U.S. Department of Energy

Office of Energy Efficiency and Renewable Energy

Advanced Manufacturing Office
NATIONAL LABORATORY CALL FOR TCF PROPOSALS

National Lab Funding for Fiscal Year 2022

DE-LC-0000012

This Lab Call is being issued by the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) Advanced Manufacturing Office (AMO).

Technology Commercialization Funding

Key Information	
Laboratory Call Issue Date	April 26, 2022
Submission Deadline for Concept Papers	May 24, 2022 5:00 PM ET
Submission Deadline for Full Applications	July 15, 2022 5:00 PM ET
Expected Dates for EERE Selection Notifications	August 2022
Means of Submission	EERE Exchange
Cost Share Requirement	50% cost share is required.
Eligible Entity	U.S. Department of Energy and National Nuclear Security Agency National Laboratories

List of Topics

Topic 1: Industrial Decarbonization

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

Modifications

All modifications to the Lab Call are [HIGHLIGHTED] in the body of the FOA.

Mod. No.	Date	Description of Modification
0001	5/02/2022	1. In Section I.A.i. – Overview and Purpose, on page 5, added additional information about CRADA or other specific agreement type in association with the Lab Call. 2. In Section I.B.i. – Key Considerations, on pages 8, added additional information about CRADA or other specific agreement type in association with the Lab Call. 3. In Section II.A.iii. Proposal Content, on pages 15-18, updates were made to the Full Application content requirements and the technical volume structure and page limits. 4. Appendix A, on page 25, has been updated to only include the format for Full Application Timeline/Budget.

I. Lab Call Description

A. Background and Context

i. Overview and Purpose

EERE National Laboratory Guiding Principles require all offices to pursue a merit review of direct-funded National Laboratory work. In line with these principles, AMO is issuing this Lab Call for fiscal year 2022 (FY 2022).

AMO is interested in funding programs that build a clean and equitable energy economy and address the climate crisis, a top priority of the Biden Administration. This Lab Call will advance the Biden Administration's goals to "deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050"[1] to the benefit of all Americans. The Department of Energy (DOE) is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of underserved communities.[2] The AMO Vision, Mission, and Strategic Goals as well as the current funding portfolio can be found on the AMO web site.

The activities to be funded under this Lab Call will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of clean energy technologies, which are critical for climate protection. Specifically, this Lab Call is intended to promote promising energy technologies for commercial purposes as part of the Technology Commercialization Fund. In addition, this Lab Call will emphasize increasing diversity of perspectives in program design and quantifiable increase of support for underserved communities.

The Lab Call seeks proposals from DOE National Laboratories for collaborative projects with qualified industrial partners that pursue manufacturing innovations of lab-developed technologies currently at mid-to-late-stage TRL levels (TRL ≥ 4) – those validated in a laboratory environment or beyond, to include manufacturing scale-up

[1] Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

[2] The term "underserved communities" refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list in the definition of "equity." E.O. 13985. For purposes of this Lab Call, as applicable to geographic communities, applicants can refer to economically distressed communities identified by the Internal Revenue Service as Qualified Opportunity Zones; communities identified as disadvantaged or underserved communities by their respective States; communities identified on the Index of Deep Disadvantage referenced at https://news.umich.edu/new-index-ranks-americas-100-most-disadvantaged-communities/, and communities that otherwise meet the definition of "underserved communities" stated above.

and execution of a business plan, for promising energy-related technologies with commercial applications in the manufacturing sector. Furthermore, these proposals must have application in the Topic Area of Industrial Decarbonization pathways to achieve economy-wide net-zero emissions by 2050.

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. The goals of TCF are to:

1. Incentivize DOE National Laboratories[3] to pursue active industry engagement and customer scouting for select promising energy technologies

2. Facilitate the commercialization of energy technologies with promising potential that are developed at DOE Facilities

With these goals in mind, the objective of this Lab Call is to focus on Lab-developed technologies that are at a stage that will attract private sector interest. 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). In this way, there will be a greater potential for impact within a decade. Applicants should therefore propose projects that are currently at mid-to-late stage TRLs (TRL 4 and above). Applicants to this Lab Call must identify innovative partners for technology commercialization and include in their proposals plans for conducting a market analysis. Priority will be shown for low-capital expenditure approaches (i.e., driving down initial capex requirements), and those with largest potential for process, facility, and lifecycle carbon emissions reduction that translate to national scale impact. 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 AMO'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.).

DOE's National Laboratories have consistently identified as a problem the lack of sufficient resources to develop technologies to a stage that attracts private sector

[3] For this Lab Call, the term "DOE National Laboratories" is intended to include all DOE and National Nuclear Security Agency National Laboratories. Further, references to "lab" and "national lab" is intended to also refer to DOE/NNSA National Laboratories.

interest. To address this, the TCF was established in Section 1001(a) of the Energy Policy Act of 2005 (42 U.S.C. 16391(a)). The TCF program provides an opportunity to support R&D collaboration between DOE National Laboratories and private industry. Specifically, the objectives of the TCF are to: 1) Support late-TRL technology maturation such as testing, qualification, and demonstration with a private partner that is willing to participate in the technology's commercialization; and 2) Support cooperative advancement of Lab-developed technology between a Lab and a private partner for a specific commercial application.

Through TCF, the DOE's applied energy technology offices (e.g., AMO) 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

Projects funded under the AMO-sponsored TCF program MUST work towards commercializing a lab-developed technology and/or lab developed IP. 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 partners.

2. The selected projects should promote promising energy technologies for commercial purposes.

3. The projects are subject to a 50% cost share requirement (see Appendix C).

ii. Timeline and Process Logistics

Timeline

KEY DATES	
Lab Call Release Date:	April 26, 2022
PROPOSAL DEADLINE AND DECISION DATES	
Concept Paper Submission Deadline(s):	May 24, 2022 5:00 PM ET
Full Application Submission Deadline(s):	July 15, 2022 5:00 PM ET
Decision Date(s):	August 2022
Expected Beginning Award Issue Date(s):	September 2022

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Process Logistics

All communication to AMO regarding this Lab Call must use AMOLabCall@ee.doe.gov.

- **PROPOSAL SUBMISSIONS:** To apply to this Lab Call, lab 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 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 AMOLabCall@ee.doe.gov. AMO 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 AMO staff questions directly.

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

B. Key Considerations and Topic Area(s)

i. Key Considerations

- **AVAILABLE FUNDING:** There is approximately **$3,960,000** in funding available to fund **all** projects solicited in this Lab Call subject to appropriations, program direction, and go/no-go decision points.

- **COST SHARE:** Lab applicants must provide a 50% cost share calculated as a percentage of the total allowable costs. The cost share must come from non-Federal sources unless otherwise allowed by law. More information may be found in Appendix C.

- **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 AMO'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, are eligible to submit proposals as prime awardees, unless specified otherwise. 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.

  Applicants must submit an eligible Concept Paper to be eligible to submit a Final Application.

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

  > [T]he Federal Government should pursue a comprehensive approach to advancing equity[4] 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.[5]

  As part of this whole of government approach, this Lab Call seeks to encourage the participation of underserved communities and underrepresented[6,7]

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[4] 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.

[5] Executive Order 13985, "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government" (Jan. 20, 2021).

[6] 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://ncses.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

[7] 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.

groups. Applicants are highly encouraged to include individuals from groups historically underrepresented, in STEM on their project teams. As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to reference, if available, the existing laboratory Diversity, Equity, and Inclusion 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 located in or benefit underserved communities (see Project DEI 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, to the extent the proposed project will include external partners, the applicant is encouraged to include Minority Serving Institutions[8], Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community. 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:
    - AMO strongly encourages 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.
    - To the extent possible and appropriate, AMO seeks lab projects that involve industry engagement or industry partners.

ii. Topic Area Descriptions

Topic 1: Industrial Decarbonization

- Estimated DOE Funding Available: up to $3,960,000
- Estimated Number of Projects Expected: 1-3

[8] Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities/Other Minority Institutions) 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.

- Estimated Project Duration: 12-36 months

The manufacturing sector accounts for 19,663 TBtu of primary energy use (onsite plus offsite) and 1,165 MMT of carbon dioxide (CO_2) emissions.[9] Industrial emissions are primarily attributable to energy-related processes that combust fossil fuels on-site for direct use or for steam (e.g., for process heating), to the generation of electricity on-site or off-site (e.g. for motor-driven systems), and to other fuels and feedstocks (e.g. non-energy fossil fuel inputs to materials production such as plastics and chemicals), as well as to additional non-energy-related process emissions (e.g., calcination of limestone in cement production).

Three sectors—iron and steel, chemicals, and cement—account for about 40% of manufacturing CO_2 emissions, based on 2018 Manufacturing Energy Consumption Survey (MECS) data.[9] Proposals with applicability in these industries are highly encouraged. Focus is needed on decarbonization technologies as well as their integration into process systems and supply chains to reduce energy consumption and CO_2 emissions. Applications are encouraged to consider operational technology integration enabled through smart manufacturing, as well as equipment needs (new equipment and modifications to existing equipment) for low-carbon processes, improved by-product utilization projects, and recycled feedstocks.

For this Topic, AMO expects the successful DOE Lab(s) to support AMO's Industrial Decarbonization efforts by further advancing those lab-developed low-CAPEX technologies at mid-to-late stage TRL that will have the largest impact within the next decade in realizing energy and CO_2 emissions reductions. The lab-developed technologies of interest may be a direct core decarbonization pathway technology supported by AMO (i.e., energy efficiency, process electrification, and low-carbon fuels/feedstocks) or an associated enabling technology (e.g., advanced sensors, process diagnostics, advanced materials, etc.), the latter for which the applicants must sufficiently describe and convincingly connect how these technologies can facilitate achieving industrial decarbonization along one of the core pathways. The selected projects will enable AMO to stimulate at-scale decarbonization efforts within the energy-intensive manufacturing and production facilities.

The successful DOE Lab will be expected to work closely with the AMO Technology Manager that oversees the Program, to plan out work that meet AMO's priorities, define specific milestones for engagement activities, and outline strategic research areas. The DOE Lab will set up monthly meetings with AMO staff to review the previous

[9] Manufacturing Energy and Carbon Footprints. Energetics, for US DOE, January 2021. Manufacturing Energy and Carbon Footprints (2018 MECS) | Department of Energy Estimated using EIA Manufacturing Energy Consumption Survey.

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.

Each DOE Lab applicant must submit a proposal detailing their team's qualifications and experience with Industrial Decarbonization technologies. The application must include private partners and describe how the overall team will address the objectives of the program.

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.

All submissions must conform to the guidelines for format and length, and be submitted at, or prior to, the deadline listed.

Applicants are encouraged to compile information and details that will be useful for developing and accelerating negotiations of FY 2022 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).**

Concept Papers

Each Concept Paper must be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.

The Concept Paper must conform to the following content requirements:

SECTION	PAGE LIMIT	DESCRIPTION
Cover Page Section	1	The cover page should include the project title, the specific announcement Topic Area being addressed, both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Technology Description	3	Applicants are required to describe succinctly: • Background: The applicant should 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) relevant to the technical topic being addressed in the Full Application. • Commercialization Impact: The applicant should describe the commercialization plan and goals. Required components consist of: ○ The target market(s) for commercialization of the technology/product, including a brief discussion of identified or anticipated market barriers. ○ Competing technologies/products and estimated timeframe to overcome technical and market barriers. ○ Proposed commercialization end state of the project, to include whether the technology/product will be available in the identified markets—and if not, the anticipated follow-on activities necessary to bring the product to market. ○ An estimate of the extent to which the proposed technology will result in a commercially successful product and/or solution that transforms or replaces existing industry approaches or solutions that can be widely used by the existing industry. ○ An estimate of the anticipated industrial decarbonization impact of the technology with successful commercialization. • Clear statement of how the proposed technology represents an innovative and significant improvement with respect to existing commercial products or solutions.
Addendum	1	Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including:

		• 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. 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.

Full Applications

- An eligible Concept Paper must have been submitted prior to the Concept Paper deadline
- EERE will only review or consider eligible Full Applications.
- Each Full Application shall be limited to a single concept or technology. Unrelated concepts and technologies shall not be consolidated in a single Full Application.

Full Applications must conform to the following requirements:

SECTION	FILE FORMAT	PAGE LIMIT	FILE NAME
Technical Volume	PDF	15	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	1 (pp)	ControlNumber_LeadOrganization_Resumes
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

Proposals must include team members' resumes, letters of commitment, summary/abstract, and summary slide, as separate documents to upload to Exchange. The Technical Volume must not exceed 15 pages single spaced, 12-point 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.

The Technical Volume to the Full Application may not be more than 15 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:

SECTION / PAGE LIMIT	DESCRIPTION
Cover Page 1 page	The cover page should include the project title, the specific Lab Call Topic Area being addressed, both the technical and business points of contact, names of all team member organizations, Principal Investigator(s) and key personnel, and any statements regarding confidentiality.
Project Overview 1-2 pages	The Project Overview component of the technical volume should contain the following information, succinctly described: • Background and Summary: 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.
Technical Narrative 11-12 pages	The Technical Narrative component of the technical volume should contain the following information: • Project Description: Describe the project's goals and objectives. Provide a history of the technology development and commercialization efforts to date including its current technology maturity status. Describe the extent to which the proposed technology, if successfully commercialized, will contribute significantly to industrial decarbonization. • Technical merit: The applicant should briefly describe the technical innovation, risks, and challenges. Required components consist of: ○ A clear statement of how the proposed technology represents an innovative and significant improvement with respect to existing commercial products or solutions. ○ The technical risks and challenges that must be addressed to reach the desired maturity of the technology, including any complementary technologies necessary for the proposed technology to function and to have relevance in the market. • Commercialization Impact: The applicant should briefly describe the commercialization plan and goals. Required components consist of: ○ The extent to which the proposed technology can in a reasonable timeframe result in a commercially successful product and/or solution that transforms or replaces existing industry approaches or solutions that can be widely used by the existing industry. Include a description of any significant market needs that the project addresses. ○ What the project intends to accomplish in terms of: advancing the maturity of its technology to at least TRL 5 (testing under representative environments and field trials/demonstrations), addressing manufacturing scale-up, or executing a business plan. ○ The current state of the technology, as well as the anticipated state of the technology at the end of the project to include whether the technology/product will be available in the identified markets—and if not, the anticipated follow-on activities necessary to bring the product to market. • Technology Maturity and Project Plan: Describe the technical and commercialization approach for the project including the approach for closing technical gaps. Demonstrate an understanding of complementary technologies necessary for the proposed work to have market relevance. Clearly state the business plan for market penetration/adoption including relevant

	assumptions. Describe the approach to manage and mitigate technical and commercial risks related to the proposed work. Clearly articulate the goals and outcomes of the project including CO_2 emission reduction and measures of technical and business success. In addition to the written summary, provide a table with milestones to include a description of the outcomes or goals being achieved. Milestones should be specific, measurable, achievable, realistic, and time-bound (SMART) and represent a tangible and measurable achievement of a project outcome or goal, e.g., completion of a technology upgrade or performance test. The table should also include deliverables with a description of the data and information, or knowledge being provided in the deliverable. • 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 circumstances such as policy or regulations required for the technology to achieve market penetration. 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. • The Project Diversity, Equity, and Inclusion (DEI) Activities should reference the National Lab DEI plan, if available, and contain the following information: ○ 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 DEI activities for

	more information on the contents of the Diversity, Equity, and Inclusion Implementation.
Budget 1 page	Applicants will be required complete the table given in Appendix A and submit as part of the Technical Volume.

Project Diversity, Equity, and Inclusion (DEI) Activities

As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a description of how the project will support or implement the DOE National Laboratory-wide Diversity, Equity, and Inclusion 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; and the extent the project activities will be located in or benefit underserved communities. The plan should include SMART milestones supported by metrics to measure the success of the proposed actions.

The following is a non-exhaustive list of actions that can serve as examples of ways the proposed project could incorporate diversity, equity, and inclusion elements. These examples should not be considered either comprehensive or prescriptive. Applicants are encouraged to propose appropriate actions not covered by these examples.

a. Diversity on the research team
    i. Include persons from groups underrepresented in STEM as PI, co-PI, and/or other senior personnel
    ii. Include persons from groups underrepresented in STEM as student researchers or post-doctoral researchers
    iii. Implement evidence-based, diversity-focused education programs (such as implicit bias training for staff) in your organization
    iv. Identify Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses to solicit as vendors and sub-contractors for bids on supplies, services, and equipment
    v. Include faculty or students from Minority Serving Institutions as PI/co-PI, senior personnel, and/or student researchers
    vi. Enhance or collaborate with existing diversity programs at your home organization and/or nearby organizations
    vii. Collaborate with students, researchers, and staff in Minority Serving Institutions
b. Explicit diversity in research impact

i. Illustrated outcome impact in underserved communities
ii. Disseminate results of research and development in Minority Serving Institutions or other appropriate institutions serving underserved communities

c. Explicit diversity in research design. Inclusion of a broad community, academic, policymaking staff in research design and execution phase

The Project Diversity, Equity, and Inclusion Implementation activities should be integrated into the technical volume.

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

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: "2022 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 technology summary
- A description of the technology's impact
- 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.

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

Proposals containing confidential, proprietary, or privileged information must be conspicuously marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Federal Government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose.

If a proposal contains confidential, proprietary, or privileged information, it must include a cover sheet marked as follows identifying the specific pages containing confidential, proprietary, or privileged information:

> **1. Notice of Restriction on Disclosure and Use of Data:**
> Pages [List Applicable Pages] of this proposal may contain confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for the purposes described in this Lab Call. The government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. In addition, (1) the header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: "Contains Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure" and (2) every line and paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

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. AMO will use expert reviewers familiar with the AMO portfolio, goals, and objectives. AMO will collect and collate review scores and comments for use in making final project selections. The AMO Selection Official will consider the merit review results, alignment with current portfolio, and effectively leveraging resources across the national laboratory complex to make the final project selections. For transparency, AMO will provide summaries of the review results to assist DOE National Labs in understanding how their proposal reviewed and aid in improving future work.

ii. Technical Review Criteria

Concept Papers

Concept Papers are evaluated based on consideration of the following factors:

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

This criterion involves consideration of the following factors:

- Commercialization Impact evaluation
- Extent to which the project team understands the market and its barriers to commercialization
- Technical Merit evaluation (technology maturity, project plan, team, and resources)
- The proposed work, if successfully accomplished, would clearly meet the technology commercialization objectives as stated in the Lab Call

Full Applications

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

Criterion 1: Commercialization Impact Evaluation (Weight: 55% of composite score)

This criterion involves consideration of the following factors:

- Extent to which the proposed technology will result in a commercially successful product and/or company
- Extent to which the proposed technology can be successfully commercialized in a reasonable timeframe
- Extent to which the proposed technology represents an innovative or significant improvement from current state of the art technologies that results in either a product or solution that transforms or replaces existing industry approaches or is a new product or solution that can be widely used by the existing industry and will have significant market impact

- Extent to which the proposed technology, if successfully commercialized, will contribute significantly to industrial decarbonization
- Extent to which the project team understands the market and its barriers to commercialization
- Extent to which the applicant identifies and discusses factors or circumstances such as policy or regulations required for the technology to achieve market penetration

Criterion 2: Technical Merit Evaluation (Weight: 35% of composite score)

Technical Impact consists of three criteria within which are multiple components as described below along with their individual contributions to this portion of the composite score:

- Technical Merit Criterion 1: Technology Maturity
    - Technology has achieved a TRL 4, which is defined as a technology having laboratory-scale testing completed in a simulated environment.
    - Extent to which the applicant describes an understanding of complementary technologies or processes that are necessary for the technology to have relevance in the market.
    - Extent to which the applicant describes an understanding of technical issues to be addressed to achieve a successful commercial deployment.
    - Evidence that the technology can be deployed at scale.

- Technical Merit Criterion 2: Project Plan
    - Technical and Commercialization Approach
        - Quality and reasonableness of the applicant's plan for closing technical gaps and addressing unanswered technical questions.
        - Quality and reasonableness of the applicant's business plan for market penetration/adoption.
    - Risk Management
        - Extent to which applicant discusses and demonstrates understanding of the key technical and commercial uncertainty and risks involved in the proposed work.
        - Extent to which applicant adequately describes how applicant's team will manage and retire risks.
    - Goals and Outcomes
        - Extent to which the project plan clearly describes the goals and outcomes of the project, including measures of technical advancement and business success.

        - Extent to which the proposed tasks and subtask activities in the work plan are verified through performance metrics, milestones, and deliverables that are specific, measurable, aggressive (but attainable), realistic, and timely (i.e., not a report summarizing work that was done).

- Technical Merit Criterion 3: Project Team and Resources
    - Capabilities – The extent to which the capability of the Principal Investigator(s) and the proposed team, including partnerships, can address all aspects of the proposed project, including, but not limited to, qualifications, relevant expertise, and time commitment of the individuals on the team.
    - Contributions – Clarity, adequacy, and completeness of roles and contributions of each team member in development of the project and/or commercialization of the products, including financial support of partners.
    - Readiness – Extent to which the final team, facilities, and equipment required to complete this project is fully in place, assembled, and committed to the project (e.g., are there any key members that are "to be hired at a later date"?).
    - Commitment – Extent to which there is demonstrated institutional commitment from senior DOE Facility management and corporate officers of partners.
    - Resources –Sufficiency of facilities to support the proposed work—and reasonableness and adequacy of the proposed budget to meet proposed project objectives.

Criterion 3: Diversity, Equity, and Inclusion (Weight: 10% of composite score)

- The degree to which diversity, equity and inclusion objectives will be incorporated in the project.
- Extent to which the project benefits underserved communities, including social and environmental impacts.
- Extent to which Minority Serving Institutions[8], Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community are included.

iii. Selection for Award Negotiation

AMO carefully considers all the information obtained through the proposal process and makes an independent assessment of each compliant and responsive proposal based on the criteria set forth in this Lab Call. AMO may select or not select a proposal for

negotiations. AMO may also postpone a final selection determination on one or more proposals until a later date, subject to availability of funds and other factors. AMO will notify applicants if they are, or are not, selected for award negotiation.

iv. Selection Notification

AMO anticipates completing the project selection process and notifying DOE National Labs of selections during the month of August 2022**.**

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

v. Questions and Agency Contacts

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

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				

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:

Address:

Phone:

Fax:

Financials

Please add a separate table for each partner laboratory.

Lead Laboratory Name:

Year	Planned Project Costs
2022	
2023	
2024	
Subtotal	

Partner Laboratory (If Applicable) Name:

Year	Planned Project Costs
2022	
2023	
2024	
Subtotal	

Total Planned Project Costs:

Performers

Please add a separate table for each partner laboratory.

Lead Laboratory Name:

Subcontractor Name	Sub Type	Start Date	End Date	2022 Planned Costs	2023 Planned Costs	2024 Planned Costs	Total Funding
Subcontractor Subtotal							

Partner Laboratory (If Applicable) Name:

Subcontractor Name	Sub Type	Start Date	End Date	2022 Planned Costs	2023 Planned Costs	2024 Planned Costs	Total Funding
Subcontractor Subtotal							

Total Planned Project Costs:

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

Risks

Project Tasks:

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

Modalities/TRL

Modalities:

Modality Number	Modality	FY21 Weight (%)	FY21 Planned Costs ($)
Total:			

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

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

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

Appendix C: TCF Match and Non-Federal Match Information

MATCHING

The terms "matching" and "cost sharing" are often used synonymously and can create confusion. AMO uses the terms "matching" and "non-Federal match" to ensure consistency with Section 1001 of EPAct 2005, which authorizes the Technology Commercialization Fund (TCF). For the TCF, "match" or "matching funds" means that for each dollar of TCF funding provided, a dollar of non-Federal funds is required. Because there is a one-for-one match required for TCF funds, the TCF will never contribute more than 50% of the total cost of any project. It is possible for the non-Federal match to exceed the funding contributed by the TCF, if the DOE Facility or private partner(s) provide more than 50% of the total project cost.

Matching funds are subject to audit by the Department or other authorized government entities (e.g., GAO). A third-party collaborator—not party to the CRADA or other approved partnership agreement—could provide matching funds. A written agreement may be advisable—either between the DOE Lab and the third party or between the CRADA partner and the third party—that requires the third party to provide the matching funds. Consult your DOE Lab legal staff for advice about how to obligate the third party to provide the matching funds, and to ensure the matching funds meet the requirements for in-kind contributions, if applicable. The lead DOE Lab 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 non-federal sources.

By law, TCF funds cannot flow to a partner for work scope that is covered by a CRADA. Other types of agreements may be used with the prior approval of AMO. If a contract is used as a partnership vehicle, TCF funds applied to the contract could flow to the partner. The 50% match requirement remains regardless of the type of partnership agreement a lab uses.

AMO has no policy regarding foreign expenditures. Consult your DOE Lab's legal staff for advice about foreign partners and agreements with the DOE Facility.

Applicants should make sure their prospective partnership arrangements comply with all DOE and CRADA directives and conditions.

WHAT QUALIFIES FOR NON-FEDERAL MATCHING

It is not possible to explain what specifically qualifies for the non-Federal match in one or even a couple of sentences. Please consult the Federal Acquisition Regulations (FAR) or the rules for

Federal Financial Assistance at 2 CFR 200 for information about which costs are allowable. In addition, matching non-Federal costs may not be counted if they are paid by the Federal Government under another award.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten 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.

Additionally, DOE generally does not allow pre-award costs for either Federal cost match or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, DOE generally does not allow pre-award costs prior to the signing of the Selection Statement by the DOE Selection Official.

DOE FINANCIAL ASSISTANCE RULES 2 CFR PART 200 AS AMENDED BY 2 CFR PART 910

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:

i. Acceptable contributions. All contributions, including cash contributions and third-party in-kind contributions, must be accepted as part of the Prime Recipient's Non-Federal 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 that 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 non-Federal matching funds, that full value must be the lesser or 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 these 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 non-Federal matching 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 property donated by third parties.

a) Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the non-Federal 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