, if successful, impacts the core goals outlined in the lab call and the root causes (inside and outside of the labs) of the existing commercialization challenges and barriers. Proposals including multiple stakeholders (e.g., multi-lab and industry-leveraged effort) will be scored as inherently more impactful than single-lab projects. Proposals that are applicable to multiple DOE program offices/ topics and AOIs are inherently more impactful.
- Accelerates Speed of Commercialization—Degree to which the proposal has the potential to accelerate the speed of commercialization. Degree to which the proposal supports achieving the statutory requirement of the TCF to "promote promising energy technologies for commercial purposes."
- Long-Term Viability—Degree to which the proposal has the potential to continue to be impactful after the project period of performance (without further DOE funding). Extent to which multi-year strategic partnerships are proposed or will be developed to continue the program beyond initial funding. Level of proposed cost-share for the project will be taken into consideration.
- Differentiated—Extent of differentiation with respect to existing commercialization or technology development efforts. Potential to enhance commercialization activities.
- Scalable—Likelihood that the proposed solution, if successful, could be scaled to have a broader impact.
- Commercialization Outcomes—Likelihood of the proposed solution achieving the proposed commercialization outcome metrics. Likelihood of the proposed team tracking and reporting on the commercialization outcome metrics.

- Cost-Share Commitment—Extent to which partners' interest and level of involvement is reflected in appropriate levels of proposed cost-share for the project will be taken into consideration.
- Evidence of Commercial Potential—Degree to which the proposal demonstrates both technology progress and market pull or interest. Extent to which the proposed technology will result in a commercially successful product or company. Extent to which the proposed technology can be successfully commercialized in a reasonable timeframe. Project starting and ending ARL will be considered.

Criterion 2: Quality and Likelihood of Completion of Stated Goals (35%)

Are the stated goals of the project SMART (specific, measurable, ambitious, relevant, and time-bound), and are they likely to be accomplished within the scope of this project? Is there a likelihood of success for the proposed project?

This criterion involves consideration of the following factors:

- Measurable—Degree to which the proposal is structured to produce a measurable result and impact. Extent to which the applicant shows a clear understanding of the importance of SMART, verifiable tasks.
- Risks mitigated—Extent to which the applicant understands and discusses the risks, core barriers, and challenges the proposed work will face, and the soundness of the strategies and methods that will be used to mitigate risks. Degree to which the proposal adequately describes how the team will manage and mitigate risks.
- Validated—Degree to which the project is applicable to one or multiple topics and/or AOI(s). Level of validation is demonstrated through letters of support/interest, partners, customer trials, data from prior work, report references, etc.
- Reasonable assumptions—Reasonableness of the assumptions used to form the execution strategy (e.g., lab staff participation, costs, throughput at full scale, speed of proposed scale-up or adoption, and mode of long-term funding).
- Reasonable budget—The reasonableness of the overall funding requested to achieve the proposed project and objectives. The completeness, reasonableness, and clarity of the budget and scope options (low, optimal, high). Level of proposed cost-share for the project will be taken into consideration.

Criterion 3: Collaboration and Capability of the Applicant and Project Team (25%)

Is the team well-qualified and positioned to successfully complete this project?

This criterion involves consideration of the following factors:

- Collaboration—Extent to which connections and alliances are forged to harness the power of regional economies, industry, state/local organizations, and other federal, state, or local agencies, etc.
- Capable—Extent to which the training, capabilities, experience, and level of participation of the assembled team will result in the successful completion of the proposed project. Extent to which this team (including proposed subrecipients) will be able to achieve the proposed results on time and to specification.
- Participation—The level of participation by project participants, as evidenced by letter(s) of commitment demonstrating cost-share and how well they are integrated into the work plan. Degree to which multi-lab, internal National Lab, and external collaboration is proposed.
- Team Quality—Extent to which the final team required to complete this project is fully assembled and committed to the project (e.g., are there any key members that are "to be hired" in the future?). Level of proposed cost-share for the project will be taken into consideration.
- Past Performance—Extent to which the assembled team has shown success in the past. Note: new performers will not be penalized. DOE encourages new entrants and new ideas, but past successes and failures will be noted.
- Access—Extent to which the team has access to facilities, equipment, people, expertise, data, knowledge, and other resources required to complete the proposed project.

iii. Selection for Negotiation

Selection of proposals will be determined based on available funding and input from DOE. In general, DOE will use data and other information contained in proposals for evaluation purposes only, unless such information is generally available to the public or is already the property of the government.

DOE carefully considers all information obtained through the selection process. DOE may select or not select a proposal for negotiations. DOE may also postpone a final selection determination on one or more proposals until a later date, subject to availability of funds and other factors. DOE anticipates completing the selection process by Q4 FY27 (subject to change) with project start dates being no earlier than Q2 FY28 (subject to change). DOE will notify the prime National Lab TTO and PI electronically of selection results. All of DOE's decisions are final when communicated to applicants.

Type of Award Instrument: TCF awards will be documented and funded through OTC's work authorization and funds management processes within the Program Information Collection System (PICS) or another system. In contrast to the TCF funding process in prior years, appropriations will be transferred to a new Fund Value established for TCF and managed by OTC. The Budget and Reporting (B&R) structure of these transferred funds will

identify the original funding source. DOE facilities will be required to track federal funds in accordance with normal departmental processes. DOE facilities will also be required to track cost-share funds in accordance with established DOE facility accounting processes.

DOE will direct transfer funding to the prime and partner labs; lab-to-lab transfers should not be needed. All partnerships between the labs and outside partners must comply with individual lab requirements under their M&O contracts.

VII. Project Administration and Reporting

DOE has an obligation to report on TCF implementation and impact. As such, all projects must incorporate clear impact-tracking strategies. Projects selected for award are managed by the DOE facilities in accordance with their requisite policies and procedures. OTC and participating DOE program offices will provide all required project oversight and engagement with TCF project recipients.

TCF project recipients will be required to report quarterly to OTC PICS or another specified system, at a minimum. DOE reserves the right to require more frequent reporting if necessary, depending on the project. Recipients will be required to submit a quarterly progress report and updated project spend (federal and cost-share) in PICS or another specified system. If multiple labs are participating in a project, then the prime lab will be responsible for all reporting.

TCF project recipients will be required to meet quarterly with OTC and supporting DOE program offices to discuss project progress, provide quarterly progress reports, and a final report at the end of the project. Annual metrics reporting is required for a five-year period starting at the time of award or for three years after the period of performance ends, whichever date is later.

Appendix A: TCF Cost-Share and Nonfederal Cost-Share Information

This lab call is subject to Section 988 of the Energy Policy Act of 2005 regarding cost-share. DOE prefers all funded projects to meet this 50% of the total project cost-share fund requirement; however, DOE acknowledges that some potentially high-impact proposed projects may not be able to meet this requirement. In this case and following the requirements by topic below, labs may still apply with less than 50% nonfederal cost-share so that DOE can see the full universe of high-quality proposals. The scoring criteria reflect that higher levels of cost-share mitigate the risk of commercializing earlier stage technologies.

DOE has approved a Cost-Share Waiver for subtopic b of this lab call, to ensure all project ideas can apply and the most impactful mix of projects can be selected.

Each proposal that applies to a subtopic (a) commits to meet the minimum 50% of total project cost-share funds requirement.

Each proposal that applies to subtopic (b) may propose to meet less than the 50% of total project cost-share funds requirement. Further details on the eligibility criteria for subtopic b are listed in the cost-share section of the lab call (see Section III.iv).

Cost-share funds are subject to audit by the Department or other authorized government entities (e.g., General Accounting Office). A written agreement may be advisable—either between the DOE Facility and the third party or between the CRADA partner and the third party—that requires the third party to provide the cost-share funds. Consult your DOE lab legal staff for advice about how to obligate the third party to provide the cost-share funds, and to ensure the cost-share funds meet the requirements for in-kind contributions, if applicable.

Labs are expected to put a process in place to ensure cost-share commitments are met over the course of a project to avoid the situation where federal funds have been largely exhausted prior to the laboratory partner providing a significant portion of the cost-share. The lead DOE lab, in conjunction with other participating labs, as applicable, are responsible for assuring cost-share commitments documented in the proposal/SOW are met. Pursuant to cost-share requirements, any cost-share not otherwise waived shall be provided by a non-Federal source. It is acknowledged that Government-Owned Government-Operated (GOGO) labs do not have access to non-Federal funds other than from the non-Federal partner.

Subcontracting support services to a cost-share partner are allowed as long as the cost-share requirements are met, and they follow both DOE and the respective lab(s) policies

and procedures. If a cost-share partner is also the subcontractor, then the work being subcontracted will be evaluated during the application review.

OTC has no policy regarding foreign expenditures. All relevant laws, DOE directives, and contractual obligations apply. Consult your DOE lab's legal staff for advice about foreign partners and agreements with the DOE lab.

Applicants must make sure their prospective partnership arrangements comply with individual lab requirements under their M&O contracts.

DOE will not allow pre-award costs (e.g., establishment of a CRADA between the cost-share partner(s) and the prime lab).

WHAT QUALIFIES FOR NONFEDERAL COST-SHARE

Please consult the Federal Acquisition Regulations for the applicable cost-sharing requirements. In addition to the regulations referenced above, other factors may come into play, such as timing of in-kind contributions and length of the project period. For example, the value of 10 years of donated maintenance on a project that has a project period of five years would not be fully allowable. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted.

As stated above, the rules about what is allowable are generally the same within like types of organizations. The following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

A. Acceptable contributions. All contributions, including cash contributions and third-party in-kind contributions, must be accepted as part of the prime recipient's nonfederal cost-share if such contributions meet all of the following criteria:
1) They are verifiable from the recipient's records.
2) They are not included as contributions for any other federally assisted project or program.
3) They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.
4) They are allowable under the cost principles applicable to the type of entity incurring the cost.
5) They are not paid by the federal government under another award unless authorized by federal statute.
6) They are provided for in the approved budget.

B. Valuing and documenting contributions.
1) Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which means amounts chargeable to the project are determined on the basis of costs incurred.

For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as nonfederal cost-share funds, that full value must be the lesser of the following:

   a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
   b. The current fair market value. If there is sufficient justification, the contracting officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The contracting officer may accept the use of any reasonable basis for determining the fair market value of the property.

2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided the services are for the same skill level for which the employee is normally paid.
3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as nonfederal cost-share if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.
4) Valuing in-kind contributions by third parties.
   a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the nonfederal cost-share must be reasonable and must not exceed the fair market value of the property at the time of the donation.
   b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the contracting officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately owned building in the same locality.
ii. The value of loaned equipment must not exceed its fair rental value.

5) Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:
   a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.
   b. The basis for determining the valuation for personal services and property must be documented.

Appendix B: TCF Points of Contact at DOE National Lab TTOs

Facility	TCF Points of Contact
Ames National Laboratory	Julienne Krennrich jmkrenn@ameslab.gov 515-294-1202 Beth Pieper pieper@ameslab.gov 515-294-6486
Argonne National Laboratory	Hemant Bhimnathwala hbhimnathwala@anl.gov 630-252-2354 David McCallum dsm@anl.gov 630-252-4338 Benjamin Recchie brecchie@anl.gov Ilya Kats ikats@anl.gov Matthew Winter mwinter@anl.gov 630-252-4495 Greg Halder halder@anl.gov
Brookhaven National Laboratory	Poornima Upadhya pupadhya@bnl.gov 631-344-4711 Vanessa Miller vmiller@bnl.gov 631-344-5981 Eric Loveridge eloveridg@bnl.gov

Facility	TCF Points of Contact
Fermi National Accelerator Laboratory	Whitney Hastings whasting@fnal.gov 630-840-3957
Idaho National Laboratory	Danielle Ferreira danielle.ferreira@inl.gov 845-537-7602
Kansas City National Security Campus	Andy Myers amyers@kcnsc.doe.gov 816-488-4432
Lawrence Berkeley National Laboratory	Shanshan Li shanshanli@lbl.gov 510-486-5366 Todd Pray tpray@lbl.gov 510-486-6053 Gail Chen gailchen@lbl.gov Jasbir (Jesse) Kindra jkindra@lbl.gov
Lawrence Livermore National Laboratory	Hannah Farquar farquar3@llnl.gov Matthew Garrett garrett29@llnl.gov
Los Alamos National Laboratory	MaryAnn D. Morgan mary_ann@lanl.gov 505-667-5324 Andrea Maestas andream@lanl.gov 505-667-1230 James Zahler jzahler@lanl.gov
National Energy Technology Laboratory	Christy Pecyna christy.pecyna@netl.doe.gov proposal-coordination@netl.doe.gov

Facility	TCF Points of Contact
National Laboratory of the Rockies	Jennifer Fetzer jennifer.fetzer@nlr.gov 303-275-3014 Eric Payne eric.payne@nlr.gov 303-275-3166
Nevada National Security Sites	Matthew Pasulka pasulkmp@nv.doe.gov 702-295-2963 Matthew Fritz fritzmf@nv.doe.gov 702-295-1705
Oak Ridge National Laboratory	Susan Ochs ochssm@ornl.gov 865-241-7387 Jennifer Caldwell caldwelljt@ornl.gov 865-574-4180
Pacific Northwest National Laboratory	Christina Lomasney-Mattis christina.lomasney@pnnl.gov 509-372-4773 Rachel Thompson rachel.thompson@pnnl.gov 509-371-6725
Pantex Plant	Caleb Heltenberg caleb.heltenberg@pantex.doe.gov 806-573-5263 Brenda Dillard brenda.dillard@pantex.doe.gov 806-573-7424
Princeton Plasma Physics Laboratory	Chris Wright cwright@pppl.gov 609-243-2425 David Zimmerman dzimmerm@pppl.gov 609-423-9947

Facility	TCF Points of Contact
Sandia National Laboratories	Mary Monson mamonso@sandia.gov 505-844-3289 Monica Martinez monmart@sandia.gov 505-844-6131 Lily Shain lshain@sandia.gov 505-525-5112
Savannah River National Laboratory	Daren Timmons daren.timmons@srnl.doe.gov 803-989-5854
SLAC National Accelerator Laboratory	Despina Milathianaki despina@slac.stanford.edu Alex Rousina-Webb alexrw@slac.stanford.edu
Thomas Jefferson National Accelerator Facility	Mariana Goldin mgoldin@jlab.org Marla Schuchman marla@jlab.org 757-269-7566 David Perkins dperkins@jlab.org Butler LaTryce latryce@jlab.org
Y-12 National Security Complex	Daniel Riddick daniel.riddick@y12nsc.doe.gov Grant Allard grant.allard@y12nsc.doe.gov

Appendix C: Title Page Template

Control Number	
Project Title	
Prime Lab	
Partner Lab(s)	
Lab Call Topic(s) (e.g., CMEI)	
Lab Call Area(s) of Interest	
Lab Call Sub-topic (a or b)	
Principal Investigator(s) Name(s)	
Principal Investigator(s) Email(s)	
Cost-Share Partner(s)	
Cost-Share Type (cash, in-kind, both, none)	
Cost-Share Amount	
Requested DOE Funding Amount	
Total Project Budget	
Period of Performance (months)	
Collaboration with SBIR/ STTR awardee? If yes, indicate award type, phase, and agency.	
Collaboration with LEEP innovator? (yes or no)	
Past Participation in DOE Energy I-Corps (EIC) or NSF I-Corps? If yes, provide team name, year, and Topic 1, 2, and/or 3 (for DOE EIC).	
ARL Start (enter number between 1–9)	
ARL End (enter number between 2–9)	
TRL Start (enter number between 4–9)	
TRL End (enter number between 4–9)	
Nonproprietary Project Summary suitable for public release (150 words or less):	