

U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy

**Industrial Efficiency and Decarbonization Office, Advanced Materials and
Manufacturing Technology Office, Building Technologies Office, and Office of
Technology Transitions**

**NATIONAL LABORATORY CALL FOR REDUCING
EMBODIED CARBON AND OPERATIONAL ENERGY
ACROSS THE BUILT ENVIRONMENT**

National Lab Funding for Fiscal Year 2023
DE-LC-0000020

This lab call is being jointly issued by the U.S. Department of Energy’s (DOE) Office of Energy Efficiency and Renewable Energy’s (EERE) Industrial Efficiency and Decarbonization Office (IEDO), Advanced Materials and Manufacturing Technology Office (AMMTO), Building Technologies Office (BTO) and the Office of Technology Transitions (OTT).

Technology Commercialization Fund – Base Annual Appropriations

Key Information	
Laboratory Call Issue Date	April 17, 2023
Informational Webinar	May 23, 2023, 2:00 PM (ET)
Submission Deadline for Full Applications	June 30, 2023, 5:00 PM (ET)
Expected Merit Review Completion Date	Topic 1–4: July 21, 2023 Topic 5: July 14, 2023
Expected Replies to Review Comments Due Date	Topic 1–4: July 26, 2023 Topic 5: July 19, 2023
Expected Dates for EERE Selection Notifications	August 04, 2023, 5:00 PM (ET)
Means of Submission	EERE Exchange
Cost-share Requirement	50% cost-share is required for Topics 1-4; waived for Topic 5.
Eligible Entity	U.S. Department of Energy and National Nuclear Security Agency National Laboratories

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List of Topics

Topic 1: Greener Buildings and Building Materials with Reduced Embodied Carbon

Topic 2: Advanced Electronics, Sensors, and Controls for Lower-Energy Buildings

Topic 3: Thermal Energy Storage and Waste Heat Recovery Technologies

Topic 4: Advanced Heat Pump Component Technologies

Topic 5: National Lab Developed IP Technology Maturation and Commercialization Projects Utilizing the Lab Embedded Entrepreneurship Program

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Table of Contents

Lab Call Modification(s) History	5
I. Lab Call Description.....	6
A. Background and Context	6
i. Background, Overview, and Purpose	6
ii. Timeline and Process Logistics	8
Timeline.....	8
Process Logistics.....	8
B. Key Considerations and Topic Area(s)	9
i. Key Considerations.....	9
ii. Topic Area Descriptions.....	12
Topic 1: Greener Buildings and Building Materials with Reduced Embodied Carbon	14
Topic 2: Advanced Electronics, Sensors, and Controls for Lower-Energy Buildings	15
Topic 3: Thermal Energy Storage and Waste Heat Recovery Technologies	16
Topic 4: Advanced Heat Pump Component Technologies.....	17
Topic 5: National Lab Developed IP Technology Maturation and Commercialization Projects Utilizing the Lab Embedded Entrepreneurship Program	18
iii. Teaming Partner List	19
II. Application Submission and Review Information	20
A. Application and Submission Details.....	20
i. Application Process	20
ii. General Proposal Requirements	21
iii. Proposal Content.....	21
Full Applications	21
Technical Volume.....	22
Project Diversity, Equity, Inclusion, and Accessibility (DEIA) Activities	27
Items to be submitted with the application not counted towards the page limit:	28
References	28
Resumes	28
Letters of Commitment.....	28
Summary/Abstract for Public Release	28

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 subject line.*

Summary Slide	28
Treatment of Application Information.....	29
B. Application Review Details.....	30
i. Merit Review and Selection Process	30
ii. Merit Review Criteria	30
Full Applications	30
iii. Selection for Award Negotiation	34
iv. Selection Notification	34
vi. Questions and Agency Contacts	34
C. Project Administration and Reporting	34
Appendix A: Full Application Timeline/Budget	36
Appendix B: Lab Call Full Application AOP Worksheet	37
Appendix C: Cooperative Research and Development Agreements (CRADAs) and Cost-Sharing Agreements.....	44
Appendix D: TCF Points of Contact at DOE National Lab TTOs.....	48

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Lab Call Modification(s) History

All modifications to the Lab Call are **HIGHLIGHTED** in the body of the Lab Call.

Mod. No.	Date	Description of Modification
01	5/10/2023	Update Informational Webinar date from May 10 to May 23
02	5/23/2023	Updated Key Information Table and Timeline Table to include Expected Merit Review Completion Date and Expected Replies to Review Comments Due Date; added Note to Topic Area Descriptions to specify Maximum Project Budget based on Number of Offices to which the Project is Responsive; removed Work Proposal and FFRDC Authorization proposal requirements.

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I. Lab Call Description

A. Background and Context

i. Background, Overview, and Purpose

The Advanced Materials & Manufacturing Technologies Office (AMMTO), the Industrial Efficiency and Decarbonization Office (IEDO), and the Buildings Technologies Office (BTO), in collaboration with The Office of Technology Transitions (OTT), are interested in jointly funding Technology Commercialization Fund (TCF) programs in Fiscal Year 2023 (FY23) that reduce embodied energy/carbon of materials and processes, as well as operational energy across the built environment, including residential, commercial, and industrial settings. The current funding portfolios of these offices can be found on the [AMMTO and IEDO web site](#) and the [BTO web site](#).

The activities to be funded under this lab call will support the government-wide approach to the climate crisis by commercializing advanced materials and energy systems/processes within the built environment that can lead to the deployment of clean energy and decarbonization technologies critical for climate protection. Collaborative projects are sought with industrial partners that pursue advancement towards commercialization of mid-TRL manufacturing innovations (\geq TRL 4; verification and validation in laboratory environments) based on lab-based developed IP. Selected projects may be supported for stages up to manufacturing scale-up and execution of a business plan on advanced materials, manufacturing, and decarbonization technologies that lower the embodied carbon (greener) and/or operational carbon (lower-energy) of residential, commercial, and industrial buildings and facilities. Specifically, project proposals must enable promising energy technologies toward commercialization with application in at least one of five broad [Topics](#):

- 1) Greener buildings and building materials with reduced embodied carbon
- 2) Advanced electronics, sensors, and controls for lower-energy buildings
- 3) Thermal energy storage and waste heat recovery technologies
- 4) Advanced heat pump component technologies
- 5) National lab developed IP technology maturation and commercialization projects utilizing the Lab Embedded Entrepreneurship Program (LEEP)

Proposals must have application in the Areas of Interest (AOIs) described in at least one of the topical areas listed in this lab call (see [Sec. I.B.ii](#)).

The Technology Commercialization Fund (TCF) is part of a broad array of activities that the Department of Energy (DOE) and its National Laboratories undertake to ensure Federal research and development (R&D) investments in technologies with commercial potential find their way to a viable market. TCF was established in the Energy Policy Act

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of 2005 and amended in Energy Act 2020,¹ which states that 0.9% of DOE's applied energy research, development, demonstration, and commercial application funding be made available to promote promising energy technologies for commercial purposes.

This was further refined when the TCF was recently reauthorized as part of EA 2020, described below:

“The Secretary, acting through the Chief Commercialization Officer established in section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391(a)), shall establish a Technology Commercialization Fund (hereafter referred to as the ‘Fund’), using nine-tenths of one percent of the amount of appropriations made available to the Department for applied energy research, development, demonstration, and commercial application for each fiscal year, to be used to provide, in accordance with the cost-sharing requirements under Section 988, funds to private partners, including national laboratories, to promote promising energy technologies for commercial purposes.”²

Through TCF, the DOE's applied energy technology offices (e.g., AMMTO, IEDO, and BTO) and the DOE National Labs can pursue a strategic, forward-looking, competitive approach to commercializing DOE National Lab-developed intellectual property (IP). This process better enables DOE National Labs to prepare and mature these technologies for commercial adoption, identify the highest-quality prospective partners, and assist those industry partners in evaluating technologies for their business models. Potential benefits of this approach include:

1. Creating a stronger incentive for DOE National Labs to identify both their most promising technologies for commercialization and industry partners
2. Empowering a broader set of potential industry partners to engage with DOE National Labs
3. Enabling DOE National Labs to identify a commercialization pathway for their technologies that have strong potential
4. Promoting DOE National Lab technologies that cut across DOE's Program Offices and technology areas

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.

² Consolidated Appropriations Act, 2021, Public Law 116–260, 116th Cong. (December 27, 2020), 134 Stat. 2597, Sec. 9003. <https://www.congress.gov/116/plaws/publ260/PLAW-116publ260.pdf>.

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Projects funded under the TCF program MUST work towards commercializing a lab-developed technology and must involve a domestic industry partner. Thus, the technology must be matured to a point where a business will enter either a (preferred) Cooperative Research and Development Agreement ([CRADA](#)) or some other sufficiently described specific agreement type (e.g., licensing the technology). Although only DOE/NNSA National Labs can respond to this lab call, these facilities can subcontract with non-DOE partners. The following restrictions apply:

1. The selected projects must include private/industry partners.
2. The selected projects are required to promote promising energy technologies for commercial purposes.
3. The projects are subject to a 50% cost-share requirement, except where cost share is waived (see [Appendix C](#)).

ii. Timeline and Process Logistics

Timeline

KEY DATES	
Lab Call Release Date:	April 17, 2023
Informational Webinar for Lab Call Overview	May 23, 2023, 2:00 PM ET
PROPOSAL DEADLINE AND DECISION DATES	
Full Application Submission Deadline(s):	June 30, 2023, 5:00 PM ET
Expected Merit Review Completion Date	Topic 1–4: July 21, 2023 Topic 5: July 14, 2023
Expected Replies to Review Comments Due Date	Topic 1–4: July 26, 2023 Topic 5: July 19, 2023
Expected Dates for EERE Selection Notifications	August 04, 2023, 5:00 PM ET
Expected Beginning Award Issue Date(s):	September 01, 2023

Process Logistics

All communication regarding this lab call must use jointFY23TCF@ee.doe.gov.

- **PROPOSAL SUBMISSIONS:** To apply to this lab call, lab Technology Transfer Office (TTO) personnel must register (and sign in) with their lab email address and submit application materials through EERE Exchange. Application materials must be submitted through EERE Exchange at <https://eere-exchange.energy.gov>, EERE's online application portal. Frequently asked

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questions for this lab call and the EERE Application process can be found at <https://eere-exchange.energy.gov/FAQ.aspx>.

Applicants are responsible for meeting the submission deadlines. EERE strongly encourages all applicants to submit the required information at least 24 hours in advance of the submission deadline. Applicants should not wait until the last minute—internet and data server traffic can be heavy in the last hours before the submission deadline, which may affect the applicants' ability to successfully submit the required information before the deadline.

- **QUESTIONS DURING OPEN LAB CALL PERIOD:** Specific questions about this lab call should be submitted via e-mail to jointFY23TCF@ee.doe.gov. The program offices will provide answers related to this lab call on EERE Exchange at: <https://eere-exchange.energy.gov/FAQ.aspx>. Please note that you must first select the specific opportunity number for this lab call in order to view the questions and answers specific to this lab call. EERE will attempt to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov. To ensure fairness for all lab participants, please do not ask individual DOE staff questions directly.

- **NOTIFICATION OF SELECTION:** When selections are finalized, lab TTO leads will receive an email from jointFY23TCF@ee.doe.gov.

B. Key Considerations and Topic Area(s)

i. Key Considerations

- **AVAILABLE FUNDING:** There is approximately \$6,200,000 in funding available to fund all projects solicited in this lab call, subject to appropriations and program direction considerations.
- **COST-SHARE:** This lab call is subject to Section 988 of the Energy Policy Act of 2005 regarding cost-share and thus a 50% cost share is required for topics 1–4. DOE has approved a Cost-Share Waiver to eliminate cost share for topic 5 of this lab call. The final cost-share requirements for each proposed project will be set at the time of selection and can only be adjusted following modification process and requires DOE approval. Cost-share requirements will be established on a budget period basis during project negotiations and prior to final project award. More information may be found in [Appendix C](#).

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- **EXISTING CRADAS AND FOA AWARDS:** The call for proposals below should NOT be construed as requiring the renegotiation of an existing CRADA or previously competed FOA award in which the lab is a prime or sub-recipient. DOE National Labs with CRADAs or FOA awards addressing any of the topic areas below may incorporate that work in proposals they submit in response to the lab call to demonstrate existing capability and leverage existing partnerships with industry and other partners. In other words, applicants with active projects may apply so long as a new scope of work is proposed that meets the intent of this lab call. It is at the program office’s discretion of what that could mean (e.g., a phase II effort, a different market, etc.), but the intention is that applicants cannot use this lab call to ask for additional funding on an existing project. If the proposal is not selected for funding under this lab call, the work under the existing CRADA or FOA award will continue—there is no additional risk to the provision of DOE funding.
- **ELIGIBILITY:** All DOE/National Nuclear Security Agency (NNSA) National Laboratories/Sites, are eligible to submit proposals as prime awardees, unless specified otherwise. All TCF proposals must be routed through the respective lab’s Technology Transfer Office (TTO). Proposals that involve more than one laboratory are also allowed. Applicants are eligible for multiple awards under this solicitation. Multiple DOE Facilities may partner together on a single proposal. There are no limits on the allowable number of applications submitted by a lab.

All proposals must include a domestic industry partner.

Excluded are applicants with currently active projects seeking additional funding to complete their original scope of work. Note, such applicants may apply so long as a new scope of work is proposed that meets the intent of this lab call. It is at the project office’s discretion of what that could mean (e.g., a phase II effort, a different market, etc.), but the intention is that applicants cannot use this lab call to ask for additional funding on an existing project (see [Sec. I.B.i.](#)).

- **DIVERSITY, EQUITY, INCLUSION, and ACCESSIBILITY (DEIA):**
It is the policy of the Biden Administration that:

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[T]he Federal Government should pursue a comprehensive approach to advancing equity³ for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments, and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity.

By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.⁴

As part of this whole of government approach, this lab call seeks to encourage the participation of underserved communities and underrepresented^{5,6} groups. Applicants are highly encouraged to include individuals from groups historically underrepresented, in STEM on their project teams. As part of the application,

³ The term “equity” means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. E.O. 13985.

⁴ Executive Order 13985, “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” (Jan. 20, 2021).

⁵ According to the National Science Foundation’s 2019 report titled, “Women, Minorities and Persons with Disabilities in Science and Engineering”, women, persons with disabilities, and underrepresented minority groups—blacks or African Americans, Hispanics or Latinos, and American Indians or Alaska Natives—are vastly underrepresented in the STEM (science, technology, engineering, and math) fields that drive the energy sector. That is, their representation in STEM education and STEM employment is smaller than their representation in the U.S. population. <https://nces.nsf.gov/pubs/nsf19304/digest/about-this-report> For example, in the U.S., Hispanics, African Americans and American Indians or Alaska Natives make up 24 percent of the overall workforce, yet only account for 9 percent of the country’s science and engineering workforce. DOE seeks to inspire underrepresented Americans to pursue careers in energy and support their advancement into leadership positions. <https://www.energy.gov/articles/introducing-minorities-energy-initiative>

⁶ Note that Congress recognized in section 305 of the American Innovation and Competitiveness Act of 2017, Public Law 114-329:

(1) [I]t is critical to our Nation’s economic leadership and global competitiveness that the United States educate, train, and retain more scientists, engineers, and computer scientists; (2) there is currently a disconnect between the availability of and growing demand for STEM-skilled workers; (3) historically, underrepresented populations are the largest untapped STEM talent pools in the United States; and (4) given the shifting demographic landscape, the United States should encourage full participation of individuals from underrepresented populations in STEM fields.

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applicants are required to describe how diversity, equity, inclusion, and accessibility objectives will be incorporated in the project. Specifically, applicants are required to reference, if available, the existing laboratory DEIA Plan and describe within the technical volume the actions the applicant will take to foster a welcoming and inclusive environment, support people from underrepresented groups in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be in, or benefit underserved communities (see [Project DEIA activities](#)). Because a diverse set of voices at the table in research design and execution has an illustrated impact on innovation, this implementation strategy for the lab-wide plan will be evaluated as part of the technical review process.

Further, Minority Serving Institutions, Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community that meet the eligibility requirements are encouraged to participate in an application as a proposed partner to the prime applicant. The Selection Official may consider the inclusion of these types of entities as part of the selection decision. For more information on how these impact scoring, please refer to [Section II.2.B.ii](#).

- **EERE NATIONAL LABORATORY GUIDING PRINCIPLES:** To ensure continued alignment with EERE lab engagement principles, applicants should consider the following when developing their proposals:
 - AMMTO, IEDO, and BTO strongly encourage projects that bring together multiple DOE National Labs in a consortia-based approach to meet a high-level strategic goal, leveraging multiple lab capabilities with strong, centralized leadership.
 - AMMTO, IEDO, and BTO seek lab projects that involve industry engagement or industry partners.

ii. Topic Area Descriptions

The application must address what the project intends to accomplish in terms of advancing the technology's readiness for commercialization. Applications must 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. The pathway for the technology beyond TCF funding should also be clearly identified for proposals in this topic. Applications should identify any risks associated with commercializing the technology and the ways the proposed

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project will mitigate the risks involved. Examples of evidence of technology progress include:

- Demonstrated analytical and experimental proof of concept in a laboratory environment.
- Experiments or modeling and simulation validating the functional performance of the technology.

Examples of evidence of market pull or interest include:

- Market analysis demonstrating the technology's current or expected future cost and/or performance advantages vis-a-vis incumbent or competing technologies.
- Demonstrated interest from private industry partners or investors.

Applicant teams must include as part of their proposals results from completed market analyses, commercialization plans, and a technoeconomic analysis (TEA). Otherwise, awardees will be asked to submit refined or updated documents as project deliverables. Where relevant, a life cycle analysis (LCA) is also encouraged.

There must be a clear articulation that the project team, industry partners, and resources are qualified and capable of successfully completing the project. This includes articulating both the facility and private-partner roles, tasks, and activities throughout the project.

Proposals should describe which activities need to be undertaken to achieve the commercialization goals of the project. There must be a clear explanation of the current state of the technology, as well as the anticipated state of the technology at the end of the project. To the degree they can be anticipated, the applicant should explain any technical challenges and unanswered technical questions that must be addressed to reach commercialization of the technology. There should be an explanation of any complementary technology(ies) necessary for the proposed technology to function and to have relevance in the market.

Applications to the following topics, which will reduce embodied energy/carbon of materials and processes, as well as operational energy across the built environment, including residential, commercial, and industrial settings are of interest in this solicitation. Applicants should focus on one topic in their proposal.

Note: The table below reflects DOE's interest in funding multiple labs to address shared commercialization challenges for Topics 1 -- 4. Solutions responsive to a single office's

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mission space are of interest; however, to be selected for larger funding amounts, this table suggests that labs should address mission spaces of multiple or all three offices, where possible.

Number of Offices to which Project is Responsive	Maximum Project Budget
1	\$400,000
2	\$800,000
3	\$1,200,000

Topic 1: Greener Buildings and Building Materials with Reduced Embodied Carbon

- Estimated DOE Federal Funding: up to \$1,200,000 per award.
- Estimated Number of Projects Expected: 0–2
- Estimated Project Duration: 12–36 months.

Reducing the embodied carbon of buildings through strengthening materials circularity and leveraging advanced materials and manufacturing processes.

Areas of Interest (AOIs) for this Topic include:

- a) Use of recycled feedstock (concrete, cullet, etc.) and other circularity practices in the design of building materials/components/systems for re-use, repair, and remanufacturing, balanced with maximizing the energy savings performance of these materials/components/systems in the building.
- b) Additive manufacturing or other more sustainable fabrication/construction practices (having a lower carbon/energy footprint) to produce buildings or building materials/components/systems.
- c) Novel low-embodied carbon materials with lower direct (process) and/or indirect (energy) emissions to substitute for traditional materials with large carbon/energy footprints. The performance and durability of the new materials must be verified as equaling or exceeding those required in intended applications/uses. Example materials include (but are not necessarily limited to) nanocellulosics & other bio-based alternatives, cement & concrete, glass, plastics, and insulation.

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d) Recycled materials for appliances/equipment (oven, furnaces, washers, dryers, icemakers, refrigerators, etc.), especially recycled reinforced composites from wind turbine clean energy generation materials, industrial materials.

Topic 2: Advanced Electronics, Sensors, and Controls for Lower-Energy Buildings

- Estimated DOE Federal Funding: up to \$1,200,000 per award.
- Estimated Number of Projects Expected: 0–2
- Estimated Project Duration: 12–36 months.

Improving the hardware for systems that can increase the flexibility and control of building operational energy, including residential, commercial, and industrial settings.

Areas of Interest (AOIs) for this Topic include:

a) Innovations in microelectronics processors, sensors, controls, and wide bandgap (WBG) semiconductor-based power electronic systems with reduced size, complexity, weight, cost, and cooling requirements plus increased functionalities that support building energy management by enabling building energy loads (equipment, plug, lighting) to 1) operate more efficiently/“smartly”; 2) charge faster; 3) self-diagnose performance and functioning; 4) forecast energy needs; 5) characterize available flexibility; and/or 6) have embedded tools that provide capacity, energy, and ancillary services to the grid and/or system owner.

b) Adjustable speed industrial motor drives: more efficient variable frequency/speed drives, or VFDs/VSDs (inverters), for accurate speed and torque control and improved efficiency of AC electric motors and compressors in building systems such as heating, ventilation, and air conditioning (HVAC)/refrigeration systems, water management system pumps, elevators, fume hoods, machine tools, and other electrical equipment. This AOI excludes proposals involving improvements to the motor itself. Rather, this AOI is concerned with the power electronics and other electrical components that make up the controller and/or interface between the control signals and the motor.

c) Higher-reliability WBG power inverters/converters for distributed energy resources (i.e., grid-tied solar, micro-combined heat and power (CHP)) in residential, commercial, and industrial buildings, as well as distributed power systems (LLC converters) for data center power supplies to consume less energy and generate much less heat, which are Smart (two-way flow; can provide grid services; self-optimize performance; have millisecond response times; programmable; modular; adaptable; able to handle widely

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varying loads). Additionally of interest are power electronic hub systems to better control/manage bidirectional power flow between the various building subsystems (e.g., renewables, emergency generators, or energy storage systems) and the grid for improved energy efficiency and to assist in preventing supply and demand fluctuations.

Topic 3: Thermal Energy Storage and Waste Heat Recovery Technologies

- Estimated DOE Federal Funding: up to \$1,200,000 per award.
- Estimated Number of Projects Expected: 0–2
- Estimated Project Duration: 12–36 months.

Commercializing technologies that improve the ability to manipulate and store thermal energy, which has typically been generated on demand from fuel combustion and/or rejected to the environment as waste heat. Applicants should make clear if the proposed technology will be applicable for low-temperature (< 100°C), medium-temperature (100 to 400°C), or high-temperature (> 400°C) grade systems.

Areas of Interest (AOIs) for this Topic include:

- a) Waste Heat Recovery (WHR) – technologies focused on recovering, storing, and utilizing heat that is otherwise wasted in buildings or manufacturing operations. Example application areas include 1) Pod design⁷ and manufacturing for integrated heat pumps; 2) Materials and designs for recovering waste heat from high-temperature industrial processes; 3) Advanced technologies for more efficient electric generation from waste heat (low, medium, and high temperature); and 4) waste heat recovery to thermal energy storage in the building and/or integrate with HVAC and/or used for process heating.
- b) Thermal Energy Storage (TES) - Materials that enable greater TES and/or thermal energy flow in buildings or in manufacturing or industrial processes. Example application areas include 1) Equipment & Envelope Integrated Thermal Energy Storage, particularly around thermal switches and phase change material storage; 2) Thermally Anisotropic Building Elements (TABE); 3) advanced manufacturing processes to lower assembly costs and incorporating novel, low cost materials for improved heat transfer, including low-cost conductive polymers; 4) Industrial process heating integrated with TES, which may avoid inefficient conversion between thermal and electrical sources of energy; and 5) TES systems that can enable the utilization of low-cost, intermittent renewable

⁷ A ‘pod’ refers to a design principle that combines the equipment for both air and water conditioning into a single operational system that unlocks additional efficiencies and performance benefits.

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electricity by converting it into thermal energy (e.g., through resistive heating), store, and deploy as thermal energy (e.g., building heat) when needed, without requiring significant disruption of process operation.

Topic 4: Advanced Heat Pump Component Technologies

- Estimated DOE Federal Funding: up to \$1,200,000 per award.
- Estimated Number of Projects Expected: 0–2
- Estimated Project Duration: 12–36 months.

Improvements are needed to heat pump performance and applicability as well as lowering manufacturing costs. Components of interest include high- efficiency heat exchangers and compressors and potentially new materials, refrigerants, and non-refrigerant-based solutions (e.g., non-vapor compression solutions, functional materials):

Areas of Interest (AOIs) for this Topic include:

- a) Non-metallic heat exchangers – applicable for use in cooling electronics and other electrical appliances, as well as additive manufacturing processes.
- b) Compressors and vaporizers for low-global warming potential (GWP) and natural refrigerants - materials and components that can replace or eliminate the need for hazardous materials with high global warming potential. Example innovation areas include non-vapor compressors.
- c) Heat pump dehumidification - dehumidification is essential to comprehensive comfort cooling and reducing the energy demand of HVAC systems. By directly addressing dehumidification, HVAC systems can save energy by avoiding overcooling needed to overcome the delta-T of the ambient temperature. Example innovation areas include membrane development, ionic liquid desiccants and latent cooling systems.
- d) Thermoelectric heat pumps - improving the maximum heat loads of thermoelectric heat pumps for residential and/or commercial appliances. For example, hybrid thermoelectric (TE) clothes dryers, TE refrigeration systems that use DC electricity, and thermoelectric heat pump dishwasher with heat recovery.
- e) Industrial heat pumps - integration of IHP technology into existing industrial process heating systems, supplying heat at or below 200°C. Integration of IHPs in existing industrial processes with a systems approach. Research advances are required in all heat pump components, including better heat exchangers and compressors and potentially

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new materials, refrigerants, and non-refrigerant-based solutions (e.g., non-vapor compression solutions, functional materials).

Topic 5: National Lab Developed IP Technology Maturation and Commercialization Projects Utilizing the Lab Embedded Entrepreneurship Program

- Estimated DOE Federal Funding: \$750,000 per award.
- Estimated Number of Projects Expected: 0–1
- Estimated Project Duration: 12–24 months.

National lab developed IP technology maturation and commercialization projects leveraging the Lab Embedded Entrepreneurship Program (LEEP) Program to bring lab-developed IP to market must be directed at technology development and not yet at demonstration stage. Cost-share is not required for funds awarded under this topic alone. To be considered eligible for TCF funds, lab developed IP must be utilized as a core part of the technology project and must be relevant to the mission spaces of IEDO, AMMTO, or BTO. Lab IP must be identified in submitted applications to be funded under this lab call. Cross-Office overlap is highly preferred. The proposed activities should integrate with and leverage the existing LEEP node programs, located at LBNL, ANL, ORNL, and NREL.

Areas of Interest (AOIs) for this Topic include:

- a) Base Project -- Base projects focus on National lab developed IP technology maturation and commercialization leveraging the LEEP Program. Project can include funds for a maximum of two fellowships to fund the innovator's time executing the project and for lab staff time and resources to promote the promising energy technology toward commercialization. The fellowships will be funded via the Oak Ridge Institute for Science and Education (ORISE). Proposals must include consideration for handling two possible scenarios for new LEEP projects:
 - 1) all relevant IP being commercialized through the LEEP project is owned by one or more national laboratories, in which case project activities and funding will be specified through an AOP; and
 - 2) some portion of relevant IP being commercialized through the LEEP project is owned by an outside entity, in which case a CRADA between the national lab and the innovator's associated start-up for completing the project as part of LEEP will be required. TCF funds can only be used to fund the national lab and cannot be used to fund the innovator's associated start-up company. TCF funding provided for the CRADA must be of equal value to funding provided by DOE offices (i.e., excluding any matching funds provided by the labs) for standard CRADAs in the LEEP program.

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The project must focus on bringing lab-developed IP to market. These projects do not include support for and TCF funds cannot be used for existing fellows, overall LEEP program management or individual node program operation activities. AMMTO, IEDO, BTO and the Office of Technology Transitions (OTT) will collaboratively select any new projects that receive funding under this Topic.

- b) Supplemental Project Funds – Supplemental funding for projects to aid specifically in the continued development of a previously funded, base National lab developed IP technology maturation and commercialization project leveraging the LEEP Program. A new merit review and selection process for awarding additional funding for these projects can be proposed as well. The process and all applications for new funds must focus on how the project will further the commercialization of lab-developed IP, ideally through new scope beyond the base project. Proposals to the AOI must include a timeline and major decision points for such a process. An award made for this AOI will include a pre-positioning of funds for such supplemental awards and for process management. No more than 10% of TCF funds awarded under this AOI can be used to execute the proposed process with at least 90% of the TCF funds awarded going to the projects.

iii. Teaming Partner List

EERE is compiling a “teaming” partner list to facilitate widespread participation in this lab call. This list allows organizations with expertise in the topics to express their interest to potential applicants and to explore potential partnerships. The Teaming Partner List is available on <https://eere-Exchange.energy.gov> under this lab call (DE-LC-0000020). Any organization that would like to be included on this list should submit the following information to the lab call email box (jointFY23TCF@ee.doe.gov) with the subject line “FY23 IEDO/AMMTO/BTO Joint TCF Lab Call: Teaming Partner Information”:

- Organization Name
- Contact Name
- Contact Email
- Contact Phone #
- Contact Website/Social Media
- Organization Type
- Lab Call Topic Area(s) of Interest
- Area of Technical Expertise (bulleted list)
- Brief Description of Capabilities
- Description of Need in a Teaming Partner
- Optional DEI Strengths/Best Practices
- Optional Demonstration/Field Validation Site Offering. Please include the below information:

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- Quantity of Properties
- Location of Properties
- Property Type
- Climate Zone(s)
- Area of Interest
- Any Additional Notes

DISCLAIMER: By submitting a request to be included in the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. Each organization should provide a generic point of contact e-mail address to receive queries. If a direct personal e-mail address is provided, the requesting organization consents to its publication. By facilitating this Teaming Partner List, EERE does not endorse or otherwise evaluate the qualifications of the entities that self-identify themselves for placement on the Teaming Partner List.

Teams that include representation from diverse entities such as, but not limited to: Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities (HBCUs)/Other Minority Institutions (OMIs)⁸, or through linkages with Opportunity Zones⁹, are encouraged.

II. Application Submission and Review Information

A. Application and Submission Details

i. Application Process

To apply to this lab call, applicants must register with their lab email address and submit application materials through EERE eXCHANGE at <https://eere-exchange.energy.gov>, EERE's online application portal. Applicants will be required to have a Login.gov account to access EERE eXCHANGE. As part of the eXCHANGE registration process, users will be directed to create an account in <https://login.gov/>. Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the Exchange Multi-Factor Authentication (MFA) Quick Guide in the [Manuals section](#) of eXCHANGE.

⁸Minority Serving Institutions (MSIs), including HBCUs/OMIs as educational entities recognized by the Office of Civil Rights (OCR), U.S. Department of Education, and identified on the OCR's Department of Education U.S. accredited postsecondary minorities' institution list. See <https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>.

⁹ Opportunity Zones were added to the Internal Revenue Code by section 13823 of the Tax Cuts and Jobs Act of 2017, codified at 26 U.S.C. 1400Z-1. The list of designated Qualified Opportunity Zones can be found in IRS Notices [2018-48 \(PDF\)](#) and [2019-42 \(PDF\)](#). Further, a visual map of the census tracts designated as Qualified Opportunity Zones may also be found at [Opportunity Zones Resources](#). Also see, [frequently asked questions](#) about Qualified Opportunity Zones.

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All submissions must conform to the guidelines for format and length, and be submitted at, or prior to, the deadline listed in the table in [section I.A.ii](#).

The application process consists of a single step, submitting a full proposal. **Concept papers are not requested for this lab call.**

Applicants are encouraged to compile information and details that will be useful for developing and accelerating negotiations of FY 2023 AOPs. [Appendix B](#) provides a worksheet to guide applicants through this process. Any information the applicant considers to be of significance for the review process must be included in the proposal, as reviewers will not have access to the AOP development information in Appendix B.

ii. General Proposal Requirements

Proposals should be formatted for 8.5 x 11 paper, single spaced, and have 1-inch margins on each side. Typeface size should be 12-point font, except tables and figures, which may be in 10-point font.

iii. Proposal Content

Proposal content aligns with content required in the EERE AOP project forms, with additional information to assist reviewers in evaluating technical details. The narrative should build on the information provided as part of the EERE Exchange template.

Applicants must include all content they wish to have reviewed in the proposal (proposal reviewers will not review any information provided in Exchange for AOP development). For the full application, if applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

Full Applications

- EERE will only review Full Applications.
- For Topics 1–4, DOE encourages multi-lab teams to address more than one topic in an interwoven, holistic approach. In this case, all topics, and subtopics the team believes are addressed by the proposal should be listed on the title page and the interconnectedness should be highlighted in the proposal itself. The proposal will be reviewed and evaluated under all respective topics indicated.

Full Applications must conform to the following requirements:

SECTION	FILE FORMAT	PAGE LIMIT	FILE NAME
Technical Volume	PDF	16	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	1 (pp)	ControlNumber_LeadOrganization_Resumes

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Letters of Commitment	PDF	1 (per LC)	ControlNumber_LeadOrganization_LOCs
Summary/Abstract for Public Release	PDF	1	ControlNumber_LeadOrganization_Summary
Summary Slide	MS PowerPoint	1	ControlNumber_LeadOrganization_Slide
DOE Work Proposal for FFRDC, if applicable (see DOE O 412.1A, Attachment 3)	PDF	N/A	ControlNumber_LeadOrganization_WP
Authorization from cognizant Contracting Officer for FFRDC	PDF	N/A	ControlNumber_LeadOrganization_FFRDCAuth
Diversity, Equity, Inclusion, and Accessibility (DEIA) Implementation Plan	PDF	2	ControlNumber_LeadOrganization_DEIAIP

Proposals must include team members’ resumes, letters of commitment, summary/abstract, summary slide, and DEIA plan, as separate documents to upload to Exchange. The Technical Volume must not exceed 16 pages single spaced, 12-point Calibri font with standard margins. Additional pages beyond that will not be reviewed.

Technical Volume

The Technical Volume must be submitted in PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages. Save the Technical Volume in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_TechnicalVolume”.

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

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The Technical Volume to the Full Application may not be more than 16 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all the information in the table below. The applicant should consider the weighting of each of the evaluation criteria when preparing the Technical Volume.

The Technical Volume must conform to the following content requirements, but there are [additional items](#) that must be submitted with the application, as listed in the [table](#) above:

SECTION / PAGE LIMIT	DESCRIPTION
Title/Cover Page 1 page	<p>This should include the proposal title, topic(s) and subtopic(s) being applied for, PI(s) and business POCs, names of all team member organizations, any statements regarding confidentiality, a nonproprietary project summary, and a 200-or-less-word summary of the project suitable for public release if the project is funded.</p> <ul style="list-style-type: none"> o Include name, address, phone number, and email address of the lead applicant (organization) for contract issues and project issues. o For Topics 1–4, DOE encourages multi-lab teams to address more than one topic in an interwoven, holistic approach. In this case, all topics, and subtopics the team believes are addressed by the proposal should be listed on the title page and the interconnectedness should be highlighted in the proposal itself. The proposal will be reviewed and evaluated under all respective topics indicated.
Title Page and Summary 2 pages maximum	<p>The Project Overview component of the technical volume should contain the following information, succinctly described:</p> <ul style="list-style-type: none"> • Background: The applicant should briefly discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline and known remaining technical barriers), commercialization plans and goals, and the project team and resources relevant to the technical topic being addressed in the Full Application. • Summary: This should be one page in length and should provide a truncated explanation of the proposed project; a clearly defined, easily communicated, end-of-project goal; and a high-level overview of estimated project budget, listing an estimated breakdown for each proposed year, separated by teaming partners. The applicant should

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	<p>discuss the impact DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding—relative to prior, current, or anticipated funding from other public and private sources—is necessary to achieve the project objectives.</p>
<p>Technical Narrative 13 pages maximum</p>	<p>The Technical Narrative component of the technical volume should contain the following information:</p> <p>Project Description: Describe the project in enough detail that it may be evaluated for its innovation, impact, and relevance to the topic 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, how the proposed project supports one or more of the lab call objectives, the approach to solving the problem, and why this funding is needed to enable this work.</p> <p>Potential Commercialization Advances: For Topics 1-4, identify root causes (inside and outside of the labs) of the existing lab commercialization challenges and barriers that, if addressed, will result in significant advances for commercializing technologies. For Topic 4, 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.</p> <p>Work Plan: This section is to list the key tasks and provide brief descriptions for each task, including roles and responsibilities of any partners. Define the key milestones to be addressed by the project, including SMART milestones, and quarterly progress measures, with dates and specific descriptions of what should be accomplished to meet the milestones. This section should address key risks to achieving stated goals and the steps to be taken to minimize those risks. The work plan should include a high-level project scope, work breakdown structure (WBS), milestones, go/no-go decision points, and project schedule. A detailed WBS is requested separately.</p> <p>Team & Resources: Describe the capabilities of the project team, including those of the PI(s), partners, and other members, and how each will contribute to the commercialization of the product. Describe the project team’s understanding of the market and its barriers to commercialization. Identify and discuss factors or</p>

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	<p>circumstances such as policy or regulations required for the technology to achieve market penetration.</p> <p>Clearly state the team’s and the lab’s readiness to begin work on the project. Describe the team’s commitment to the project, including that of senior laboratory management and corporate officers of partner organizations. Describe the facilities needed to support the proposed work. As appropriate, include the names of any partners and a description of their businesses, as well as a discussion of the partners’ products and services currently in the market. Describe the history of the laboratory’s interaction with the partner(s) and the role of the partner(s) in the project including their responsibilities for accomplishment of milestones and deliverables, as well as financial support or in-kind contributions. Describe the mechanism to be utilized with partner organizations (CRADA, licensing agreement, other) to be employed as part of the project.</p> <p>Impact Tracking: DOE has an obligation to report on TCF implementation and impact. As such, all projects must incorporate clear impact-tracking strategies. Proposals must describe how, if funded, the proposed project would measure success during and after the funded period. Awardees must report every year over a 5-year period, which includes the up-to-3-year award period and any relevant period afterward to reach the entire 5-year time period. These impact metrics will be tracked and shared with OTT over a 5-year period, which includes the up-to-3-year award period.</p> <p>Proposals must describe how the team will implement and track impact metrics. Proposals must include outcome-focused metrics that are most applicable for the proposed project and describe how and when the team will track and report against those metrics. Metrics should focus on outcomes that show traction and not steps or deliverables the team has complete control over. Specific targets for identified metrics should be provided, as appropriate. Applicants should consider short-, medium-, and long-term goals when identifying metrics. Example impact metrics include:</p> <ul style="list-style-type: none"> • qualitative data before and after activity measuring understanding or perspective shift • additional funds invested in the technologies or solutions being developed in the projects • increase in number of licensed lab technologies
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	<ul style="list-style-type: none"> • number and value of established industry/incubator partnerships • number of inquiries for new partnerships • annual revenue from commercialized technologies <p>Team and Required Resources: Describe the expected DOE and National Laboratory member resources, including proposed work areas, staff time, and any facility/equipment needs. Include specific locations and laboratories to be used.</p> <p>Cost-sharing: Provide a detailed table describing any proposed cost-sharing, clearly articulating cash versus in-kind.</p> <p>References: References are not counted in the 16-page limit and should be included in the application as an appendix.</p> <p>Team Resumes: Include single page resumes of key project participants. These are not counted in the 16-page limit and should be included in the application as an appendix.</p> <p>The Project Diversity, Equity, Inclusion, and Accessibility (DEIA) Activities: This should reference the National Lab DEIA plan, if available, and contain the following information:</p> <ul style="list-style-type: none"> ○ Equity Impacts: the impacts of the proposed project on underserved communities, including social and environmental impacts. ○ Benefits: The overall benefits of the proposed project, if funded, to underserved communities. ○ How diversity, equity, and inclusion objectives will be incorporated in the project. See Project DEIA activities for more information on the contents of the Diversity, Equity, Inclusion, and Accessibility Implementation.
<p>Budget 1 page</p>	<p>Applicants will be required complete the table given in Appendix A and submit in addition to the Technical Volume.</p>

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Project Diversity, Equity, Inclusion, and Accessibility (DEIA) Activities

The Project Diversity, Equity, Inclusion, and Accessibility Implementation activities

should be integrated into the technical volume. As part of the application, applicants are required to describe how DEIA objectives will be incorporated in the project. Specifically, applicants are required to submit a description of how the project will support or implement the lab wide DEIA plan and describe the actions the applicant will take to foster a welcoming and inclusive environment, support people from groups underrepresented in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project, as well as the extent to which the project activities will be located in or benefit underserved communities. The plan should include at least one SMART milestone per budget period supported by metrics to measure the success of the proposed actions, which will be incorporated into the award if selected. The DEIA section should contain the following information:

- Equity Impacts: the impacts of the proposed project on underserved communities, including social and environmental impacts.
- Benefits: The anticipated overall benefits of the proposed project, if funded, to underserved communities
- How DEIA objectives will be incorporated in the project.

The following is a non-exhaustive list of actions that can serve as examples of ways the proposed project could incorporate DEIA elements:

- Include persons from groups underrepresented in STEM as PI, co-PI, and/or other senior personnel.
- Include persons from groups underrepresented in STEM as student researchers or postdoctoral researchers.
- Include faculty or students from Minority Serving Institutions as PI/co-PI, senior personnel, and/or student researchers, as applicable.
- Enhance or collaborate with existing diversity programs at your home organization and/or nearby organizations.
- Collaborate with students, researchers, and staff in Minority Serving Institutions
- Disseminate results of research and development in Minority Serving Institutions or other appropriate institutions serving underserved communities
- Implement evidence-based, diversity-focused education programs (such as implicit bias training for staff) in your organization.
- Identify Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, and Veteran Owned Businesses to solicit as vendors and subcontractors for bids on supplies, services, and equipment.

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These examples should not be considered either comprehensive or prescriptive. Applicants may include appropriate actions not covered by these examples.

Items to be submitted with the application not counted towards the page limit:

References

References should be included in the application as an appendix.

Resumes

Applicants are required to submit one-page resumes for key participating team members. Multi-page resumes are not allowed. Save all resumes in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_Resumes”.

Letters of Commitment

Submit letters of commitment from team members and third-party cost-share providers. If applicable, also include any letters of commitment from partners/end users (one-page maximum per letter). Save the letters of commitment in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_LOCs”.

Summary/Abstract for Public Release

This is separate from the Project summary included in the technical volume. The project summary/abstract must be suitable for dissemination to the public, and it must not exceed one (1) page. It should be a self-contained document that identifies the name of the applicant; the project director/PI(s); the project title; list of major deliverables; scope and objectives of the project; a description of the project, including major tasks (phases, planned approach, etc.) and methods to be employed; the potential impact of the project (i.e., benefits and outcomes); and major participants (for collaborative projects). This document must not include any proprietary or business sensitive information because DOE may make it available to the public if the project is selected for award. The document must be saved in Portable Document Format (PDF) and conform to this naming convention: “2023 TCF Abstract [Tracking ID #].pdf

Summary Slide

Applicants are required to provide a single MS PowerPoint slide summarizing the proposed project. This slide is used during the evaluation process.

The Summary Slide template requires the following information:

- A project summary
- A description of the project’s impact

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- Proposed project goals
- Any key graphics (illustrations, charts and/or tables)
- The project’s key idea/takeaway
- Project title, Applicant, Principal Investigator, and Key Participant information
- Requested EERE funds and proposed applicant cost-share, if applicable

Save the Summary Slide in a single page MS PowerPoint file using the following convention for the title “ControlNumber_LeadOrganization_Slide”.

Treatment of Application Information

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 page, which does count towards 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.

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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.

B. Application Review Details

i. Merit Review and Selection Process

Upon receipt and review for initial compliance with requirements, all proposals received in Exchange by the deadline will undergo a thorough technical review. The BTO, AMMTO, and IEDO program offices will use expert reviewers familiar with the office's portfolios, goals, and objectives. The offices will collect and collate review scores and comments for use in making final project selections. The Program Office Selection Officials will consider the merit review results, alignment with current portfolios, available funding, and effectively leveraging resources across the national laboratory complex to make the final project selections.

ii. Merit Review Criteria

Full Applications

Applications will be evaluated against the merit review criteria shown below:

Criterion 1: Innovation and Impact Evaluation (Weight: 45% of composite score)

This criterion involves consideration of the following factors:

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- How innovative and impactful is the project, assuming the stated outcomes can be achieved as written?
 - Innovative—Extent to which the proposed project or solution is innovative. Extent to which the proposed project or solution incorporates DEIA objectives. 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/or the root causes (inside and outside of the labs) of the existing commercialization challenges and barriers. Also includes the impact of forging collaborations on the challenges being addressed (e.g., multi-lab and industry-leveraged effort), as well as the impact of collaboration on other interested and impacted stakeholders (e.g., through collaboration with stakeholders outside the National Labs). For Topics 1-4, multi-lab collaboration will be scored as inherently more impactful than single-lab projects.
 - Accelerates Speed of Commercialization—Degree to which the proposal has the potential to accelerate the speed of commercialization, to move quickly, and to embrace agility with the proposed project. 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 without long-term, continued, direct funding from DOE. Extent to which multiyear 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 programs or efforts. Potential to enhance commercialization activities at the National Laboratories.
 - Scalable—Likelihood that the proposed solution, if successful, could be scaled to have a broader impact. Likelihood that the project could

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be scaled beyond the proposed multi-lab collaboration and to all labs, even those not directly participating in the proposed project.

- 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. Degree to which proposal is likely to positively impact DEIA objectives outlined in [Project DEIA activities](#).
- 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 proposal demonstrates both technology progress and market pull or interest. Extent to which the proposed technology will result in a commercially successful product and/or company. Extent to which the proposed Accelerates Speed of Commercialization.

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

This criterion involves consideration of the following factors:

- Are the stated goals of the project SMART, and are they likely to be accomplished within the scope of this project? Is there a likelihood of success for the proposed project?
 - Measurable—Degree to which the proposal is structured to produce a measurable result/impact, including the required DEIA milestones. Extent to which the applicant shows a clear understanding of the importance of SMART, verifiable milestones and proposes milestones that demonstrate clear progress, are aggressive but achievable, and are quantitative.
 - 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.

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- Validated—Degree to which the proposed project fits within and builds on the laboratory ecosystem. Level of validation (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 reasonableness and clarity of the budget and scope options. Level of proposed cost-share for the project will be taken into consideration.

Criterion 3: Collaboration and Capability of the Applicant and Holistic Project Team (Weight: 20% of composite score)

This criterion involves consideration of the following factors:

- Is the team well-qualified and positioned to successfully complete this project?
 - Collaboration—Extent to which there are multiple labs engaged on the proposed project. Degree to which the proposed project branches out, connects, and builds on the innovation ecosystem across the country. Extent to which connections and alliances are forged to harness the power of regional economies; state/local organizations; and other federal, state, or local agencies.
 - Capable—Extent to which the training, capabilities, and experience 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 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 lab, and external collaboration is proposed. Extent to which teams include representation from diverse entities, such as, but not limited to: Minority Serving Institutions, including

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Historically Black Colleges and Universities/Other Minority Institutions, or through linkages with Opportunity Zones.

- 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/or failures will be noted.

iii. Selection for Award Negotiation

The project offices carefully consider all the information obtained through the proposal process and make an independent assessment of each compliant and responsive proposal based on the criteria set forth in this lab call. The project offices may select or not select a proposal for negotiations. They may also postpone a final selection determination on one or more proposals until a later date, subject to availability of funds and other factors. The project offices will notify applicants if they are, or are not, selected for award negotiation.

iv. Selection Notification

The project offices anticipate completing the project selection process and notifying DOE National Labs of selections during Q4 FY2023.

The project team will notify lab leads of selection results and will provide lab leads with summaries of anonymized review comments for each proposal submitted.

vi. Questions and Agency Contacts

Specific questions about this lab call should be submitted via e-mail to jointFY23TCF@ee.doe.gov. To ensure fairness across all DOE National Labs, individual DOE staff cannot answer questions while the lab call remains open. To keep all DOE National Labs informed, the project team will post all questions and answers on EERE Exchange.

C. Project Administration and Reporting

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For selected proposals in all topic areas, the successful DOE Lab will be expected to work closely with the AMMTO, IEDO, and/or BTO Technology Manager(s) that oversee the program to: 1) develop a work plan that meets the technology offices' priorities; 2) define specific milestones for engagement activities; and 3) outline strategic research areas. Once awarded, the DOE Lab will set up monthly meetings with program office staff to review the previous month's activities and plan for activities to be carried out in the coming month. At the end of each quarter the laboratory will submit a quarterly report with consolidated information on all program activities and current budget status.

AMMTO, IEDO and BTO have collaborated with OTT in developing this solicitation and will continue to provide information to OTT on status and selections. For all proposals selected for awarding, the negotiated statement of work (SOW) or Statement of Program Objectives (SOPO) and budget will be provided to OTT. Throughout the life of these projects, semi-annual (at the end of both FY Q2 and FY Q4) reporting with high-level project technical performance and budget status, as well as any project changes (scope, cost-share, period of performance, partners) will be provided to OTT for awareness or concurrence. Additionally, impact metrics will be tracked and shared with OTT over a 5-year period, which includes the up-to-3-year award period. A final report summarizing the overall accomplishments will be provided to OTT at the end of the project.

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Appendix A: Full Application Timeline/Budget

Proposed Project Timeline and Budget

Cost Category	Project Year 1	Project Year 2	Project Year 3	Total
Labor – Principal Investigator				
FTE:				
Labor - Additional staff				
Materials & Supplies				
Travel				
Subcontracting				
Overhead				
Other				
Total DOE Funding				
Total Non-DOE Funding				
Total				

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Appendix B: Lab Call Full Application AOP Worksheet

Lab Call Full Application Worksheet

IMPORTANT: This document is provided as a courtesy to aid lab call applicants in compiling information needed for the AOP process, if selected. All relevant information must be entered into the Exchange system. **This worksheet is not required to be submitted with the full application.**

Please contact ITSIHelp@ee.doe.gov with any questions.

Project General Information

Control Number:

Applicant (Name and Email):

Organization Name:

Project Title:

Topic:

Project Start Date:

Project End Date:

Partner Laboratories:

Non-Lab Partner Organizations:

Partner Laboratory	Email	First Name	Last Name

Is this a continuation of an existing project?

WBS Number:

Fiscal Year Existing Project:

Project Overview (Multi-year):

Project Objectives (Multi-year):

Contact Information

Lab Lead Point of Contact and Business Contact Information

Name:

Email:

Title:

Questions about this lab call? Email jointFY23TCF@ee.doe.gov.

Problems with EERE Exchange? Email EERE-ExchangeSupport@hq.doe.gov Include lab call name and number in subject line.

Address:

Phone:

Fax:

Financials

Please add a separate table for each partner laboratory.

Lead Laboratory Name:

Year	Planned Project Costs
2023	
2024	
2025	
Subtotal	

Partner Laboratory (If Applicable) Name:

Year	Planned Project Costs
2023	
2024	
2025	
Subtotal	

Total Planned Project Costs:

Questions about this lab call? Email jointFY23TCF@ee.doe.gov.
Problems with EERE Exchange? Email EERE-ExchangeSupport@hq.doe.gov Include lab call name and number in
subject line.

Performers

Please add a separate table for each partner laboratory.

Lead Laboratory Name:

Subcontractor Name	Sub Type	Start Date	End Date	2023 Planned Costs	2024 Planned Costs	2025 Planned Costs	Total Funding
Subcontractor Subtotal							

Partner Laboratory (If Applicable) Name:

Subcontractor Name	Sub Type	Start Date	End Date	2023 Planned Costs	2024 Planned Costs	2025 Planned Costs	Total Funding
Subcontractor Subtotal							

Total Planned Project Costs:

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Project Plan

Project Tasks:

Task Number	Title	Description	Team Members	Planned Costs	Start Date	End Date

Project Milestones:

Item Number	Type	Title	Description	End Date	Team Members	Criteria

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Risks

Project Tasks:

Risk Name	Description	Response Plan	Severity	Probability	Response	Source	Classification	Team Members	Target Completion Date

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Modalities/TRL

Modalities:

Modality Number	Modality	FY23 Weight (%)	FY23 Planned Costs (\$)
Total:			

Current TRL of the proposed technology (1-9):

Estimated TRL the technology will reach at project end (2-9):

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Project Impacts

Deliverable/Product or "Output" Description:

Audience/Customer:

Audience/Customer Use:

Communications/Outreach Strategy:

Does this project involve significant industry engagement?

Description of Engagement:

Associated CRADAs?

CRADA Text

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Appendix C: Cooperative Research and Development Agreements (CRADAs) and Cost-Sharing Agreements

COST-SHARE

This lab call is subject to Section 988 of the Energy Policy Act of 2005 regarding cost-share. For topics 1–4 of this lab call, all funded projects must meet the 50% of the total project cost-share fund requirement. For topic 5 of this lab call, cost share has been eliminated as authorized in Section 988(b)(3).

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 facility 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. The lead DOE facility is responsible for any funding gap should a TCF project fail to obtain from partners or other collaborators the statutorily required 50% of total project costs from nonfederal sources. By law, TCF and other DOE funds cannot flow to a partner for work scope that is covered by a CRADA.

AMMTO, IEDO, and BTO have no policy regarding foreign expenditures. All relevant laws, DOE directives, and contractual obligations apply. Consult your DOE facility's legal staff for advice about foreign partners and agreements with the DOE facility.

All partnerships between the labs and outside partners, CRADAs and otherwise, must comply with individual lab requirements under their management and operating (M&O) contracts.

WHAT QUALIFIES FOR NON-FEDERAL MATCHING

Please consult the Federal Acquisition Regulations for the applicable cost-sharing requirements. In addition to the regulations referenced above, other factors may also 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 5 years would not be fully allowable. Only the value for the 5 years of donated maintenance that corresponds to the project period is allowable and may be counted.

Additionally, DOE will not allow pre-award costs.

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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 match if such contributions meet all 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 based on 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.

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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 match 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.

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS (CRADAs)ⁱ

Many methods are available for the transfer of technology from Government-owned laboratories to industry. The methods, or agreements, differ in regard to issues such as assigning intellectual property rights (ownership of patents and copyrights) and sharing resources. CRADAs are joint partnership opportunities and agreements established between

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Government-owned, contractor-operated laboratories and industrial partners to perform cooperative research on topics of mutual interest.

CRADAs provide private industry access to commercially valuable technology in a variety of disciplines. Intellectual property rights to inventions developed as a result of CRADA research may be shared with the industry partners. Such sharing of rights protects the competitive edge gained as a result of the cooperative research.

In CRADAs, an industrial partner can provide any combination of funds, personnel, equipment, and services. M&O contractors can provide any combination of personnel, equipment, and services; but are specifically barred from providing funds directly to an industrial partner. In this method of cooperation, technology is transferred to industry by matching the capabilities and resources of Federal laboratories and private industry partners.

In CRADAs, the sharing of intellectual property rights be negotiated prior to beginning the cooperative research. A benefit derived by the industry partner is that either the Federal researcher or the partner may specify sensitive information resulting from the cooperative research as "protected CRADA information."

This information may be protected from disclosure through the Freedom of Information Act (FOIA) for up to five years. This allows proprietary information to be protected from disclosure to the industry partner's competitors. Congress has mandated that DOE's CRADA review process be completed within a specified time.

The CRADA is usually the agreement of choice when:

- the partner is an active participant in the research effort,
- there is a requirement to designate information as CRADA-protected information, or
- there is sharing of intellectual property rights.

By contrast, cost-sharing agreements allow industry partners to contribute financially to research programs in Federal laboratories. Unlike CRADAs, there is no protection of such projects from Freedom of Information Act (FOIA) requests in a cost-sharing agreement. However, release of information to a third-party requestor may be delayed pending patent protection of the invention in question. Additionally, there is no time limit on the cost-sharing review process.

The cost-sharing agreement may be appropriate when the partner's contribution is limited to financial support.

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¹ <https://www.energy.gov/sites/prod/files/cioprod/documents/OthersCradas.pdf>

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

See the table below for TCF points of contact at each National Lab.

Facility	TCF Points of Contact
The Ames Laboratory	Julienne Krennrich jmkrenn@ameslab.gov 515-294-1202
Argonne National Laboratory	Hemant Bhimnathwala hbhimnathwala@anl.gov 630-252-2354 David McCallum dsm@anl.gov 630-252-4338
Brookhaven National Laboratory	Poornima Upadhya pupadhya@bnl.gov 631-344-4711 Eric Hunt ehunt@bnl.gov 631-344-2103 Ivar Strand istrand@bnl.gov 631-344-7579
Fermi National Accelerator Laboratory	Mauricio Suarez suarez@fnal.gov 630-840-6947 Cherri J. Schmidt cherri@fnal.gov 630-840-5178
Idaho National Laboratory	Lisa Aldrich lisa.aldrich@inl.gov 208-569-0405 Jason Stolworthy jason.stolworthy@inl.gov 208-526-3437

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Kansas City National Security Campus	Andrew Myers amyers@kcncsc.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	Elsie Quaiter-Randall quaiterandal1@llnl.gov 925-423-5210 Chris Hartman hartmann6@llnl.gov
Los Alamos National Laboratory	MaryAnn D. Morgan mary_ann@lanl.gov 505-667-5324 Andrea Maestas andream@lanl.gov 505-667-1230 Jerome Garcia jgarcia@lanl.gov 505-665-9090
National Energy Technology Laboratory	Jessica Lamp jessica.lamp@netl.doe.gov 412-452-3645 Chris Bond chris.bond@netl.doe.gov 412-386-5133 Samantha Zhang Samantha.zhang@netl.doe.gov 541-918-4517
National Renewable Energy Laboratory	Jennifer Fetzer jennifer.fetzer@nrel.gov 303-275-3014 Eric Payne

Questions about this lab call? Email jointFY23TCF@ee.doe.gov.
Problems with EERE Exchange? Email EERE-ExchangeSupport@hq.doe.gov Include lab call name and number in subject line.

	eric.payne@nrel.gov 303-275-3166
Nevada National Security Site	Robert Koss kossrj@nv.doe.gov 702-295-1213 Matthew Pasulka pasulkmp@nv.doe.gov 702-295-2963
Oak Ridge National Laboratory	Michael J. Paulus paulusmj@ornl.gov 865-574-1051 Eugene Cochran cochraner@ornl.gov 865-576-2830 Jennifer Caldwell caldwelljt@ornl.gov 865-574-4180
Pacific Northwest National Laboratory	Christina Lomasney christina.lomasney@pnnl.gov Allan C. Tuan allan.tuan@pnnl.gov 509-375-6866
Pantex Plant	Jeremy Benton jeremy.benton@cns.doe.gov 865-241-5981
Princeton Plasma Physics Laboratory	Laurie Bagley lbagley@pppl.gov 609-243-2425
Sandia National Laboratories	Liz Hillman elucero@sandia.gov 505-206-8434 Mary Monson mamonso@sandia.gov 505-844-3289 Monica Martinez monmart@sandia.gov Lily Shain lshain@sandia.gov

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subject line.

Savannah River National Laboratory	Amy Ramsey amy.ramsey@srnl.doe.gov Byron Sohovich Byron.sohovich@srnl.doe.gov
SLAC National Accelerator Laboratory	Diana Creswell doon@slac.stanford.edu 650-926-8608 Jose Zavala jzavala@slac.stanford.edu
Thomas Jefferson National Accelerator Facility	Deborah Dowd dowd@jlab.org 757-269-7180 Marla Schuchman marla@jlab.org
Y-12 National Security Complex	Jeremy Benton Jeremy.Benton@cns.doe.gov 865-241-5981

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