U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

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

Advanced Manufacturing Office
NATIONAL LABORATORY CALL FOR PROPOSALS

National Lab Funding for Fiscal Year 2022-2026

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).

CHP AND WORKFORCE DEVELOPMENT SUPPORT

Key Dates	
Laboratory Call Issue Date	July 28, 2021
Submission Deadline for Proposals	September 13, 2021, 5:00 pm ET
Expected Dates for EERE Selection Notifications	October 2021

Summary Information	
Means of Submission	Proposals must be submitted through Exchange. EERE will not review or consider proposals submitted through other means.
Total Amount to be Provided	Up to $3,000,000 per year for AOI 1 and $800,000 for AOI 2 subject to annual appropriations and congressional direction
Period of Performance	FY22-FY26 (5 years) for AOI 1 and FY22 (1 year) for AOI 2, subject to annual appropriations and congressional direction
Eligible Entity	U.S. Department of Energy National Laboratories are eligible to apply.
Cost Share Requirement	Cost share is not required.
Submission of Multiple Proposals	Laboratories are not limited in the number of proposals they may submit through this laboratory call.
Proposal Forms	The proposal template is contained in this document.
Questions	Direct questions about the program rules and proposal process to AMOLabCall@ee.doe.gov

Summary of Areas of Interest (AOI)

- AOI 1: Combined Heat and Power Deployment Program
- AOI 2: Education and Workforce Development Roadmap

Process Logistics and Key Considerations

All communications to AMO should be directed to the AMOLabCall@ee.doe.gov. For AOI specific questions the POC (listed below) contacts should be included.

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. DOE strongly encourages all applicants to submit the required information at least 48 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. 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. We will attempt to respond to a question within three 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: EEREExchangeSupport@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 emails from the specific program POCs.

Background

EERE National Laboratory Guiding Principles require all offices to pursue a merit review of direct-funded national laboratory work. In line with these Principles, the Advanced Manufacturing Office (AMO) is issuing this lab call. Labs may also be selected as a recipient (or participate as a sub-recipient) through the standard Financial Opportunity Announcement (FOA) process, depending on specific eligibility requirements of individual FOAs.

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 is committed to pushing the frontiers of science and engineering, catalyzing

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

clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of underserved communities. For more information about AMO goals and technical targets, please see the Advanced Manufacturing Office Draft Multi-Year Program Plan. The AMO Vision, Mission, and Strategic Goals as well as the current funding portfolio can be found on the AMO web site.

Some labs also have continuing multi-year projects that have already gone through the merit review process. These will continue to be reviewed through the annual peer review process and labs should work with AMO technology managers to ensure that ongoing projects are appropriately included in the AOPs. This lab call will only pertain to the topics below.

Key Consideration:

DIVERSITY, EQUITY, and INCLUSION

Building a clean and equitable energy economy and addressing the climate crisis is a top priority of the Biden Administration. This laboratory call will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035 and 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" to the benefit of all Americans. The Department of Energy 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 activities to be funded under this laboratory 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. In addition, this laboratory call will emphasize increasing diversity of staff, increasing diversity of perspectives in program design, and or increasing quantification and emphasis on supporting underserved communities.

It is the policy of the Biden Administration that:

> [T]he Federal Government should pursue a comprehensive approach to advancing equity[3] 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

[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 of in the definition of "equity." E.O. 13985. For purposes of this Laboratory 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.

[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.

> 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 laboratory call seeks to encourage the participation of underserved communities and underrepresented groups. Applicants are highly encouraged to include individuals from groups historically underrepresented[5,6] 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. 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 laboratory-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[7], Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community.

---

[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://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

[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.

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

AOI 1: Combined Heat and Power Deployment Program

Topic Overview

The industrial sector has been seeking environmentally responsible ways to meet its electric and thermal needs. Combined Heat and Power (CHP) – increasingly using renewable fuels – offers a solution that is deployable today and poised to evolve with a decarbonizing grid.

For more than a decade, the Advanced Manufacturing Office's (AMO) technical assistance efforts have advanced awareness of CHP and facilitated greater deployment. However, there is significant potential remaining for cost-effective implementation of CHP to meet current and future challenges associated with climate change and a decarbonized economy, including:

- Lowering carbon emissions for the industrial sector, as well as in commercial and institutional facilities;
- Improving end-user resilience, especially for critical infrastructure;
- Enabling accelerated deployment of renewables like wind and solar while stabilizing the electric grid; and,
- Bolstering the financial competitiveness of the nation's energy-intensive industries.

Under this Lab Call, AMO is recompeting support for its CHP technical assistance activities to support renewable-fueled CHP systems and overcome barriers to their deployment. CHP technologies are fuel flexible and utilize a single energy source to generate both electricity and heat, capturing energy that would normally be lost in power generation, transmission, and distribution. Their high efficiency – often twice as efficient as separate heat and power generation – has significantly lowered emissions for end-users, particularly as CHP displaces fossil generating technologies on the margin of today's grid. In 2021, approximately 4,600 installed CHP systems provided 80 GW of electricity generation which avoided more than 200 million tons of CO_2 per year compared to separate heat and power.[8]

To ensure CHP continues to have significant carbon reduction benefits as the grid decarbonizes, AMO is focusing on renewably fueled CHP systems that have the potential to act as an energy-transformation technology in the future. Existing CHP systems can utilize biogas and biofuels as well as renewable natural gas without major changes, and all major engine and gas turbine manufacturers are working on the capability to operate efficiently at high levels of renewable hydrogen.

AMO seeks to characterize market barriers and identify technical and market solutions to overcome them, including field validation and verification of renewable-fueled CHP technologies and systems. The selected national laboratory will need the capability to perform program and techno-economic analysis related to CHP powered by renewable fuels including biogas, renewable natural gas, and hydrogen. Additional analysis will investigate the role of CHP in reinforcing critical infrastructure, decarbonizing the industrial sector, stabilizing the electric grid to enable greater intermittent renewable generation, integrating CHP into microgrids, and complementing deployment of emerging energy storage technologies. Threaded throughout this effort will be a focus on stimulating progress on Administration workforce development priorities.

The selected national laboratory will also support AMO's technical assistance around CHP deployment, including:

[8] ICF analysis using 2019 regional eGRID factors

- Screening analyses for how CHP, waste heat to power (WHP), district energy, and thermal energy storage systems can benefit manufacturing facilities and large energy users in terms of efficiency, resiliency, competitiveness, and lowered emissions;
- End-user education about CHP's benefits, including the potential for increased deployment of CHP fueled renewable fuels both today and in the future;
- Development of resources on implementation strategies, technology specifications, and market deployment for CHP;
- Workforce training; and,
- Stakeholder engagement with utilities, state energy offices, and other organizations to encourage CHP deployment.

A critical component of this project is to provide support to the ten regional CHP Technical Assistance Partnerships (CHP TAPs), which promote and assist in transforming the market for CHP, waste heat to power, and district energy technologies, through coordination meetings, centralized tool and resource development, CHP-relevant workforce development support, and integration with AMO R&D activities and programs.

The selected national laboratory will need to be flexible and responsive to AMO as the office responds to the industrial sector's changing needs. For example, on short notice AMO recently launched an investigation to characterize the capability of CHP to operate carbon-free through the use of renewable fuels sources such as biogas, renewable natural gas and hydrogen.

Project Objectives

In FY22 AMO expects the successful laboratory to focus on four areas to support AMO's CHP deployment/technical assistance efforts: 1) CHP technology and market validation, 2) field manager validation and support to the CHP TAPs, 3) support of topical initiatives, such as the current topical initiative of validating the performance and cost of packaged CHP systems, and 4) analysis and strategic planning for the future of CHP and AMO CHP programs, including a primary focus on decarbonization with CHP powered by net-zero carbon fuels. This focus will enable AMO to provide effective assistance in identifying and expanding the potential universe of organizations interested in installing CHP systems. The assistance sought from the laboratory will also enable AMO to stimulate increased deployment of CHP in commercial buildings and manufacturing plants, and assist city, state, and utility partnerships that could potentially include CHP as a clean, carbon-free, resilient, energy-efficient, and economic option.

The successful laboratory will be expected to work closely with the AMO Technology Manager that oversees the CHP Program, to plan out work products that meet AMO's priorities, define specific milestones for engagement activities, and outline strategic research areas. The laboratory will set up monthly meetings with AMO 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. Specific information on each of the four focus areas is included in the table below.

Table 1: CHP Program Focus Areas

CHP Technology and Market Validation	Research and validate CHP deployment and factors impacting increased deployment. Specific deliverables: • Maintenance of the CHP Installation Database • Maintenance of the Microgrid Database • Develop and/or update CHP Technology Fact Sheets and Market Sector Profiles • Draft yearly CHP market update reports that show market trends based on region, fuel type, end-use sector, etc. As needed analysis and support: • Execute analysis and evaluation of regulatory and market barriers/opportunities for CHP. • Investigate technical and economic potential of CHP in multi-technology systems such as solar/storage and hybrid CHP, as well as microgrids. • Provide techno-economic analysis related to AMO priority areas such as decarbonization, energy storage, the energy-water nexus, workforce development, and other topics that may arise.
Provide Field Manager Validation and Support to the CHP TAPs	Analyses and advice to the CHP TAPs. Specific deliverables: • Strategic guidance and coordination of analysis and technical assistance provided by the CHP TAPs • QA/QC of CHP TAP screening studies • Tracking of CHP TAP metrics on screening analyses and advanced technical assistance, as well as a specific milestone completion (CHP project profiles, program/policy profiles, stakeholder engagement, end-user engagements, etc.) • QA/QC of all CHP TAP deliverables • Yearly report on CHP TAP accomplishments, including CHP installations impacted and carbon emissions saved • Conduct monthly CHP TAP Directors calls • Organize and lead yearly CHP TAP in-person Directors meetings As needed analysis and support:

	• Coordination of CHP TAP special projects and market sector specialty areas[9] • Analysis and support tailored to the unique needs of each regional CHP TAP, for example, research on hybrid CHP systems, which integrate CHP with renewables and energy storage, to support the Western CHP TAP region because of the strong regulatory pressure in California away from fossil fuel use.

Support Topical Initiatives
 	
(Current Topical Initiative - Validate Performance and Cost of Packaged CHP Systems)
	Plan for, launch, and support topical initiatives that support AMO priorities.
	
	Specific deliverables:
	• Maintenance of current topical initiative focused on Packaged CHP Systems:
	  • Maintenance of the eCatalog as an online resource with a database of packaged CHP systems, keeping it accurate and complete
	  • Continuation of the Packaged CHP Accelerator AMO has developed to validate the installation, performance, costs, and procurement processes of packaged CHP systems
	  • Packaged CHP vendor engagement and support getting packages listed in the eCatalog
	  • Partner engagement and evaluation of user experiences around installation and interconnection of packaged CHP systems
	  • Analysis of project development times and costs of packaged CHP systems enabled through the eCatalog
	  • Evaluation of the integration of new technologies (such as renewable energy systems, energy storage, microgrids, or emerging technologies) with packaged CHP systems
	  • Identification of additional R&D challenges and opportunities for packaged CHP systems and related technologies
	
	As needed analysis and support:
	• Plan for, launch, and support topical initiatives that support AMO priorities:

[9] CHP TAPs often conduct specialized analysis that is particularly relevant to their region. For example, the Northwest CHP TAP has done targeted analysis on biomass CHP systems because of the high volume of wood products sites in the region.

	• Potential to start new CHP Accelerators • Engagement activities on specific topics
Support AMO's CHP strategic planning	Specific deliverables: • Develop a strategic plan for the CHP Program (to be updated annually) that will guide program activities and • Help AMO connect its ongoing CHP R&D activities with the CHP Deployment Program • Support alignment of both those with AMO's efforts to get CHP deployed where cost effective • Develop a process to track progress in representation by underserved communities in AMO CHP activities As needed analysis and support: • Provide flexibility, adaptability, and responsiveness to AMO's changing analytic and program needs, including AMO's increased focus on renewables and decarbonization • Provide analytic and writing/communication capability to conduct quick-turnaround products, including both analytic writeups and well-presented explanatory briefs understandable by the lay person. Required analytic capabilities include understanding of and ability to analyze CHP system capabilities, the value of CHP and CHP activities, how CHP systems can support the accelerated deployment of intermittent renewables like wind and solar, infrastructure and equipment requirements allowing CHP systems to be increasingly fueled by biogas, renewable natural gas and hydrogen in a cost-effective way

Project Structure

One DOE National Laboratory, or a team of laboratories, will be expected to support the CHP program. Each DOE National Laboratory will submit a proposal detailing their team's qualifications and experience with CHP technologies, technical assistance programs, and deployment outreach programs. Proposals will also include how the team will address the objectives of the program. Laboratory teams may plan to use subcontractors to augment their staff experience, however the winning laboratory team will be expected to solicit subcontractor proposals after the award. The Lab Call will be open and applications will be due by the date indicated in Exchange and on the cover sheet.

CHP Program – Merit Review Criteria

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 to make the final project selections. For transparency, AMO will provide summaries of the review results to assist labs in understanding how their proposal reviewed and aid in improving future work.

Proposals will be reviewed, and selections will be made based on the following criteria:

Criterion 1: Technical Merit, Innovation, and Impact (Weight: 40%)

- Clarity and extent with which the project proposes to conduct technical assistance and validation activities related to CHP deployment and factors impacting increased deployment.
- Degree to which the applicant describes their approach to meeting the deliverables specified.
- Clarity of the discussion on the support to be provided to the CHP TAPs, with a focus on the strategic guidance and coordination of analysis and technical assistance provided by the CHP TAPs. Extent of the discussion on the specifics of tracking the performance of the individual TAPs.
- Clarity and extent with which the applicant describes the Laboratory's capabilities to support current topical initiatives and to undertake new topical initiatives as directed by the DOE Headquarters CHP team.

Criterion 2: Project Approach (Weight: 30%)

- Relevance and appropriateness of the approach and description of key tasks, metrics (including baseline), and milestones.
- Degree of likelihood that the work plan will succeed in meeting project objectives.
- Degree to which the approach incorporates industry engagement.
- Degree to which the project approach identifies and addresses the current and/or potential opportunities to accelerate deployment of CHP.

Criterion 3: Team, Resources, and Inter-Lab Collaboration (Weight: 20%)

- Degree to which the project leverages established capabilities at the Laboratory.
- Capability of the PI(s) and team members to address all aspects of the work, including the qualifications, expertise, and time commitment of the team.
- Degree to which the proposal team demonstrates the ability to facilitate and expedite further development and adoption of CHP.
- Degree to which inter-Laboratory collaboration is occurring, as appropriate.
- Level and appropriateness of partnerships, and clarity in the description of roles and responsibilities.
- Reasonableness of budget and spend plan for the proposed plan of work.

Criterion 4: Diversity, Equity, and Inclusion Plan (Weight 10%)

- 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.
- Degree to which diversity, equity, and inclusion objectives will be incorporated in the project.

AOI 2: Education and Workforce Development Roadmap

Topic Overview

A strong and resilient manufacturing sector is fundamental to a healthy economy that provides high quality jobs and pathways to the middle class. To support a strong manufacturing sector, educational resources for industrial companies are essential. As a result, Education and Workforce Development (EWD) is an important priority for DOE and the Administration.

The DOE and Administration priorities, include:

- Supporting the Administration goals around Jobs & the American Workforce, and championing a motivated, diverse, multi-generational workforce.
- Building a trained workforce and creating millions of good-paying, middle-class clean energy-focused jobs with the choice to join a union and help Americans develop the skills they need to secure these jobs.
- Contributing to priorities around diversity and inclusion of underserved communities through a targeted approach to extend workforce opportunities to demographics that are underrepresented in the manufacturing workforce.
- Supporting diversity in STEM and Clean Energy Industries.
- Supporting energy efficiency and carbon reduction goals such as decarbonizing energy intensive and high GHG industries by 50% by 2035 compared to a 2020 baseline.

This lab call seeks to enhance existing AMO EWD resources to support the Administration and DOE priorities in a way that delivers maximum value to the U.S. manufacturing sector. The expected outcome is a roadmap and EWD programs and resources that will accelerate the development of the talent pipeline through targeted Education and Workforce Development programs that provide education to students/new workers as well as upskilling and training for the incumbent manufacturing/industrial workforce.

The three pillars of AMO (R&D Projects, R&D Consortia, Technical Partnerships) have offered EWD programs and resources for many years. AMO seeks to better integrate these EWD programs, resources and activities to increase scalability and impact through the development of an EWD Roadmap. The Roadmap will unite and enhance the EWD resources offered by AMO and map out a strategy for additional high-impact EWD resources and how they can be delivered to students and professionals interested in careers in manufacturing. The overall goal of the roadmap is to create an action plan for delivering training to enable personnel employed in manufacturing to support the clean energy economy of the future. This will include characterizing challenges to educating the industrial workforce and developing mechanisms and solutions to overcome those challenges.

The roadmap aims to create a comprehensive structure to organize AMO's activities related to energy efficiency education and workforce development that lead to an industrial workforce that is more aware and knowledgeable in industrial energy efficiency, energy management, renewable energy, advanced manufacturing technologies/practices, waste reduction, water efficiency, and decarbonization. In addition to raising awareness and expertise within the existing industrial workforce, AMO seeks to train future generations of industrial workers to understand energy efficiency and new manufacturing technologies and practices, and how they can positively impact a wide range of industrial processes and manufacturing plants.

The roadmap will be informed by a series of EWD workshops that AMO is currently holding. These workshops are intended to help understand what resources, skill sets, pedagogical approaches, and frameworks are needed to educate the industrial workforce and to suggest delivery pathways and techniques that AMO can use to maximize knowledge sharing and understanding within companies, educational organizations, and other workforce stakeholders. The workshops are also being held to gather input on existing AMO EWD programs and resources to understand what gaps exist with respect to clean energy and energy efficiency that need to be addressed. The information gathered will aid in the development of a unified AMO wide EWD strategy.

These workshops are being held with a variety of stakeholders including current AMO EWD implementers, manufacturers, academia, NGOs, Government partners, HBCUs and minority-serving organizations, as well as labor unions, to capture critical information that will help AMO configure its future EWD resources in accordance with Administration and DOE priorities. The road map will need to integrate the conclusions from the EWD workshops[10] and align with AMO priorities. Expected outcomes of the workshops include:

- Identify advanced manufacturing EWD gaps and how AMO will drive manufacturing EWD forward
- Gain insights on career development pathways and EWD pipeline challenges to understand where AMO investments would have the most impact
- Foster communication and broad collaboration to identify and pursue common strategic EWD opportunities
- Identify best practices for diversity, equity and inclusion that align with Administration and DOE priorities and can be incorporated into all AMO EWD investments

Project Objectives

AMO expects the successful laboratory to focus on five areas during the development of the EWD Roadmap:

1. Develop a strategic framework to guide an integrated set of high impact AMO EWD activities, drawing from AMO's mission and priorities, existing programs and activities, and stakeholder input from the EWD workshops. The framework should:
    - Prepare AMO to develop a cogent, comprehensive approach during all phases of growth and maturation of the AMO's EWD resources and offerings
    - Harmonize goals and objectives
    - Incorporate EWD delivery approaches that prepare workers for high-quality jobs (ie. apprenticeships, work-study programs, etc.)
    - Incorporate creation of more defined career pathways and resources for education-to-work (entry-level pipeline), currently employed (upskilling), and dislocated (unemployed) candidates
    - Ensure diversity, equity and inclusion are integrated throughout

[10] All sessions of the EWD workshop series are being recorded and will be made available to the awardee for use in developing the roadmap.

2. Based on the strategic framework, identify gaps and opportunities in AMO's current EWD portfolio, including opportunities to expand into new topic areas and reach additional population groups.
3. Communications and outreach - Identify strategic outreach and collaboration opportunities with federal and other partners developing EWD programming related to manufacturing to drive higher impact.
4. Develop a Roadmap and Implementation plan by sequentially organizing new activities identified above that:
    - Prioritizes the development and delivery of EWD curricula that aligns with Administration and DOE priorities
    - Prioritizes collaboration with specific partners based on anticipated impact
    - Plans how AMO resources will be kept up to date with new technological/programmatic developments and advances in knowledge
    - Enables executing and benchmarking AMO's activities in EWD, including tracking progress in representation by underserved communities in AMO EWD activities
5. Create a knowledge hub or resource center such as a database or comprehensive website that includes information about all AMO EWD activities:
    - Dispenses educational and training content
    - Contains a clear message about the goals and objectives of AMO's EWD strategy
    - Facilitates the connection of EWD stakeholders with AMO programs

The assistance sought from the laboratory will synthesize and apply takeaways from the stakeholder workshops, and evaluate AMO's strengths, gaps and opportunities in EWD. It will also catalyze educational content creation and delivery of content that results in significant high-impact training for the U.S. industrial sector. Specific information on each of the four focus areas is included in the table below.

Table 2: EWD Roadmap Focus Areas

Develop an Overarching Framework/Strategy for AMO EWD Activities	• Identify key opportunities for EWD impact for AMO, given AMO's mission, existing programs and activities, and stakeholder input from the EWD workshops.
	  ○ By topic (this includes industrial systems, processes and sectors)
	  ○ By career stage
	• Based on the key opportunities identified above, develop a framework that integrates, strengthens, and extends AMO's existing EWD activities for greater impact.
	• Incorporate EWD delivery approaches that prepare workers for high-quality jobs related to energy efficiency, clean

	energy and advanced manufacturing (ie. apprenticeships, work-study programs, etc) • Incorporate creation of more defined career pathways and resources for education-to-work (entry-level pipeline), currently employed (upskilling), and dislocated (unemployed) candidates • Prepare AMO to develop a cogent, comprehensive approach during all phases of growth and maturation of the AMO's EWD resources and offerings • Identify resources that strengthen manufacturing employee retention by showcasing manufacturing career pathways. All sector needs and career levels must be addressed in new programs focused on community college/technical schools, vocational high schools, mentorship programs, support for innovators, and real-world industry experience activities. • Identify how new EWD programs and resources support the development of a more capable, flexible, and resilient manufacturing workforce that is better able to react to market needs and address the challenges of the future • Ensure diversity, equity and inclusion are integrated throughout
Identify gaps and opportunities in AMO's current EWD portfolio	Based on the strategic framework: • Identify gaps in AMO's historical and existing EWD portfolio and opportunities to expand into new topic areas and reach additional population groups • Identify high priority opportunities to refresh the content of existing EWD activities and resources • Consider the technological, programmatic and policy developments that have occurred since existing EWD resources were created • Identify pedagogical techniques and educational frameworks that are appropriate to all the different audiences that will be impacted by AMO's EWD portfolio
Communication and Outreach	• Create unifying messaging around AMO EWD activities, including goals and objectives • Engage with stakeholder organizations to highlight where they can work with AMO • Identify strategic outreach and collaboration opportunities with federal and other partners developing EWD

	programming, including the Department of Education, the National Science Foundation, the National Institute of Standards and Technology, state education departments, vocational schools, universities, unions, and organizations that perform professional/continuing education for industrial/manufacturing workers. • Identify outreach and other mechanisms that will help AMO establish robust, collaborative relationships the stakeholders and partners identified.
Develop an EWD Roadmap/ Implementation Plan	• Sequentially organize new activities identified above. • Prioritize the development and delivery of EWD curricula that aligns with Administration and DOE priorities • Prioritize collaboration with specific partners based on anticipated impact • Plan for how AMO resources will be kept up to date with new technological/programmatic developments and advances in knowledge • Develop a structure for executing and benchmarking AMO's activities in EWD • Develop a process to track progress in representation by underserved communities in AMO EWD activities
Create a Centralized Location for Information About All AMO EWD Activities	• Create a knowledge hub or resource center such as a database or comprehensive website that includes information about all AMO EWD activities and ○ Dispenses educational and training content ○ Contains a clear message about the goals and objectives of AMO's EWD strategy ○ Facilitates the connection of EWD stakeholders with AMO programs • Ensure that the centralized location or resource is designed with scalability in mind so that it can continue to grow as more activities are undertaken, or as related workforce programs throughout DOE are brought under the same umbrella.

Project Structure

The selected DOE National Laboratory, or Laboratory consortium, will be expected to support the EWD Roadmap. This effort will be a highly interactive process where the awarded laboratory will work directly

with a team of AMO staff to develop the roadmap. The Laboratory will submit a proposal detailing how their team will address the objectives of the roadmap.

It is important that the EWD Roadmap maximize and build on existing DOE AMO educational programs and resources[11] to take full advantage of the investments that AMO has already made in these resources. The EWD Roadmap should also consider other government and private advanced manufacturing EWD programs and activities to ensure that AMO does not duplicate existing resources and to build partnerships with outside activities that can be leveraged to meet AMO's EWD goals. Proposals will be selected based upon their approach to support AMO's objectives, as well as the partnership's credentials and resources. AMO will prioritize proposals that demonstrate innovative approaches, that maximize industry participation, and that increase diversity by reaching out to disadvantaged groups.

The EWD initiative's structure can be flexible, but it must address the following key elements:

1) Enable AMO programs to increase the number of training opportunities for manufacturing and industrial employees of all education levels and in underserved communities.
2) Support new workforce development activities that 1) increase undergraduate and community college/technical school students trained, 2) increase in training options that earn continuing education units (CEUs) to help workers retain professional certifications and earn certifications in new areas, and 3) define career pathways and resources for education-to-work (entry-level pipeline), currently employed (upskilling), and dislocated (unemployed) candidates.
3) Support the development of a more capable, flexible, and resilient manufacturing workforce. AMO intends for the EWD Roadmap to help U.S. manufacturers be more agile in reacting to market needs, focus on innovation that will address the challenges of the future, and ensure that the value of energy efficiency is ingrained in the manufacturing and industrial workforce.

Workforce Development – Merit Review Criteria

Criterion 1: Project Approach (Weight: 60%)

- Degree to which the proposed project addresses the project objectives given in the lab call, and does so in an innovative, integrated, and efficient way
- Degree to which the project plan is informed by current knowledge of EWD in manufacturing
- Relevance and appropriateness of the approach and description of key tasks and milestones leading to an impactful outcome
- Likelihood that the work plan will succeed in meeting project goals and objectives.
- Level of well thought out and meaningful interaction with AMO for feedback and input
- Degree to which the proposal supports administration priorities, including
    - championing a motivated, diverse, multi-generational workforce
    - inclusion of underserved communities
    - supporting energy efficiency and carbon reduction goals

[11] Information on AMO's existing EWD resources and activities was presented during the kickoff session of the EWD Workshop on June 22, 2021. The recording of that presentation as well as the presentation slides is available at: https://betterbuildingssolutioncenter.energy.gov/resources/education-and-workforce-development-kickoff-meeting-materials

Criterion 2: Team and Resources (Weight: 30%)

- Degree to which the project leverages team knowledge and expertise of manufacturing EWD and AMO EWD in particular.
- Capability of the Principal Investigator(s) and team to address all aspects of the work – qualifications, expertise, and time commitment of the team.
- Reasonableness and sufficiency of budget and spend plan for proposed project and objectives.

Criterion 3: Diversity, Equity, and Inclusion Plan (Weight 10%)

- 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.
- Degree to which diversity, equity, and inclusion objectives will be incorporated in the project.

Funding Information and Eligibility

A. TYPE OF FUNDING INSTRUMENT

EERE anticipates funding the CHP program through FY 2022 via Annual Operating Plans with the National Laboratories, through the EERE Advanced Manufacturing Office.

B. ESTIMATED FUNDING

EERE anticipates that approximately $3,000,000 per year in federal funds will be available for AOI 1 and $800,000 for AOI 2. Funding is subject to annual appropriations and congressional direction.

Anticipated Number of Selections: One per AOI
Anticipated Funding Amount per Selection: $3,000,000 per year for AOI 1; $800,000 for AOI 2.

EERE reserves the right to fund, in whole or in part, any, all, or none of the proposals submitted in response to this Laboratory Call.

C. PERIOD OF PERFORMANCE

The period of performance will begin in FY 22 for AOI 1 and continue for up to 4 additional years subject to funding availability, meeting performance objectives, and AMO priorities. For AOI 2, the period of performance be approximately one year and will begin in FY22 subject to funding availability.

D. ELIGIBILITY

Department of Energy National Laboratories are eligible to apply as the primary applicant. The proposal must also conform with the DEI principles outlined below. The laboratory proposal must identify the senior management representatives of each participating National Laboratory. At DOE's discretion, DOE may consider other entities that are similar to the types of entities listed in the sentence above.

E. COST SHARING

DOE will determine annually the level of federal support to be provided based upon the recipient's continuation work, amount of cost share and availability of federal funding. Cost share is not required. If provided, recipient cost share must come from non-federal sources.

The proposal must specify the amount and source of funding that each partner will contribute to the project in the budget template provided. In addition, the proposal shall include a cost share commitment letter signed by each partner.

F. SELECTION NOTICES

Selected Applicants Notification: EERE will notify applicants selected for funding under this Laboratory Call. Notice of selection is not an authorization to begin performance. Selected projects will proceed to the negotiation stage. EERE reserves the right to request additional or clarifying information before proceeding with negotiations for any selection.

Non-selected Notification: Organizations whose proposals have not been selected will be advised as promptly as possible.

Proposal Review Information

1. Initial Eligibility Review

Proposals submitted after the deadline on the cover sheet and in Exchange will be deemed ineligible and declined without review.

Prior to a full merit evaluation, EERE will perform an initial eligibility review to determine that (1) the applicant is an eligible entity under this Laboratory Call; (2) the information required by the Laboratory Call has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the Laboratory Call. Proposals that fail to pass the initial eligibility review will not be forwarded for merit review and will be eliminated from further consideration.

2. Proposals

Proposal content aligns with content required in the EERE AOP project forms, with additional information to assist reviewers in evaluating technical details. 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). References do not count toward the page limit.

Project Specific Implementation of lab-wide DEI plan

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 lab-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 Diversity, Equity and Inclusion Implementation Plan should be integrated into the technical volume.

Appendix A: CHP Deployment Program- Proposal Submission and Template

Proposals must be submitted through Exchange by **September 13, 2021, 5:00 pm ET**. The proposal should include the information requested in Section 1 below, respond to each of the items in Sections 2 and 3, and the budget items in Section 4, and be submitted in Portable Document Format (PDF). Proposals may include an appendix of team members' resumes (no other information or materials). Proposals must not exceed 20 pages single spaced, 12-point font with standard margins. The budget document, the proposed resumes, and any industry partner's cost share commitment letter can be additional pages beyond the 20-page limit. Additional pages beyond that will not be reviewed.

Section 1: Project Administrative Detail

Project Title		
Topic		
Laboratory		
Principal Investigator	Name:	E-mail:
Proposed Budget per year ($K)		
Period of Performance	Start:	End:

Section 2: Project Plan

Please describe how this proposal supports the CHP program objectives: Please also characterize how your proposed coalition partners will contribute to the program:

Please describe the project approach, work plan, and how the project will achieve the CHP program goals and expectations:

Please describe the technical scope of the proposed work plan, including how the coalition partners' technical expertise and capabilities will help meet the CHP program goals and expectations:

Please describe any potential risks or challenges to successfully completing the project plan and mitigation strategies to address these:

Please describe proposed project metrics and milestones:

Please describe proposed DEI plan:

Section 3: Team and Resources

Please describe the team members and their abilities, unique roles, time commitment, programmatic relationship, and relevant experience/background. Please identify any educational experts by name and explain any additional staffing needs or hiring plans:

Please describe the team's commitment to the project and any additional resources it plans to commit to support the project objectives:

Other notes. If there is other relevant information the Laboratory would like to convey, please include it below:

Section 4: Proposed Project Timeline and Budget

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

Other			
Total DOE Funding			
Total Non-DOE Funding			
Total			

Appendix B: Education and Workforce Development - Proposal Submission and Template

Proposals must be submitted through Exchange by **September 13, 2021, 5:00 pm ET**. The proposal should include the information requested in Section 1 below, respond to each of the items in Sections 2 and 3, and the budget items in Section 4, and be submitted in Portable Document Format (PDF). Proposals may include an appendix of team members' resumes (no other information or materials). Proposals must not exceed 15 pages single spaced, 12 point font with standard margins. The budget document, the proposed resumes, and any industry partner's cost share commitment letter can be additional pages beyond the 15 page limit. Additional pages beyond that will not be reviewed.

Section 1: Project Administrative Detail

Project Title		
Topic		
Lab		
Principal Investigator	Name:	E-mail:
Proposed Budget ($K)		
Period of Performance	Start:	End:

Section 2: Project Plan

Please describe how this proposal supports the EWD objectives: Please also characterize how your proposed coalition partners will contribute to the EWD Roadmap:

Please describe the project approach, work plan, and how the project will achieve the EWD Roadmap goals and expectations:

Please describe the technical scope of the proposed work plan, including how the coalition partners' technical expertise and capabilities will help meet the EWD Roadmap goals and expectations:

Please describe any potential risks or challenges to successfully completing the project plan and mitigation strategies to address these:

Please describe proposed project metrics and milestones:

Please describe proposed DEI plan:

Section 3: Team and Resources

Please describe the team members and their abilities, unique roles, time commitment, programmatic relationship, and relevant experience/background. Please identify any educational experts by name and explain any additional staffing needs or hiring plans:

Please describe the team's commitment to the project and any additional resources it plans to commit to support the project objectives:

Other notes. If there is other relevant information the Laboratory would like to convey, please include it below:

Section 4: Proposed Project Timeline and Budget

Cost Category	Project Year 1	Project Year 2	Total
Labor –			
FTE:			
Labor - Additional staff			
Materials & Supplies			
Travel			
Subcontracting			
Overhead			

Other			
Total DOE Funding			
Total Non-DOE Funding			
Total			