Department of Energy (DOE)
Wind Energy Technologies Office (WETO)

Bipartisan Infrastructure Law (BIL) FOA to Address Key Deployment Challenges for Offshore, Land-Based, and Distributed Wind

Funding Opportunity Announcement (FOA) Number: DE-FOA-0002828
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FOA Issue Date:	12/06/2022
Submission Deadline for Concept Papers:	01/20/2023, 5:00pm ET
Submission Deadline for Full Applications:	03/27/2023, 5:00pm ET
Expected Date for DOE Selection Notifications:	August 2023
Expected Timeframe for Award Negotiations:	August - December 2023

- Applicants must submit a Concept Paper by 5:00pm ET on the due date listed above to be eligible to submit a Full Application.

- To apply to this FOA, applicants must register with and submit application materials through EERE Exchange at https://eere-exchange.energy.gov/, EERE's online application portal.

- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the selection.

- **Unique Entity Identifier (UEI) and System for Award Management (SAM)** - Each applicant (unless the applicant is excepted from those requirements under 2 CFR 25.110) is required to: (1) Be registered in the SAM at https://www.sam.gov before submitting its application; (2) provide a valid UEI number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active federal award or an application or plan under

consideration by a federal awarding agency. DOE may not make a federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, the DOE will determine that the applicant is not qualified to receive a federal award and use that determination as a basis for making a federal award to another applicant.

NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process they should utilize the HELP feature on SAM.gov. SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: GSAFSD Tier 0 Knowledge Base - Validating your Entity.

Modifications

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

Mod. No.	Date	Description of Modification	Page #
0001	12/21/2022	Clarified Federal agency eligibility language for Topic Area 3	44
0002	2/1/2023	Add Section IV.D.xix. Community Partnership Documentation	74
0003	2/8/2023	Add Budget Period Information to Section I.B.iii Topic Area 3: Offshore Wind Energy Social Science Research Revised Go/No-Go recommended timeframe in Section IV.D.ii. Technical Volume	26, 27 62
0004	2/22/2023	Revised Submission Deadline for Full Applications: Expected Date for DOE Selection Notifications: Expected Timeframe for Award Negotiations: *On cover page* Revised II.A.i Estimated Funding for Topic Area 4	Cover Page 41, 42
0005	2/28/2023	Added Budget Period information in Section I.B.i. Topic Area 1 High Voltage Direct Current (HVDC) for Offshore Wind, and Section I.B.ii. Topic Area 2: Advancing Deployment of Distributed (ADD) Wind Revised Budget Period Information in Section I.B.iii. Topic Area 3: Offshore Wind Energy Social Science Research Revised Section II.A.ii. Period of Performance table	21, 22 26 42
0006	3/9/2023	Add two bullets to Section IV.E. Post Selection Information Requests Added Section IV.I.xiv. Foreign Collaboration Considerations.	75 87

0007	3/21/2023		Revised Section IV.D.xv. Open Source Software Distribution Plan and Appendix D – Open Source Software	69, 137

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I. Funding Opportunity Description

A. Background and Context

The Wind Energy Technologies Office (WETO) is issuing this Funding Opportunity Announcement (FOA). Awards made under this FOA will be funded, in whole or in part, with funds appropriated by the Infrastructure Investment and Jobs Act[1], more commonly known as the Bipartisan Infrastructure Law (BIL).

The BIL is a once-in-a-generation investment in infrastructure, designed to modernize and upgrade American infrastructure to enhance United States competitiveness, drive the creation of good-paying union jobs, tackle the climate crisis, and ensure stronger access to economic, environmental, and other benefits for disadvantaged communities.[2] The BIL appropriates more than $62 billion to the Department of Energy (DOE)[3] to invest in American manufacturing and workers; expand access to energy efficiency and clean energy; deliver reliable, clean and affordable power to more Americans; and demonstrate and deploy the technologies of tomorrow through clean energy demonstrations.

As part of and in addition to upgrading and modernizing infrastructure, DOE's BIL investments will support efforts to build a clean and equitable energy economy that achieves a zero-carbon electricity system by 2035, and to put the United States on a path to achieve net-zero emissions economy-wide by no later than 2050[4] to benefit all Americans.

With respect to WETO and this FOA in particular, BIL section 41007(b)(1) invests appropriations of $60 million(M) for the four (4)-year period encompassing Fiscal Years (FYs) 2022 through 2025 to carry out general wind research and development activities under section 3003(b)(2) of the Energy Act of 2020 (42 U.S.C. 16237(b)(2)).

[1] Infrastructure Investment and Jobs Act, Public Law 117-58 (November 15, 2021). https://www.congress.gov/bill/117th-congress/house-bill/3684. This FOA uses the more common name "Bipartisan Infrastructure Law".

[2] Pursuant to E.O. 14008 and the Office of Management and Budget's Interim Justice40 Implementation Guidance M-21-28, DOE has developed a definition and tools to locate and identify disadvantaged communities. These resources can be located at https://energyjustice.egs.anl.gov/. DOE will also recognize disadvantaged communities as defined and identified by the White House Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST), which can be located at https://screeningtool.geoplatform.gov/.

[3] U.S. Department of Energy. November 2021. "DOE Fact Sheet: The Bipartisan Infrastructure Deal Will Deliver For American Workers, Families and Usher in the Clean Energy Future." https://www.energy.gov/articles/doe-fact-sheet-bipartisan-infrastructure-deal-will-deliver-american-workers-families-and-0

[4] Executive Order (EO) 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

The activities to be funded under this FOA support BIL section 41007(b)(1) and the broader government-wide approach to enable the innovations needed to advance U.S. wind systems, reduce the cost of electricity, and accelerate the deployment of wind power, maximize the benefits of the clean energy transition as the nation works to curb the climate crisis, empower workers, and advance environmental justice. The FOA consists of four Topic Areas as summarized in the table below:

Topic Area	**Title**	**Summary**
Topic Area 1, Subtopic 1a	High-Voltage Direct Current (HVDC) Standards and Benchmark System Development for Offshore Wind	Understand gaps in U.S. HVDC standards and begin addressing by developing a benchmark system and proposing and revising standards, especially to incorporate transmission for offshore wind.
Topic Area 1, Subtopic 1b	Multi-terminal HVDC Controls and Functional Requirements	Develop HVDC controls and identify functional requirements to address multi-terminal HVDC deployment barriers.
Topic Area 1, Subtopic 1c	HVDC Curriculum Development for Education and Workforce Training	Develop HVDC curriculum for education and workforce training.
Topic Area 2	Advancing Deployment of Distributed (ADD) Wind	Develop innovative zoning and permitting processes to make distributed wind (DW) more accessible to community members in localities where DW can be deployed cost-effectively and equitably to support community-based energy transition.
Topic Area 3, Subtopic 3a	Community Impacts of Offshore Wind Development	Social science research that characterizes the impacts of offshore wind development on affected communities through time, with particular interest in interactions between offshore wind and local economies.
Topic Area 3, Subtopic 3b	Capacity Building for Community Participation in Offshore Wind	Connect communities with the full offshore wind development process through community-driven, collaborative capacity building.
Topic Area 4	Bat Deterrent Technology Development	Advance bat deterrent technologies through behavioral research, field testing, and hardware development.

Additional background on the four Topic Areas is summarized below:

Topic Area 1: High Voltage Direct Current (HVDC) for Offshore Wind

The rapid deployment at scale for wind and other renewable resources requires cost-effective transmission solutions[5]. HVDC transmission lines are an effective technology[6] both on land and offshore to accomplish this deployment. Some of the highest quality wind resources[7] in the United States are located offshore. The Administration has set a near-term offshore wind deployment goal of 30 gigawatts (GW) by 2030 and achieving it could unlock a pathway to 110 GW by 2050. Along the Atlantic and Pacific coasts, many States have set their own procurement goals[8] for offshore wind development. HVDC transmission can connect large amounts of new geographically diverse variable renewable energy resources that are far from load centers. As a result, HVDC transmission can facilitate achievement of the Administration's goal of 100% carbon pollution-free electricity by 2035.

HVDC is currently only a small fraction of the existing high voltage transmission lines in the United States.[9] Of the over 160,000 miles[10] of high voltage lines, only 2,370 miles are HVDC – approximately 1.5%. U.S. HVDC lines include four overhead transmission lines[11] built from 1970 to 1986 and three short underwater lines[12] commissioned from 2002 to 2010. Additionally, there are seven High Voltage Alternating Current (HVAC)-HVDC-HVAC back-to-back converter stations along the eastern-western interconnect[13] boundary from Montana to New Mexico. Five were built between 1977 and 1988 and two were added in 2003-2005. Although several large HVDC projects to deliver renewable generation to load centers are in the planning phases,[14] HVDC has not been a significant part of U.S. grid development since the 1970-1980s.

Currently, there are gaps in standards with respect to HVDC connected offshore wind projects. Multi-terminal offshore HVDC systems[15] are identified as critical

[5] Transmission-Planning-White-Paper.pdf (esig.energy)
[6] https://www.eia.gov/analysis/studies/electricity/hvdctransmission/pdf/transmission.pdf
[7] Wind Resource Maps and Data | Geospatial Data Science | NREL
[8] Chapter 2, Offshore Wind Market Report: 2022 Edition (energy.gov)
[9] https://en.wikipedia.org/wiki/List_of_HVDC_projects#North_America
[10] https://www.eia.gov/todayinenergy/detail.php?id=27152
[11] Pacific DC Intertie, Square Butte, Coal Creek to Dickson, and Intermountain Power Project.
[12] Cross Sound, Neptune, and TransBay
[13] https://www.nrel.gov/analysis/seams.html
[14] VT: http://necplink.com/, IA-IL: https://soogreen.com/, WY-NV: http://transwestexpress.net/, IA-IL: https://icc.illinois.gov/industry-projects/rock-island-clean-line-project, KS-IN: https://grainbeltexpress.com/, NY: https://www.cleanpathny.com/, Canada-NY: https://chpexpress.com/
[15] https://eepublicdownloads.azureedge.net/clean-documents/Publications/Position papers and reports/2021/entso-e_pp_Offshore_Development_03_Interoperability_210125.pdf

elements in offshore wind deployment; however, technical challenges such as multi-vendor interoperability, DC grid protection, and system stability require additional research, development, and demonstration.

The HVDC Topic Area addresses gaps in HVDC standards and benchmark systems for offshore wind, multi-terminal HVDC controls and functional requirements, and curriculum development for education and workforce training. Addressing these gaps is expected to facilitate development of HVDC transmission, which in turn will enhance deployment of offshore wind.

Topic Area 2: Advancing Deployment of Distributed (ADD) Wind

Deploying place- and community-based energy solutions such as distributed energy resources (DERs)—technologies used to generate, store, and manage energy consumption for nearby energy customers—can help meet decarbonization and energy equity goals while increasing power system reliability and resilience. Wind turbines used as a DER—i.e., distributed wind (DW)— are typically installed at residential, agricultural, commercial, industrial, or community sites to offset retail power costs or secure long-term power cost certainty, support grid operations and local loads, and provide backup power. The WETO DW research program sponsors a multi-faceted portfolio of investments advancing DW by reducing costs, increasing power production efficiency and predictability, improving distributed energy system integration, and supporting national, state, and local capacity to deploy DW projects.

DW technology development and cost reduction has lagged behind distributed solar photovoltaics (DPVs) and land-based utility-scale wind, but recent advancements are closing the gap. A new generation of cost-competitive, DER-compatible, and grid-responsive DW technologies is being commercialized. To inform wind developers, grid planners, utilities, policymakers, and community stakeholders about opportunities for widespread U.S. deployment of next-generation DW technologies, DOE recently published the Distributed Wind Energy Future Study. The study finds that at present DW has nearly 1,400 GW of economic potential today, and could reach multiple terawatts in 2035, representing a largely untapped near-term opportunity to make significant contributions the nation's electricity supply. In addition, the study notes that because DW is sited and used locally, it is well positioned to support community- and industry-based energy transitions to carbon-free electricity sources, does not require the long timelines associated with transmission expansion, and in many regions has strong complementarity with DPV. To support the expanded use of DW in the energy transition, an understanding of DW technology must be established for project development stakeholders. A general lack of familiarity with modern DW technologies and their application is complicating project development procedures at the national, state, and local levels and constraining deployment. This knowledge gap is evident, for example, in local

zoning ordinances and permitting requirements where a lack of policies or restrictive regulations are limiting the deployment of DW in regions that are favorable for development. Fortunately, many of the market barrier and soft cost reduction approaches and deployment acceleration models successfully implemented by DPV are applicable to DW, and learnings from DPV market expansion can be leveraged to facilitate DW deployment acceleration.

The ADD Wind Topic Area seeks to leverage renewable energy deployment networks nationwide and engage stakeholders to rethink DW project development processes. Specifically, the ADD Wind Topic Area will seek to address deployment barriers associated with local zoning ordinances and permitting processes by innovating and piloting the most promising policies and processes that work for communities and developers. WETO seeks solutions that reduce the time and costs associated with project permitting, are informed by the different scales (kilowatt (KW) and megawatt (MW)) of DW development and local land use and are broadly applicable regionally and nationally as appropriate. WETO's objectives under this Topic Area are to develop and pilot innovative policies and processes for DW permitting and leverage national renewable energy deployment and stakeholder networks to disseminate the most promising solutions. The desired impact of this Topic Area is to make DW more accessible to community members in localities where DW can be cost effectively and equitably deployed to support place-based energy transitions.

Topic Area 3: Offshore Wind Energy Social Science Research

As stated, the Administration aims to deploy 30 gigawatts of offshore wind energy by 2030[16] in an effort to promote the climate and economic benefits of offshore wind energy. As part of the broader clean energy transition, the Administration has also committed to delivering environmental quality, union jobs, and health, socioeconomic, and other benefits of clean energy to all communities, including historically disadvantaged communities.[17] The growth of a domestic offshore wind industry, including the development of a domestic supply chain, has the potential to support a clean energy transition and promote job growth and infrastructure. The growth of the industry also has the potential to affect use of ocean space, viewsheds, sense of place, and local economies. There are 42 MW of offshore wind currently deployed in the United States. With tens of thousands more MW planned, there is a significant need to understand the potential social effects of this scale of development through time, the potential distribution of such effects across the

[16] https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/29/fact-sheet-biden-administration-jumpstarts-offshore-wind-energy-projects-to-create-jobs/

[17] https://www.whitehouse.gov/ceq/news-updates/2022/07/26/icymi-biden-harris-administration-announces-additional-covered-programs-for-inclusion-in-the-justice40-initiative/

communities, and to ensure communities have the knowledge and capacity to fully participate in the offshore wind development.

Through this Topic Area, WETO seeks to better understand the positive and negative effects of expanded offshore wind development on affected communities' workforce, economies, and relationships to the marine environment and other resources, and to help communities build capacity to participate in the offshore wind development process. WETO is soliciting projects in two subtopics:

a) Community Impacts of Offshore Wind Development - Peer-reviewed social science literature on the relationships between coastal communities and offshore wind development in the United States is relatively sparse due to the limited scope of development to date. That which does exist largely focuses on perceptions and concerns along the Eastern Seaboard and impacts of the Block Island Wind Farm off the coast of Rhode Island.[18] The limited scope of the literature, contrasted with the dramatic expansion of planned development, presents a compelling need to expand foundational knowledge and social science research related to the effects of offshore wind energy development, including the accompanying supply chain expansion, on affected communities. This subtopic invites proposals for longitudinal research to understand the impacts of offshore wind development on affected communities through time, with a particular focus on effects on local economies.
b) Capacity Building for Community Participation in Offshore Wind – Rapid expansion of the offshore wind industry in the United States means stakeholders and communities are working to understand processes, impacts, and engagement opportunities relating to development. There is opportunity to build capacity for engagement utilizing existing information from domestic and international development as well as creating domestic communities of practice. Activities that address community-identified needs can support local preparation for and engagement with current and future offshore wind development. This subtopic invites proposals that connect communities with the full offshore wind development process through capacity building activities such as offshore wind education, structured dialogue on issues of concern, peer-to-peer learning, and the creation of tools and resources that communities need to engage in offshore wind development more fully.

Improved data, information, and understanding on the effects of offshore wind on communities, and more effectively connecting communities to the offshore wind development process, will support improved development processes, lead to more

[18] See Dwyer and Bidwell (2019) and Smythe, Bidwell and Tyler (2021) as examples of existing social science research that address these topics.

equitable outcomes, and help maximize the benefits and minimize negative impacts to communities from offshore wind energy development.

Topic Area 4: Bat Deterrent Technology Development

As wind power deployment expands in the United States, developers have access to fewer sites with easy transmission interconnections and low potential conflict with wildlife. Of the species impacted by wind power, bats represent a significant and growing environmental concern for land-based wind deployment and operation.

The U.S. Fish and Wildlife Service (USFWS) has proposed to reclassify the northern long-eared bat and the tricolored bat each as an endangered species under the Endangered Species Act. The little brown bat is currently under review regarding whether it should be listed as endangered. USFWS is also gathering data to better understand the relative threat of wind energy development for hoary bat populations, which make up roughly 35% of all bat fatalities at wind facilities. Nearly all deployable areas for wind energy development in the United States overlap with habitat ranges for these four species.

At present, the primary means for addressing bat fatalities at wind facilities is through operational curtailment. In the context of wildlife impact minimization, curtailment refers to stopping turbine blades from spinning at times of high risk to the species of concern. This approach can be costly and reduces the energy generation and reliability of wind energy facilities. Seasonal curtailment may also render wind energy development cost-prohibitive in regions with lower wind speeds.

Bat deterrents—devices that deter bats from the rotor swept area of wind turbines—are a potential alternative to curtailment. The most developed technologies use ultrasound to deter bats from the rotor swept area. The development of bat deterrent technologies (ultrasonic or otherwise) may help further minimize or eliminate the need for curtailment and reduce the environmental impacts of wind turbines to bats. These deterrent options remain early-stage and require additional support to solve wind-turbine integration, reliability, and performance challenges.

Through this Topic Area, WETO seeks to improve the species-specific effectiveness of bat deterrent technologies in three ways: 1) Targeted behavioral research studying stimuli that effectively deter bats from an area (e.g., sound, light, smell, etc.); 2) in situ bat deterrent testing at a commercial-scale wind energy facility; and 3) efforts to advance the reliability, durability, and integration of deterrent technologies.

i. Program Purpose

This FOA supports the Administration's goals laid out above by supporting solutions to several key challenges to accelerating the deployment of wind energy. Analysis of future decarbonization scenarios consistently finds that dramatic acceleration of wind energy deployment will be required to decarbonize the grid by 2035 and put the nation on a pathway to a net-zero carbon economy by 2050 and realizing the attendant benefits to all Americans of less-volatile energy costs, reduced climate impacts, and the elimination of air pollution from fossil fuel power plants. The FOA is a key part of WETO's implementation of section 3003(b)(2) of the Energy Act of 2020 (42 U.S.C. 16237(b)(2)) and BIL section 41007(b), which respectively authorize and appropriate funds for a wide range of wind energy research, development, and deployment activities.

ii. Technology Space and Strategic Goals

WETO is focused on three key opportunities for U.S. wind energy through 2030 and beyond:

- Reduce the cost of wind energy for all applications, targeting:
  - For land-based wind, 2.3 cents/kWh by 2030
  - For fixed-bottom offshore wind, 5.1 cents/kWh by 2030
- Enable the integration of up to 50% wind energy or more into the U.S. grid while increasing grid resilience and reliability and supporting the electrification of U.S. industry, transportation, and buildings.
- Reduce impacts on the environment and affected communities and facilitate just, inclusive, and equitable development and delivery of wind energy.

Detailed technical descriptions of the specific Topic Areas are provided in the sections that follow.

B. Topic Areas

This FOA consists of four Topic Areas. Topic Areas 1 and 3 include Subtopic Areas. Descriptions for all Topic Areas and Subtopics are provided below.

All work for projects selected under this FOA must be performed in the United States. See Section IV.I.iii. and Appendix B.

i. Topic Area 1: High Voltage Direct Current (HVDC) for Offshore Wind

WETO released a Request for Information[19] in November 2020 on offshore wind transmission system integration research needs. Following that, a series of industry outreach and broader scoping calls were conducted to collect more information. Areas identified by respondents included, but were not limited to, the optimal design of transmission configurations; use of HVDC; and gaps for HVDC deployment in U.S. such as lack of standards, needs for control and model validations, and workforce training. WETO also performed a literature review and gaps analysis[20] of transmission activities in the Atlantic coastal region. From this activity, WETO initiated an analysis of transmission solutions[21] including HVDC options for offshore wind development in the Atlantic Ocean and is engaged in further convening calls and workshops associated with the Building a Better Grid initiative.[22]

With HVDC being identified as an enabler for offshore wind transmission, in May 2022, WETO held a topic specific HVDC workshop jointly with the DOE Office of Electricity to further define the research and development needs of HVDC technologies. The workshop convened more than 100 stakeholders, including equipment manufacturers, developers, consultants, utilities/system operators, academia, and national labs. Discussion included grid System Architecture, HVDC Station Architecture and Equipment, and Tools, Standards, and Workforce. While a long-term strategic research and development roadmap is currently under development as the result of the workshop, this Topic Area addresses near-term needs for offshore HVDC technologies. Applicants are encouraged to submit proposals that address any or all of the following areas, submitting each subtopic proposal separately:

Subtopic 1a: HVDC Standards and Benchmark System Development for Offshore Wind

The alternating current (AC)-dominant power grid has a history of more than a century. Over the years, a suite of standards has been established to guide the planning and operational principles of the grid. In North America, the North American Electric Reliability Corporation (NERC) Reliability Standards[23] "define

[19] https://www.federalregister.gov/documents/2020/11/27/2020-26149/notice-of-request-for-information-rfi-on-offshore-wind-transmission-system-integration-research
[20] https://www.energy.gov/sites/default/files/2021-10/atlantic-offshore-wind-transmission-literature-review-gaps-analysis.pdf
[21] https://www.nrel.gov/wind/atlantic-offshore-wind-transmission-study.html
[22] https://www.energy.gov/oe/building-better-grid-initiative
[23] https://www.nerc.com/pa/Stand/Pages/default.aspx

the reliability requirements for planning and operating the bulk power system and are developed using a results-based approach that focuses on performance, risk management, and entity capabilities". NERC's set of standards[24] cover issues from real power balancing, to cybersecurity and communication, to transmission planning, model validation, and more.

The Institute of Electrical and Electronics Engineers (IEEE) Power and Energy Society[25] creates and maintains standardization documents that define a broad range of activities related to the power grid. Other organizations such as the International Electrotechnical Commission (IEC[26]) have developed standards based in part on international power systems technical publications from CIGRE.[27]

Standards are evolving. For example, IEEE 2800-2022[28] was established recently for interconnection and interoperability of inverter-based resources that interconnect with transmission systems. It also includes the interconnection of individual HVDC facilities, such as offshore wind plants, into the AC grid via inverters and their associated functional requirements.

Although NERC and IEEE standards include all transmission infrastructure on land and offshore, they do not comprehensively address shared ocean transmission corridors, multi-terminal HVDC stations, or extreme weather conditions facing offshore development. Review of these and other standards for gaps associated with offshore wind development and operation is needed.

In addition, to date, the majority of HVDC systems have been built by a single vendor as turn-key projects. A multi-vendor solution is, however, likely to build large-scale HVDC grids in a step-by-step manner. Multiple challenges with multivendor interoperability have been identified in the literature.[29] In Europe,[30]

[24] https://www.nerc.com/pa/Stand/Reliability Standards Complete Set/RSCompleteSet.pdf
[25] https://www.ieee-pes.org/technical-activities/standards
[26] https://www.iec.ch/dyn/www/f?p=103:7:0::::FSP_ORG_ID,FSP_LANG_ID:3988,25
[27] https://www.cigre.org/article/GB/knowledge-programme/study-committees/b4---dc-systems-and-power-electronics
[28] https://www.techstreet.com/ieee/standards/ieee-2800-2022?gateway_code=ieee&vendor_id=10453&product_id=2212471
[29] https://ietresearch.onlinelibrary.wiley.com/doi/10.1049/gtd2.12165
[30] https://windeurope.org/newsroom/news/tsos-hvdc-technology-suppliers-and-the-wind-industry-join-forces-to-build-the-dc-grid-of-the-future/#:~:text=Multi-terminal%20high%20voltage%20direct%20current%20%28HVDC%29%20systems%2C%20integrating,450GW%20of%20offshore%20wind%20across%20Europe%20by%202050.

the European Union has established a more comprehensive grid code[31] related to HVDC's connection to the AC grid; however it has gaps. The European Network of Transmission System Operators for Electricity (ENTSO-E) in coordination with the trade associations T&D Europe and WindEurope have defined workstreams[32] and set research priorities for the development, delivery and deployment of multi-terminal, multi-vendor HVDC systems specific to offshore wind. The READY4DC project[33] is an industry consortium with the goal to plan for Europe's first multi-terminal, multi-vendor HVDC project both on land and offshore.

While the international efforts on HVDC standards can be leveraged, the lack of comprehensive interconnection and interoperability standards for HVDC and multi-terminal HVDC systems is becoming a barrier to the rapid deployment of offshore wind in United States.

IEEE and CIGRE have developed standard test systems over the past decades for benchmarking power system studies. A 2019 IEEE Industrial Electronics Magazine article[34] provides an overview and pro and cons of these benchmark systems. For example, most IEEE benchmark systems have not been updated to include variable renewable resources and HVDC, although some modifications have been suggested. CIGRE benchmark systems include more extensive HVDC elements, but the wind representation is limited. Other ongoing efforts include KU Leuven's[35] test system[36] for electromagnetic transient studies with HVDC and offshore wind.

To address these identified issues, the goals of this Subtopic Area are: a) to establish vendor-neutral HVDC standards for new HVDC systems connecting offshore wind to the existing AC or DC grid; and b) to establish at least one HVDC benchmark system and relevant standardized scenarios, conditions, and reference results that can be used for future offshore wind HVDC studies and research.

[31] https://www.legislation.gov.uk/eur/2016/1447#:~:text=Commission%20Regulation%20%28EU%29%202016%2F1447%20of%2026%20August%202016,Treaty%20on%20the%20Functioning%20of%20the%20European%20Union%2C

[32] https://eepublicdownloads.azureedge.net/clean-documents/RDC documents/210505 Multi-Vendor-HVDC-workstream.pdf

[33] https://www.ready4dc.eu/

[34] https://ieeexplore.ieee.org/document/8939187

[35] https://www.esat.kuleuven.be/electa/hvdcresearch/hvdc-test-grid

[36] https://limo.libis.be/primo-explore/fulldisplay?docid=LIRIAS1620915&context=L&vid=Lirias&search_scope=Lirias&tab=default_tab&fromSitemap=1

It is anticipated that up to two projects will be chosen in this subtopic Area:

- One proposal focused on revisions to existing standards or proposing new standards to comprehensively address the transmission interconnection of offshore wind through HVDC and to ensure interoperability of HVDC components. The proposal should include identification of gaps in existing standards, development of a timeline detailing the process flow of proposing new standards or revising existing standards that fill the gaps, and initiation of processes to implement proposed changes.
- One proposal focused on developing and implementing an HVDC benchmark system including development of standardized interoperability tests.

One proposal may be chosen that achieves both activities. Applicants are encouraged to submit proposals that address one or both focus areas.

Desired Application Qualities:

- Project Deliverables:
  - For HVDC standards and standardization: The proposed project must develop vendor neutral HVDC standards that support both point-to-point HVDC connection and multi-terminal HVDC (MTDC) grid and the expansion from the former to the latter. The standards should include standard functional requirements (such as control modes, dynamic performance, start-up and shutdown procedures, protection strategies, and fault-ride-through capability) and standard interfaces at AC or DC points of interconnection. Standards should also address multi-vendor interoperability of HVDC grid protection. Other standards such as standard DC voltage levels and planning standards for MTDC grid are highly recommended. The scope of work proposed should include conducting gap analysis on existing standards and initiating a path towards filling the gaps, such as initiating a Standard Authorization Request (SAR[37]) with NERC or a Project Authorization Request (PAR[38]) with IEEE. The proposed work can be in the form of a roadmap with a timeline and action plan. Applicants should clearly describe the organizations that they anticipate approaching to modify rules and standards. The proposal should identify the expected timeframe for approval by the organization along with steps necessary from proposed change to approved implementation.

[37] https://www.nerc.com/pa/Stand/Pages/SARs.aspx
[38] https://standards.ieee.org/faqs/pars/

- For benchmark system: The proposed project must develop or improve HVDC benchmark test systems. The benchmark system should properly model at least a four-terminal HVDC network connecting at least two offshore wind plants to a meshed AC grid consisting of at least 30 buses. Standardized tests using the benchmark system should at a minimum include power flow, stability, control interaction, and fault behavior studies in both phasor and electromagnetic transient domains and at various AC grid strength conditions. It is expected that the benchmark system, including its topology, component models, parameters, and controls, be established, in consultation with technical stakeholders. Additionally, the proposed project will establish protocols for using the benchmark system for interoperability testing at multiple time scales. The draft benchmark test system must be completed within 18 months of project initiation so that it can be used by recipients of subtopic 1b for functional requirements testing. An IEEE publication at the end of the project is preferred.

- Project Team: Applicants must provide a description of the project team. WETO emphasizes increasing diversity of research staff, increasing diversity of voices in research design, and increasing quantification and emphasis on supporting underserved communities. It is preferred that the project team include co-Principal Investigators from multiple organizations. The team must include relevant industry members from equipment manufacturers, consultants, electric utilities, and system operators including those who will use the benchmark test system for product or system testing. The application must include letters of support clearly indicating each team member or advisor role and the support of their organization.
- Broadened Impact: Applicants must include with their proposal a plan for including stakeholders in project development and a plan for communication and outreach upon conclusion of the project. Applicants should consider how to communicate results more broadly over diverse audiences. This should include broadly communicating the gaps and developed approaches to non-technical audiences.

Subtopic 1b: Multi-Terminal HVDC Controls and Functional Requirements
While point-to-point HVDC technologies are relatively mature and have been deployed in the United States, MTDC is nascent yet gaining traction.

Developments are occurring in the UK, India, and China.[39] In the United States, several studies have analyzed or are actively analyzing the cost and benefit of MTDC networks.[40]

Interest in MTDC for offshore wind is also increasing. ENTSO-E published a series of position papers in 2020–2021 that discussed possible solutions to the realization of the European Commission's Offshore Wind strategy. Offshore MTDC systems are identified as critical elements in the potential solutions. However, technical challenges such as multi-vendor interoperability, DC grid protection, and system stabilities require additional research, development, and demonstration.

In the United States, the first tranche of commercial-scale offshore wind plants such as Vineyard Wind 1[41] are expected to connect to the onshore AC grid through radial HVAC export cables as illustrated in Figure 1, configuration (a). The interconnection process is the same as how other renewables onshore are interconnected and then operated. When an offshore wind plant is further away from shore, higher capacity radial HVDC cables that connect wind plants to land and associated HVDC equipment often cost less and have lower environmental impacts than equivalent capacity multiconductor HVAC lines. A radial point-to-point HVDC connection, as shown in Figure 1, configuration (b) with HVDC converters at both ends can be economical. In the United States, the Sunrise Wind Offshore project[42] will be the first to use a radial HVDC transmission system.

Several Atlantic states are exploring coordinated solutions with shared transmission infrastructures. New York released its third solicitation[43] for offshore wind projects in July 2022. It included a stipulation that proposed projects include design of a "meshed ready[44]" offshore transmission configuration, expanding and interconnecting the grid as shown in Figure 1,

[39] ABB Power Grids supports China to build multi-terminal power transmission projects; Multi-Terminal VSC HVDC Transmission Project Commissioned in China - Offshore Energy (offshore-energy.biz)
[40] Interconnections Seam Study | Energy Analysis | NREL; National Transmission Planning Study | Department of Energy; Atlantic Offshore Wind Transmission Study | Wind Research | NREL; Transmission-Planning-White-Paper.pdf (esig.energy); The Value of Inter-Regional Coordination and Transmission in Decarbonizing the US Electricity System - ScienceDirect; Design and Valuation of High-Capacity HVDC Macrogrid Transmission for the Continental US | IEEE Journals & Magazine | IEEE Xplore
[41] https://www.vineyardwind.com/vineyardwind-1
[42] https://sunrisewindny.com/news/2021/10/sunrise-wind-will-be-first-offshore-wind-project-in-united-states--to-use-hvdc-transmission-technology
[43] https://www.nyserda.ny.gov/About/Newsroom/2022-Announcements/2022-07-27-Governor-Hochul-Announces-Third-Offshore-Wind-Solicitation
[44] https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00P8z000000gjB1EAI

configuration (c). This configuration will enable the expansion of point-to-point HVDC connected offshore transmission to form an offshore grid at the AC side of HVDC converters with AC interlinks. New York's "meshed ready" design also includes specific requirements in control, interface, performance, and functionality. Additionally, New Jersey is working closely with PJM Interconnection (PJM) to initiate the State Agreement Approach[45] with four offshore transmission options including a shared HVAC or HVDC interlink between offshore wind farms. A shared backbone, as illustrated in Figure 1, (d) configuration, is the multi-terminal HVDC topology formed by connecting HVDC converters with DC interlinks. Further, five New England states have issued and RFI[46] that explores a modular offshore wind integration plan with HVDC.

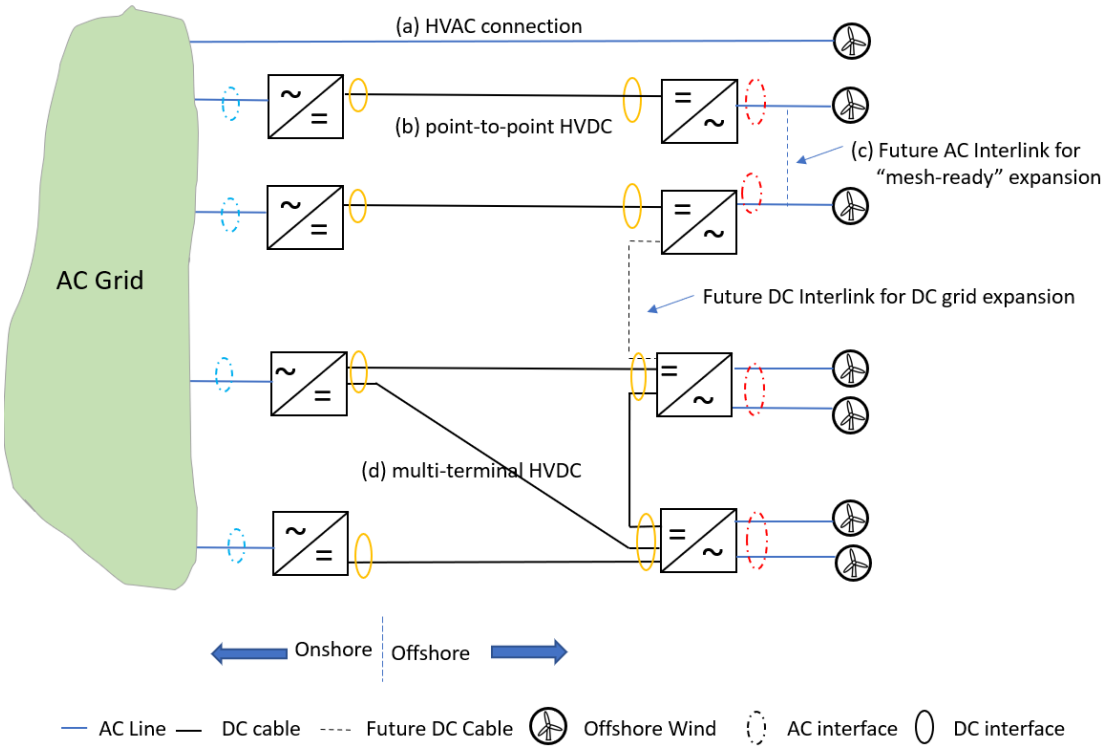

Figure 1: Illustrative Offshore Transmission Topology Configurations
(a) point to point HVAC connection; (b) point to point HVDC connection;
(c) AC interlink for meshed AC grid; (d) MTDC

45 https://www.nj.gov/bpu/newsroom/2022/approved/20220127.html#:~:text=The%20Agreement%2C%20known%20as%20the%20State%20Agreement%20Approach,7%2C500%20MW%20of%20offshore%20wind%20energy%20by%202035.

46 https://newenglandenergyvision.files.wordpress.com/2022/09/transmission-rfi-notice-of-proceeding-and-scoping.pdf

Among the four offshore transmission topologies illustrated in Figure 1, multi-terminal HVDC has promise but is the most technically challenging. Researchers primarily from Europe and China have worked on this subject over past decade. Their research areas include modeling and control of DC grids,[47] planning a meshed HVDC offshore, HVDC grid protection.[48] Large European projects, such as BEST PATHS and Progress on Meshed HVDC Offshore Transmission Networks (PROMOTioN),[49] have made significant progress in evaluating the-state-of-the-art and addressing some of the gaps. However, practical experiences in planning and operating multi-terminal HVDC is still quite limited globally.

This Subtopic Area intends to leverage international experiences and address certain HVDC deployment barriers including MTDC by: a) developing and validating innovative controls that enable reliable operation of multi-terminal HVDC grid; and b) establishing basic functional requirements of HVDC converters at the AC interfaces and DC interfaces to enable multi-vendor interoperability of HVDC converters with an existing AC or DC grid and enable DC grid expansion. The availability of HVDC breakers[50] can be assumed when a MTDC grid is formed.

Desired Application Qualities:

- Project Deliverables:
  - The proposed project must develop HVDC converter controls that respond to a central grid controller, or automatically respond to local measurements for reliable grid operation of both AC and MTDC systems. The proposed project must include verification of the effectiveness of the controls through simulation or emulation in terms of:
    - Operation of a hybrid AC/DC system and coordination between the AC and DC sides to ensure power delivery, power quality, and potentially provide grid forming functionality.
    - Transient and dynamic performance during large disturbances.
  - The proposed project must identify basic functional requirements at AC and DC interfaces that include but are not limited to:
    - Control modes, including potential grid forming controls
    - Dynamic performance

[47] https://www.scribd.com/document/398068363/Modeling-and-Control-of-DC-Grids-Jef-Beerten-PhD-Thesis-2013

[48] https://ietresearch.onlinelibrary.wiley.com/doi/10.1049/gtd2.12165

[49] https://www.promotion-offshore.net/

[50] Adopting Circuit Breakers for High-Voltage dc Networks: Appropriating the Vast Advantages of dc Transmission Grids, https://ieeexplore.ieee.org/document/8694106

        - Signals exchanged
        - Start-up and shutdown procedures
        - Protection strategies, and
        - Fault-ride-through capability
    - The proposed project will coordinate with subtopic 1a for verification of the controls and functional requirements during the last budget period using the developed benchmark test system. The proposal should reflect this in the timeline accordingly.
- Project Team: Applicants should provide a description of the project team. WETO emphasizes increasing diversity of research staff, increasing diversity of voices in research design, and increasing quantification and emphasis on supporting underserved communities. The team must include relevant industry members from equipment manufacturers, consultants, electric utilities, and system operators. The application must include letters of support clearly indicating each team member or advisor role and the support of their organization.

Subtopic 1c: HVDC Curriculum Development for Education and Workforce Training

As discussed, HVDC technologies incorporated into the electric system are growing in importance. To efficiently develop and deploy offshore wind, it is imperative to adequately equip the workforce through enhanced HVDC technology education and training to keep pace with rapid industry innovation. Since most HVDC activity took place in the United States roughly 40 years ago in limited geographic regions, the integration of HVDC to enable the transformation of the electricity sector requires an expanded and updated workforce. This includes the engineers that design, model, study and recommend HVDC systems, the technicians that operate and maintain the HDVC equipment, and the electric system operators that model, analyze, and control the HVDC systems alongside the AC grid to maintain a reliable and secure system.

Currently, there is not a comprehensive curriculum for training engineers, technicians, or operators on HVDC technologies. Some U.S. universities, such as Georgia Tech,[51] University of Idaho,[52] University of Illinois,[53] Penn State,[54] and University of Pittsburgh,[55] offer limited HVDC content within broader courses on

[51] https://www-new.ece.gatech.edu/research/tigs/electrical-energy
[52] https://catalog.uidaho.edu/courses/ece/
[53] https://ece.illinois.edu/academics/grad/meng-manual/meng-coursework
[54] https://www.eecs.psu.edu/research-areas/power-energy-systems.aspx
[55] https://www.engineering.pitt.edu/subsites/Labs/epsg/epsg/research/current/mitsubishi-electric/

energy systems, electric circuits, and power electronics; however, this content is not sufficient to adequately prepare power system engineers to design and analyze HVDC in the broader system context including the design and development of multiterminal HVDC for offshore wind integration. Some European colleges offer more extensive curriculum, such as Aalborg University,[56] University of Aberdeen,[57] Technische Universität Berlin,[58] University di Bologna,[59] KTH Royal Institute of Technology,[60] KU Leuven,[61] and University of Strathclyde-Glasgow,[62] yet these too are not comprehensive nor are they publicly open and readily accessible to U.S. students.

There are existing reference materials that provide more in-depth coverage on various aspects of HVDC. A recent book[63] *High Voltage Direct Current Transmission: Converters, Systems and DC Grids* covers many HVDC topics including more recent voltage source converter (VSC) technology and modular multilevel converters. The Electrical Power Research Institute (EPRI) has developed planning guides and technical materials for HVDC including but not limited to transmission planning, economics,[64] overhead transmission,[65] transmission cable ratings,[66] modeling multi-terminal and hybrid systems,[67] VSC topologies,[68] Hybrid Targeting Line Commutated Converter (LCC)-VSC stations,[69] and model specifications for VSC converter stability models.[70] Additionally, EPRI has conducted case studies[71] regarding the integration of HVDC into an AC grid. The cost of existing materials, limits accessibility. Developing materials such as these and others into interactive educational materials is desired. Some organizations including IEEE[72] and the Global Power System Transformation

[56] https://www.en.aau.dk/education/master/energy-engineering/specialisations/electric-power-systems-high-voltage-engineering
[57] https://www.abdn.ac.uk/engineering/research/aberdeen-hvdc-research-centre-472.php
[58] https://www.eecs.tu-berlin.de/menue/faculty_institutions/institutes/iea/parameter/en/#c104326
[59] https://www.unibo.it/en/teaching/course-unit-catalogue/course-unit/2021/446500
[60] https://www.kth.se/ee/epe
[61] https://www.esat.kuleuven.be/electa/hvdcresearch
[62] https://www.strath.ac.uk/engineering/electronicelectricalengineering/ourindustriallinks/continuingprofessionaldevelopment/powerelectronicshvdc/
[63] https://www.wiley.com/en-us/High+Voltage+Direct+Current+Transmission%3A+Converters%2C+Systems+and+DC+Grids%2C+2nd+Edition-p-9781119566618
[64] https://www.epri.com/research/products/000000003002021764
[65] https://www.epri.com/research/products/000000003002019110
[66] https://www.epri.com/research/products/000000003002012450
[67] https://www.epri.com/research/products/000000003002016656
[68] https://www.epri.com/research/products/000000003002010065
[69] https://www.epri.com/research/products/000000003002010064
[70] https://www.epri.com/research/products/000000003002013563
[71] https://www.epri.com/research/products/000000003002010075
[72] https://site.ieee.org/pes-hvdcfacts/working-groups/15-05-14/

Consortium G-PST[73] have suggested educational outreach but have not yet developed materials in the scope, magnitude, and reach needed by industry.

This Subtopic Area seeks to identify HVDC workforce gaps and provide educational materials to fill those gaps to support the future workforce to integrate HVDC technology reliably into the grid, with an emphasis on offshore wind integration. The successful proposal will develop modules that can be incorporated into degree and certificate programs and will provide access to outside academic institution (for example, an HVDC educational center where participants can take modules without getting a degree). The successful proposal will offer a package of modular courses (that can be developed by different entities).

The following is a list of potential curriculum topics, but other creative ideas are welcome based on identified training gaps and industry needs:

- Overview of HVDC technology and applications, including economics of HVDC in planning and trade-offs between LCC and VSC technologies.
- HVDC design process.
- Interactions between HVDC and the AC grid.
- Performing studies including HVDC (electromagnetic transient, load flow, short-circuit, transient stability)
- Converter station and back-to-back (B2B) design and operational considerations. Power electronic circuits and rectifier circuits. Multilevel modular converters.
- Wind energy conversion systems and power electronics.
- Transmission lines and submarine cables design and operational considerations.
- DC grid Protection including multi-terminal protection and protection of the conversions from DC to AC.
- Controls.
- Offshore specific considerations including networks.
- Physical and cyber security considerations in HVDC systems.
- Use of the benchmark system developed in Subtopic 1a.

Desired Application Qualities:

- Project Deliverables: The proposal must include a detailed list of modules to be developed including the topics to be covered, the time requirement to complete the module, and how knowledge proficiency will be assessed. It is envisioned that the successful proposal will provide a comprehensive package of modular courses addressing the broad range

[73] https://globalpst.org/wp-content/uploads/G-PST_Inaugural_Teaching_Agenda_updated.pdf

of topics described above. It is preferred that a combination of courses form a certificate program which can be standalone and can be incorporated into a set of college courses for undergraduate and graduate students as well as used for professional development. The proposal should explain how this will be accomplished.
The curriculum must be completed within 24 months of project initiation so that it can be disseminated and evaluated in the third year. Enhancements can be made in the third year based on student and instructor feedback.

- Project Team: Applicants should provide a description of the project team. WETO emphasizes increasing diversity of research staff, increasing diversity of voices in research design, and increasing quantification and emphasis on supporting underserved communities. It is preferred that the project team include Principal investigators from multiple academic institutions and include academic representation from Minority Serving Institutions[74] and Community Colleges. The team should also include relevant industry experience from equipment manufacturers, consultants, and electric utilities and system operators. At a minimum, industry representatives should be in an advisory role in curriculum development to ensure the curriculum is meeting the training gaps; however, other creative ideas for incorporating industry to student opportunities are strongly encouraged. Teaming partnerships are highly recommended. The application must include letters of support clearly indicating each team member or advisory role and the support of their organization.
- Project Delivery: Applicants should clearly describe how the educational materials will be delivered. It is preferred that multiple formats be developed to reach a variety of learning styles. At a minimum, an open online format must be developed. Optionally, applicants can propose a fee for participants to obtain certification or certificate of completion. The proposal should identify how it will reach underserved student populations.
- Broadened Impact: Applicants should include with their proposal the expected outcomes and the proposed methods to be used to evaluate the reach of material dissemination and the knowledge proficiency of participants. Applicants should consider how to incorporate HVDC

[74] Minority Serving Institutions refers to universities and colleges that serve a significant percentage of students from minority groups, 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

education more broadly over diverse audiences. This may include extended outreach such as university senior design projects, industry internship opportunities, and/or K-12 introductory materials. It may include educational materials for decision makers such as industry managers and regulators. Innovative ideas are welcome. The proposal should identify how it will increase quantification and emphasis on supporting underserved communities.

Budget Periods for Topic Area 1

The proposed project performance period for applications under each subtopic area will be 36 months, divided into budget periods. There will be formal Go/No-Go decision points between each Budget Period. Funding for future Budget Periods will depend on the results of these Go/No-Go decisions, which will be based in part on the accomplishment of technical milestones during the previous phase as well as the likelihood of success in achieving the objectives of the next phase. Specific criteria for these Go/No-Go decisions will be determined prior to award.

ii. Topic Area 2: Advancing Deployment of Distributed (ADD) Wind

A variety of community-based clean energy solutions will be essential to equitably and justly achieving 100% clean electricity by 2035 and a net-zero economy by 2050. Wind energy technology deployed as a distributed energy resource—DW—is a place-based solution that can support the Administration's equity and clean energy objectives. However, local zoning and permitting can present significant challenges to DW deployment. In some places, there is no established permitting process for DW, necessitating expensive and lengthy variances and more generally raising the risk of DW development. In others, extensive requirements and paperwork associated with project permitting that may not be relevant to DW are discouraging development of DW in areas with quality wind resources and otherwise favorable economic conditions. To increase access to DW, reduce costs, and accelerate the deployment of community-based clean energy, the ADD Wind Topic Area seeks to support innovative approaches for zoning and permitting DW projects that work for communities and industry alike.

Through this topic, WETO envisions seeding collaboration between the distributed wind industry, local and/or state governments, utilities, and other important stakeholders with the goals of a) addressing challenges in particular locations and b) contributing to the development of a zoning, planning and permitting framework that jurisdictions can use more broadly when undertaking

DW planning and permitting reform, and c) the development of metrics for measuring the impacts of planning and permitting reform and support communities in demonstrating DW market development readiness. In achieving these goals, ADD Wind projects should result in a growing toolkit for DW planning, zoning, and permitting applicable to multiple scales of DW technology that can be implemented broadly in locations across the country.

WETO encourages applicants to leverage existing work related to planning and permitting innovation for other DERs and build on them under this Topic Area. Examples include, but are not limited to:

- National, state, and/or local stakeholder networks working to develop innovative strategies for making it easier, faster and cheaper for homeowners and businesses to develop distributed energy resources, like those developed under the Rooftop Solar Challenge.
- Development of a national designation and technical assistance program, like SolSmart, that is designed to support and recognize communities that have taken key steps to address local DW zoning and permitting barriers and open their communities to DW businesses.

Budget Periods for Topic Area 2

The proposed project performance period will be 24 to 36 months. There will be formal Go/No-Go decision points between each Budget Period. Funding for future Budget Periods will depend on the results of these Go/No-Go decisions, which will be based in part on the accomplishment of technical milestones during the previous phase as well as the likelihood of success in achieving the objectives of the next phase. Specific criteria for these Go/No-Go decisions will be determined prior to award.

Desired Application Qualities

Project Deliverables should:

- Address key zoning and permitting challenges related to DW at multiple scales of technology, including:
    - Identify specific permitting opportunities or challenges facing the deployment of distributed wind and specific solutions to overcome them
    - Specify the types and scales of DW applications (e.g., multi-MW turbines at industrial facilities) they propose to address and provide a compelling justification as to why their focus is appropriate, if not proposing to address the full range of DW types and scales

  - Make a compelling case that the proposed solution will address the applicant identified opportunity or challenge
  - Establish clear project performance metrics to measure success, for example cost of permitting, time associated with permitting, or number of local governments reached
- Show the commitment of relevant local and/or state government and other important stakeholders to address those challenges
- Show a clear pathway to scaling the proposed zoning and permitting solutions beyond the targeted or participating locations
- Provide mechanisms such as technical assistance to support adoption and implementation of proposed solutions
- Demonstrate that the solution will be replicable and broadly applicable.
- If the project has a regional focus, make a compelling case that the region has favorable wind and economic conditions for DW deployment and market development
- Demonstrate that the solution will generate clear benefits for disadvantaged communities
- Provide a compelling plan on how the solution will be disseminated and adopted.

Project Team:
Applicants should form strong, interdisciplinary teams of project development stakeholders, and should strongly consider partnering with:

- Relevant authorities having jurisdiction in the location or locations of interest, such as state or local permitting bodies or energy offices.
- National coalitions of state agencies.
- National associations of localities and counties.
- National industry associations.
- Renewable energy deployment acceleration stakeholders.
- Community-based, academic, and research organizations.
- National laboratories.

iii. Topic Area 3: Offshore Wind Energy Social Science Research

This FOA topic builds on responses to the Offshore Wind Social Science Research Needs RFI[75] published by WETO in February 2022. Responses to the RFI identified the following research needs as high priority: categorizing community impacts of offshore wind development, particularly on workforce and

[75] https://www.energy.gov/eere/wind/articles/doe-requests-inputs-inform-social-science-research-related-offshore-wind

economies, and supporting community engagement with the development process. This Topic Area aims to expand our understanding of: offshore wind impacts and benefits on communities; community perceptions of those impacts and benefits; community interactions with the offshore wind development process; environmental justice considerations of offshore wind; and community-identified needs related to engagement in development processes. Projects will be funded for three to five years.

This Topic Area contains two subtopics:

Community Impacts of Offshore Wind Development: Social science research that characterizes impacts (positive and negative) of offshore wind development with particular interest in interactions between offshore wind and workforce/economies.

Capacity Building for Community Participation in Offshore Wind: Proposals focused on bridging communities with the full offshore wind development process through community-driven collaborative capacity building.

Proposals must address longitudinal aspects (information over multiple years) of the offshore wind development process. This especially applies to data used in Subtopic 3a proposals. Proposals for subtopic 3b must describe how the proposed project methods or project output addresses longitudinal needs. Longitudinal work may include communities or regions where offshore wind projects are likely to be operational during the study period, but WETO also invites proposals that focus on the periods prior to construction, such as for proposals on the West Coast where development is still in early stages.

WETO is particularly interested in proposals that:

- Consider cumulative impacts of offshore wind development–including but not limited to impacts of multiple wind farms in one geography and of one wind farm across multiple parts of a local economy.
- Include community members and community organizations as full members of the project team.
- Include participatory methods such as Community-Based Participatory Research methods (see e.g., Hackler, 2013[76], Jalbert et al. 2021[77]).

[76] Hacker, K. (2013). Community-Based Participatory Research. Sage Publications. ISBN-13: 978-1452205816.
[77] Jalbert, Kirk, Ball, K, Bruhis, N., Hegde, S., and Test, L. (2021). A Capabilities Model for Social Learning in Engaged STS: Building Capacity for Action-Oriented Research in Arizona's Helium Extraction Boom. Engaged Science, Technology, and Society 7:2 33-55.

WETO encourages applicants to include annual dissemination of project updates for a broader audience (progress, findings, or engagement) designed for multiple stakeholder communities. Dissemination plans should outline the proposal's demonstration of practical implications of the work.

Funded teams will be required to collaborate to:

- Improve awareness about what teams are doing, particularly in terms of data sources and methodologies
- Support the development of a comparable research base on offshore wind community impacts in the United States
- Allow for potential data aggregation for further research on heterogenous impacts and development of information resources

DOE's Lawrence Berkeley National Laboratory (LBNL) will work under separate funding with all funded program teams following selection to identify synergies as opportunity presents and help ensure the robustness of funded research across teams. Project teams will be required to participate in annual convenings of all selected Topic Area 3 projects for project updates.

Subtopic 3a: Research on Community Impacts of Offshore Wind Development

WETO invites research proposals that aim to first define impacts (positive and negative) of offshore wind development on communities and second assess the magnitude and reach (temporal and geographic) of those impacts over time and through multiple phases of offshore wind development, from planning to construction to operations. Proposals should describe practical and broad implications of the proposed research. Cross-sectional approaches, mixed-methods strategies (e.g. surveys, case studies, focus groups, and/or expert elicitations), and participatory approaches are encouraged where appropriate.

- High quality proposals should identify and define impacted communities, as well as the impacts on those communities they seek to understand.
- Proposals are encouraged to use statistical methods with large datasets, but WETO welcomes mixed-method and case study qualitative approaches, preferably comparative, particularly where large datasets are not available or are not sufficient to capture impacts of interest.
- While WETO invites proposals for longitudinal research on a broad range of potential effects on community, priority areas include the effects of offshore wind on local economies, such as:
    - Local workforce transitions,
    - The impacts of compensation schemes, labor and community benefit agreements, and

- Other economic transitions associated with offshore wind development.

A Statement of Project Objectives (SOPO) milestone at the end of the first Budget Period will require recipients to share study design with DOE and LBNL for review and feedback. Project teams should be prepared and may be required to work with LBNL and other awarded project teams to revise their methods to enable comparative and meta-analysis across projects, such as by standardizing portions of survey protocols and research questions, or by sharing data between awarded project teams in support of future analysis of aggregate data.

Subtopic 3b: Capacity Building for Community Participation in Offshore Wind

WETO invites proposals focused on bridging communities with the full offshore wind development process through community-driven, collaborative capacity building. Potential activities could include offshore wind education, structured dialogue on issues of concern, peer-to-peer learning, and the creation of tools and resources that communities need to engage in offshore wind development more fully. DOE is particularly interested in proposals that will develop sustainable communities of practice or design tools and/or resources in partnership with communities that target needs expressed by community members. Proposals must address longitudinal needs of communities including information needs from multiple points in the offshore wind development process and how proposed work may address time-specific community needs. Proposals should include a description of specific activities during offshore wind development relevant to the project.

High quality proposals should leverage existing information resources and repositories and use replicable methods.

- Proposals must demonstrate how the project outputs are ensured to reach target audience including how developed resources/tools will be maintained through time following the funding period, such as through funding strategies, Letters of Commitments, or demonstrated commitments to host and continue organizing
- Proposals are encouraged to consider the role of timing in engagement opportunities with companies and local/state/federal government offshore wind development processes

Budget Periods for Topic Area 3

Under Subtopic 3a, the proposed project period of performance will be 48-72 months with a minimum of two and a maximum of four Budget Periods. Under Subtopic 3b, the proposed project period of performance will be 18-36 months

with a minimum of one and a maximum of three Budget Periods. Budget Periods should separate phases of the project as relevant to the proposed work (i.e. Budget Period 1 might include establishing study design with community input, Budget Period 2 data collection or resource development, and Budget Period 3 data analysis/reporting or resource deployment). For Subtopic 3a Budget Period 1 must conclude with the SOPO milestone for study design mentioned in the Subtopic description.

There will be formal Go/No-Go decision points between each Budget Period. Funding for future Budget Periods will depend on the results of these Go/No-Go decisions, which will be based in part on the accomplishment of technical milestones during the previous phase as well as the likelihood of success in achieving the objectives of the next phase. Specific criteria for these Go/No-Go decisions will be determined prior to award.

Applicants must submit a Statement of Project Objectives (SOPO) and budget for the entire project. However, only the first Budget Period will be negotiated in detail prior to commencement of Budget Period 1. The SOPO and budget will be further refined and negotiated for each subsequent Budget Period following the Go/No-Go discussions and decision.

iv. Topic Area 4: Bat Deterrent Technology Development

This Topic Area of the FOA seeks applications to support the advancement of bat deterrent technologies to expand the toolbox of effective, reliable, and predictable measures that reduce impacts to bats and enable cost-effective and sustainable wind-wildlife coexistence. The development of bat deterrent technologies may help further minimize or eliminate the need for curtailment and reduce the environmental impacts of wind turbines to bats.

Particular interests under this Topic Area are: targeted behavioral research studying deterrent stimuli on bats, in situ bat deterrent testing at a commercial scale wind energy facility, and hardware advancements. Each of these interests is described below. Applications to Topic Area 4 of this FOA can address one **or more** of the three interests. Applicants addressing more than one interests should clearly indicate how each will relate to the other(s) (e.g., describe how a proposal for targeted behavioral research studying deterrent stimuli on bats will inform proposed testing of in situ bat deterrent at a commercial scale wind energy facility). Work on multiple interests can overlap in time and can be planned as successive activities (e.g., work on in situ bat deterrent testing at a commercial scale wind energy facility could begin 2 years after behavioral research studying deterrent stimuli) but applications must demonstrate how

these proposed activities are related, and scientifically feasible. Please note that applications that propose work across multiple interests must clearly address the application requirements of each.

Each application will be evaluated based on the strength of the technical proposal, proposed approach, teaming resources, and how well each proposal addresses the relevant application requirements described below. Applications that include research under more than one interest will not be given higher priority or additional preference over applications for only one interest. Applicants should carefully consider how combining multiple interests in one application will increase the overall complexity of the proposal and ability to execute the research upon award.

Targeted behavioral research studying deterrent stimuli on bats

Bat deterrents are devices designed to discourage bats from entering the airspace around wind turbines. WETO has previously funded bat deterrent technology research. While this research led to advancements in both nacelle-based and blade-mounted acoustic deterrents, results also highlighted the need for additional research to optimize deterrent effectiveness across various species. Work on targeted behavioral research studying deterrent stimuli on bats will advance the scientific understanding of which stimuli illicit the greatest response across as many high-risk bat species as possible. WETO will consider applications that evaluate ultrasonic and non-ultrasonic stimuli (e.g., scent, light, etc.).

Research Objectives:

The objectives are to 1) address knowledge gaps related to how bat species of concern react and respond to various stimuli, and 2) develop novel or updated deterrent stimuli recommendations for field testing at a wind energy facility.

Specific Application Requirements

Applications that propose targeted behavioral research studying deterrent stimuli on bats should:

- Describe the proposed research area(s) of focus (stimuli, patterns, etc.), research objectives, and provide a robust justification for each.
- Demonstrate a comprehensive understanding of existing research on bat deterrents and wind energy, how proposed tasks will fill gaps in that research, and how the proposed study will advance or support commercialization of deterrent technologies.
- Design a study methodology that evaluates bat behavioral responses to deterrent stimuli; (see Study Methodology Expectations).

- Provide a description of the anticipated study environment where species identification is possible (for example, a controlled environment such as a flight cate, natural setting such as a pond or hibernacula, or at one or more wind turbines). Include as much information about the study environment as possible and options for reducing potential response biases that might result from testing in a controlled environment. Please Note: WETO funding under this Topic Area can support all aspects of conducting research (such as equipment acquisition, labor, etc.), but cannot be used for the construction of research facilities. Applicants must already have access to, or plan to build any necessary research facilities entirely with cost-share funding. Awards for which construction projects are utilized as cost-share funds will be subject to an environmental review subject to NEPA (See VI.B.vi).
- Seek to Identify optimal deterrent stimuli (e.g., intensity, range, and pattern) to ultimately inform development of a deterrent technology that can be deployed and validated in later field testing.

Study Methodology Expectations

Proposals should include draft study methodologies that seek to advance deterrent technologies through a better understanding of bat behavioral responses to stimuli. Prior to initiating field work, WETO will coordinate a peer review with subject matter experts to finalize the study methodology and framework.

The draft study methodology proposed in the application should to the greatest extent practicable:

- Seek to demonstrate the response of various bat species to different deterrent stimuli based on testing in a controlled environment, natural setting, or at one or more wind turbines where species identification is possible (the scope of work for targeted behavioral research studying deterrent stimuli on bats should NOT include fatality monitoring, only behavioral response to deterrent stimuli);
- Identify key research goals, metrics to assess quality of responses to stimuli, and questions to be addressed.
- Identify anticipated target species, regions of focus, and rationale for choice of species and region.
- Include monitoring protocols that incorporate various methods (e.g., camera, acoustics, etc.), and can account for potential negative impacts to bats, if any.
- Describe how the study setting and research tools will facilitate data collection on species-specific responses (e.g., species identification, and accuracy of proposed identification method).

- Present a statistical sampling methodology and robust experimental design, including a power analysis, to determine a treatment effect.
- Present an analytical framework for data analysis which accounts for the number of treatments and trials as well as monitoring protocols and technologies for measuring and recording responses.

Specific Deliverables:

- Quarterly reports and presentations to WETO outlining progress made on all awarded tasks.
- Annual technical reports for multi-year awards.
- Participation in WETO Program Peer Review activities occurring during the project timeline or within 1-2 years.
- A peer-reviewed publicly available final report that includes a detailed technical summary of all tasks, results of testing, and stimuli recommendations for full-scale field testing.
- Submission of at least one manuscript, open access preferred, on study methodology and results for publication in a peer-reviewed journal that is publicly available.
- Teams will make applicable data available to the public, government agencies and other researchers, preferably through established platforms.

Funding Available:
Proposals may seek up to $1,000,000 in federal funds for targeted behavioral research studying deterrent stimuli on bats.

In situ bat deterrent testing at one or more commercial scale wind energy facilities

To understand the efficacy and impact reduction potential of deterrent stimuli, they must be evaluated at a commercial scale wind energy facility using a combination of methodologies/technologies over multiple years. In situ bat deterrent testing will seek to better understand the effectiveness of deterrent technologies to reduce bat interactions and mortality using existing or novel deterrent stimuli tested in novel configurations, or in ways that seek to address inconsistent efficacy results as published in the peer reviewed literature. For example, an applicant could propose to test a novel stimuli/pattern/frequency in an existing configuration, propose to test a novel/expanded configuration using current stimuli, or proposed to test novel stimuli in a novel configuration.

The primary objective of in-situ field testing is to understand real-world deterrent effectiveness. Obtaining consistent and predictable results across years and research sites will contribute to the weight of evidence needed for

stakeholder acceptance and commercialization of these technologies. Proposed research treatments may also include other impact minimization strategies to compare with or evaluate alongside deterrents, such as deterrents plus curtailment.

Research Objectives

The objectives of in situ bat deterrent testing at one or more commercial scale wind energy facilities are to 1) validate the effectiveness of novel deterrent stimuli/signals or novel deterrent configurations across one or more operational wind energy facilities, and 2) understand how bats behave around deterrents installed at a commercial wind energy facility.

Specific Application Requirements

Applications that propose in situ bat deterrent testing at one or more commercial scale wind energy facilities should:

- Briefly describe the proposed system configuration, including intended mounting location for the device (e.g., on a turbine nacelle or blade(s)) as well as associated considerations, such as power requirements, accessibility, external communication, and discussion on potential impacts to turbine warrantees, maintenance requirements, system health/operational monitoring, etc.
- Describe which species the applicant believes the technology will be most effective at deterring, and research objectives.
- Demonstrate a comprehensive understanding of existing research on bat and wind energy interactions by describing how proposed tasks are (1) informed by best available stimuli-response-behavioral research or hardware configuration research, and (2) will fill gaps that are important for advancing deterrent technologies and development of future commercial technologies.
- Provide a robust justification based on previous research and published literature of how the proposed system is novel compared to currently published research on bat deterrents (e.g., novel stimuli, novel configuration, or both), and how the proposed research will address key uncertainties in deterrent effectiveness.
- Where available, provide evidence of effectiveness (fatality reduction) to date of proposed deterrent system (including citations).
- Discuss the potential for habituation and how the applicant has minimized, or might minimize, this risk.
- (For proposed blade mounted systems) demonstrate applicant has previously addressed (or plans to address through Hardware Advancement research) the potential challenges associated with blade mounting, including but not limited to, impact on aerodynamics, blade

integrity, lightning strike vulnerability, operational monitoring, and device maintenance. Additionally, WETO requires applicants to provide support or concurrence from a turbine Original Equipment Manufacturer (OEM) and wind energy facility owner/operator indicating willingness to integrate blade-mounted deterrent solutions.

- Plan for research to take place at one or more commercial scale wind energy facilities. Data collection at each facility must occur over a minimum of two years.
- Propose a research program that incorporates both behavioral and post-construction mortality monitoring as part of their in-situ testing to better understand how bats are behaving around the deterrent technology (e.g., how bats are approaching the turbine) when deployed at a wind energy facility.
- Include indications of potential willingness of wind energy facilities to host this research. Final commitments will not be required until the Go/No-Go decision prior to commencing field work.
- Present a statistical sampling methodology and robust experimental design, including a power analysis, to determine the expected treatment effect. Applicants that have secured a wind energy facility at the time of submission should use existing mortality data from the project site to inform the power analysis. Where the applicant does not have a wind energy facility partner secured at the time application, the applicant should use the best available data to develop a power analysis. In either case, following a potential award, applicants must submit a finalized power analysis and study methodology for peer review and approval as part of a Go/No-Go decision point (prior to initiating field work).
- Describe the quantitative performance goals of the proposed technology (and how that performance will be measured) including end-of-project technical and system-cost targets.
- Demonstrate that the proposed technology has the potential to be an effective and affordable long-term solution for reducing bat fatalities at existing and future wind energy facilities for high-risk bat species.
- Where feasible, include multi-sectoral projects teams and discuss how the project team will enable the successful achievement of research objectives (e.g., blade engineers, turbine manufacturers, biologists, biostatisticians, and/or consultants capable of conducting the biological field studies associated with assessing the effectiveness of the impact minimization technology.)
- Demonstrate the ability to obtain any necessary permits or authorizations in a timely manner.
- Provide a contingency plan in the event the deterrent or monitoring technology requires maintenance or replacement (e.g., extra device(s)

onsite in case of technical failures, alternative techniques for data collection, etc.).

If the applicant proposes to combine targeted behavioral research studying deterrent stimuli on bats or hardware advancement with in-situ bat deterrent testing, applicant should discuss how the expected results will inform the in-situ bat deterrent testing approach and study methodology.

Study Methodology Expectations

Proposals should include draft methodologies that seek to advance our understanding of the effectiveness of deterrent stimuli and understand how bats behave around wind turbines equipped with bat deterrents. Prior to initiating field work, WETO will coordinate a peer review with subject matter experts to finalize the study methodology and framework. The proposed draft study methodology should to the greatest extent practicable:

- Include sufficient detail for proposal reviewers to clearly understand the proposed approach and statistical justification.
- Identify key research goals and questions to be addressed (related to both deterrent efficacy and behavior)
- Identify and describe the research site (if one has been selected at the time of application).
- Identify anticipated target species, geographical regions of focus to conduct the research, and rationale for choice of species and region.
- Identify treatments and metrics to demonstrate deterrent effectiveness. In developing study treatments, applicants must cite scientific research to demonstrate how the proposal will advance performance of a deterrent *in situ* beyond the current state of the science. For example, research that shows the stimuli or stimuli pattern is highly effective at deterring specific bat species, or research that demonstrates how a specific deterrent hardware configuration will increase the effective deterrence range of the deterrent technology.
- Include at least two years of data collection at the same site(s) assessing the effectiveness of the proposed deterrent stimuli.
- For both carcass monitoring and behavioral monitoring, establish a statistical sampling methodology and robust experimental design, including a power analysis, to determine a treatment effect.
- Establish an analytical framework for data analysis which accounts for the number of treatments and trials, as well as monitoring protocols and technologies for measuring and recording responses.

Specific Deliverables

- Quarterly reports and presentations to WETO outlining progress made on all awarded tasks.
- Annual technical reports for multi-year awards.
- Participation in WETO Program Peer Review activities occurring during the project timeline or within 1-2 years.
- A peer-reviewed publicly available final report that includes a detailed technical summary of all tasks, results of performance and efficacy testing and cost analysis.
- Submission of a manuscript, open access preferred, on project methodology and results for publication in a peer-reviewed journal that is publicly available for any effectiveness testing.
- Teams will be encouraged to make applicable data available to the public, government agencies and other researchers, preferably through established platforms.

Funding Available:
Proposals may seek up to $2,750,000 in federal funds for in situ bat deterrent testing at one or more commercial scale wind energy facilities.

Hardware Advancement

Many bat deterrent technologies require installation of deterrents on or within the turbine tower/nacelle or along a turbine blade. Safe and efficient installation and long-term reliability are essential for the commercialization of a technology. Thus, the focus on hardware research is to advance the functionality, durability, and integration of deterrent technologies to ensure they are cost-effective and compatible with the design, cybersecurity, and performance of wind turbines.

Research Objectives

The objective of hardware advancement is to advance bat deterrent technology hardware, software, communications, and installation infrastructure to improve performance, reliability, and compatibility with wind turbines.

Applicants seeking to conduct work that advances hardware should focus on evaluating and validating hardware performance (functionality) based on technical objectives/metrics. Proposals should NOT include tasks focused on evaluating how well the improvements impact bat behavior or mortality (efficacy) unless the project application is combined with another interest as described for this Topic Area. In such cases, all efficacy testing (use of live bats to evaluate behavior or mortality reduction) of systems for which there is proposed hardware advancement should be included as part of the proposed targeted behavioral research and/or the proposed in situ testing, as applicable.

Specific Application Requirements

Applications that address advancement of hardware should:

- Seek to address one or more of the following system design considerations: 1) improve system configurations to increase the effective range of the stimuli for existing and future wind turbines, 2) improve the flexibility of signal generation (patterns, variability, etc.) or deterrent stimuli triggering mechanisms to decrease the potential for habituation and potentially enable smart deterrent options based on species specific deterrent behaviors, 3) address fundamental design questions including blade integration, power system integration, system weatherization, expected lifespan, and ease of maintenance.
- Describe the deterrent technology and stimuli, location(s) on the wind turbine or wind energy facility where deterrent(s) will be deployed, power requirement, and communication system.
- Where deterrent designs are integrated within a wind turbine, WETO strongly encourages applicants to partner with at least one wind turbine OEM to ensure deterrent system design and integration options comply with OEM concerns and restrictions, particularly for technologies that may be mounted on turbine blades. At a minimum, WETO strongly recommends applicants include a robust turbine integration and OEM engagement plan to ensure buy-in from OEMs.
- Describe the hardware challenges and describe how proposed advancements are based on historical performance improvement needs, or credible research or reasoning (including biological response considerations, or technical performance requirements, reliability improvements etc.).
- Describe how the proposed tasks will likely advance the state of the art with respect to challenges or limitations in existing or emerging technologies.
- Develop quantitative performance targets for the proposed hardware advancement (e.g., reliability, expectations for technology life-span improvements, condition health monitoring, maintainability, deterrent signal output ranges, etc.), and describe your method for validating these targets.
- Describe how the improvements made to the deterrent hardware will improve the system's effectiveness and affordability as a long-term solution for reducing bat mortality at wind energy facilities.

Research Plan Expectations:

The proposed research plan should to the greatest extent practicable:

- Describe the plan to test and validate hardware performance/functionality enhancements in laboratory and field settings, such as improvements to hardware reliability, health monitoring, maintainability, turbine integration, etc.
- Identify key goals and questions to be addressed.
- Identify metrics to measure performance/functionality improvement achievements.
- Establish an analytical framework for data analysis which accounts for the number of treatments and trials and technologies for measuring and recording responses.

Specific Deliverables:

- Quarterly reports and presentations to WETO outlining progress made on all awarded tasks.
- Annual technical reports for multi-year awards.
- Participation in WETO Program Peer Review activities occurring during the project timeline or within 1-2 years.
- Where turbine integration is critical to hardware advancements, a detailed plan for testing and validating integration on at least one full-scale wind turbine.
- Detail regarding how and where applicant will test and validate the hardware improvements made to the deterrent system (e.g., how applicants intend to validate hardware reliability and weatherization testing).
- A peer-reviewed publicly available final report that includes a detailed technical summary of all tasks, results of performance testing and cost analysis.
- Submission of a manuscript, open access preferred, on research and performance improvement results for publication in a peer-reviewed journal that is publicly available for any effectiveness testing.
- Teams will be encouraged to make applicable data available to the public, government agencies and other researchers, preferably through established platforms.

Funding Available:
Proposals may seek up to $750,000 in federal funds for work supporting the advancement of hardware.

Budget Periods for Topic Area 4
The proposed project performance period will be up to 60 months for awards that address only a single described interest, and up to 72 months for awards that address two or more described interests. Given the complexity of the

proposed project, there may be a minimum of two and maximum of three Budget Periods across the project period of performance. Projects including in-situ bat deterrent testing at one or more commercial scale wind energy facilities should include at least two Budget Periods where the in-situ testing portion of the project would not occur until BP2 or BP3.

There will be formal Go/No-Go decision points between each Budget Period. Funding for future Budget Periods will depend on the results of these Go/No-Go decisions, which will be based in part on the accomplishment of technical milestones during the previous phase as well as the likelihood of success in achieving the objectives of the next phase. Specific criteria for these Go/No-Go decisions will be determined prior to award.

Applicants must submit a Statement of Project Objectives (SOPO) and budget for the entire project. However, only the first Budget Period will be negotiated in detail prior to commencement of Budget Period 1. The SOPO and budget will be further refined and negotiated for each subsequent Budget Period following the Go/No-Go discussions and decision

v. Teaming Partner List

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

Updates to the Teaming Partner List will be available in the EERE Exchange website. The Teaming Partner List will be regularly updated to reflect new teaming partners who provide their organization's information.

SUBMISSION INSTRUCTIONS: Users will see a new section, "Teaming Partners", within the left-hand navigation in eXCHANGE. This page allows users to view published Teaming Partner Lists and any interested party that would like to be included on this list should submit a request within eXCHANGE to join the teaming partner list. Select the appropriate Teaming Partner List from the dropdown and fill in the following information: Investigator Name, Organization Name, Organization Type, Topic Area, Background and Capabilities, Website, Contact Address, Contact Email, and Contact Phone.

DISCLAIMER: By submitting a request to be included on the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. By facilitating the Teaming Partner List, DOE is not endorsing, sponsoring, or otherwise evaluating the qualifications of the individuals and

organizations that are self-identifying themselves for placement on this Teaming Partner List. DOE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information.

C. Applications Specifically Not of Interest

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (See Section III.D. of the FOA):

- Applications that fall outside the technical parameters specified in Sections I.A. and I.B. of the FOA.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).

Additionally, the following types of applications will be deemed nonresponsive and will not be reviewed or considered under specific Topic Areas or Subtopic Areas, as described below:

Topic Area 1, Subtopic 1a:

- Applications that propose standards that are not related to offshore wind development.
- Applications that propose standards work that is already being developed.

Topic Area 1, Subtopic 1b:

- Applications that propose hardware design of HVDC converters.
- Applications that propose vendor specific controls.
- Applications that propose functional requirements specifically targeting LCC technologies.

Topic Area 1, Subtopic 1c:

- Applications that propose individual courses.
- Applications that propose in-house training that cannot be offered to the industry as a whole.

Topic Area 3, Subtopic 3b:

- Applications with participatory Geographic Information System (GIS) projects.

Topic Area 4

- Applications for research projects focused solely on curtailment.

- Applications for research projects not specific to bats.

D. R&D Community Benefits Plan

DOE is committed to investing in research and development (R&D) innovations that deliver benefits to the American public and leads to commercialization of technologies and products that foster sustainable, resilient, and equitable access to clean energy. Further, DOE is committed to supporting the development of more diverse, equitable, inclusive, and accessible workplaces to help maintain the nation's leadership in science and technology.

To support the goal of building a clean and equitable energy economy, projects funded under this BIL FOA are expected to (1) advance diversity, equity, inclusion and accessibility (DEIA); (2) contribute to energy equity; and (3) invest in America's workforce. To ensure these objectives are met, applications must include a Research and Development Community Benefits Plan (R&D Community Benefits Plan[78]) that addresses three objectives stated above. See Section IV.D.xvi and Appendix F for the more information on the R&D Community Benefits Plan content requirements.

E. Authorizing Statutes

The programmatic authorizing statute is sec. 3003(b)(2) of the Energy Act of 2020 (42 U.S.C. 16237(b)(2));

Section 41007(b)(1) of the BIL (Pub L 117–58, 135 Stat. 1293).

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

F. Notice of Bipartisan Infrastructure Law-Specific Requirements

Be advised that special terms and conditions apply to projects funded by the BIL relating to:

- Reporting, tracking and segregation of incurred costs;

[78] Most DOE BIL FOAs focused on demonstration and deployment (D&D) also require a Community Benefits Plan; however, the plan content requirements for R&D-focused FOAs vary from the D&D Community Benefits Plan content requirements.

- Reporting on job creation and preservation;
- Publication of information on the Internet;
- Access to records by Inspectors General and the Government Accountability Office;
- Requiring all of the iron, steel, manufactured goods, and construction materials used in the infrastructure activities of applicable projects are produced in the United States;
- Ensuring laborers and mechanics employed by contractors or subcontractors on BIL-funded projects are paid wages equivalent to prevailing wages on similar projects in the area;
- Protecting whistleblowers and requiring prompt referral of evidence of a false claim to an appropriate inspector general; and
- Certification and Registration.

Recipients of funding appropriated by the BIL must comply with requirements of all applicable federal, state, and local laws, regulations, DOE policy and guidance, and instructions in this FOA. Recipients must flow down the requirements to subrecipients to ensure the recipient's compliance with the requirements.

II. Award Information

A. Award Overview

i. Estimated Funding

DOE expects to make a total of approximately $27.9M of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. DOE anticipates making approximately 18 – 35 awards under this FOA. DOE may issue one, multiple, or no awards. Individual awards may vary between $500k and $8M.

DOE may issue awards in one, multiple, or none of the following topic areas:

Topic Area Number	Topic Area Title	Anticipated Number of Awards	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards
1	High-Voltage Direct Current (HVDC) for Offshore Wind	Subtopic 1a: 1-2 Subtopic 1b: 2-4 Subtopic 1c: 1	Subtopic 1a: $1.0M Subtopic 1b: $1.0M Subtopic 1c: $500k	Subtopic 1a: $2.0M Subtopic 1b: $3.0M Subtopic 1c: $700K	$9.7M
2	Advancing Deployment of Distributed (ADD) Wind	2-4	$1.0M	$3.0M	$3.3M
3	Offshore Wind Energy Social Science Research	Subtopic 3a: 2-4 Subtopic 3b: 2-4	Subtopic 3a: $1.0M Subtopic 3b: $200k	Subtopic 3a: $2.5M Subtopic 3b: $500k	$6.9M
4	Bat Deterrent Technology Development	3-8	$750k	For, “Targeted behavioral research studying deterrent stimuli on bats”: $1,000,000 For, “In situ bat deterrent testing at one or more commercial scale wind energy facilities” : Up to $2.75M For, “Hardware Advancement:” $750,000k	$8.0M

				The above totals are additive based upon the research areas selected.	

DOE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed. Funding for all budget periods, including the initial budget period, is not guaranteed.

ii. Period of Performance

DOE anticipates making awards that will run from 12 months up to 72 months in length, comprised of one or more budget periods as outlined in the table below. Project continuation will be contingent upon several elements, including satisfactory performance and DOE's Go/No-Go decision. For a complete list and more information on the Go/No-Go review, see Section VI.B.xiv.

Topic Area	Title	Est. Period of Performance (months)	Number of Budget Periods
Subtopic 1a	HVDC Standards and Benchmark Systems Development for Offshore Wind	36	2-3
Subtopic 1b	Multi-Terminal HVDC Controls and Functional Requirements	36	2-3
Subtopic 1c	HVDC Curriculum Development for Education and Workforce Training	36	2-3
Topic Area 2	Advancing Deployment of Distributed (ADD) Wind	24-36	1-3
Subtopic 3a	Community Impacts of Offshore Wind Development	48-72	2-4
Subtopic 3b	Capacity Building for Community Participation in Offshore Wind	18-36	1-3
Topic Area 4	Bat Deterrent Technology Development	36-72	2-3

iii. New Applications Only

DOE will accept only new applications under this FOA. DOE will not consider applications for renewals of existing DOE-funded awards through this FOA.

B. DOE Funding Agreements

Through cooperative agreements and other similar agreements, DOE provides financial and other support to projects that have the potential to realize the FOA objectives. DOE does not use such agreements to acquire property or services for the direct benefit or use of the United States government.

i. Cooperative Agreements

DOE generally uses cooperative agreements to provide financial and other support to prime recipients.

Through cooperative agreements, DOE provides financial or other support to accomplish a public purpose of support or stimulation authorized by federal statute. Under cooperative agreements, the government and prime recipients share responsibility for the direction of projects.

DOE has substantial involvement in all projects funded via cooperative agreement. See Section VI.B.ix. of the FOA for more information on what substantial involvement may involve.

ii. Funding Agreements with Federally Funded Research and Development Center (FFRDCs)[79]

In most cases, FFRDCs are funded independently of the remainder of the project team. The FFRDC then executes an agreement with any non-FFRDC project team members to arrange work structure, project execution, and any other matters. Regardless of these arrangements, the entity that applied as the prime recipient for the project will remain the prime recipient for the project. See Section III.E.iii.

III. Eligibility Information

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

[79] Federally Funded Research and Development Centers (FFRDC) - FFRDCs are public-private partnerships which conduct research for the United States government. A listing of FFRDCs can be found at http://www.nsf.gov/statistics/ffrdclist/.

A. Eligible Applicants

i. Domestic Entities

The proposed prime recipient and subrecipient(s) must be domestic entities. The following types of domestic entities are eligible to participate as a prime recipient or subrecipient of this FOA:

1. Institutions of higher education;
2. For-profit entities;
3. Non-profit entities; and
4. State and local governmental entities, and tribal nations.

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

Topic Areas 1, 2, and 4:
Federal agencies and instrumentalities (other than DOE) are eligible to participate as a subrecipient but are not eligible to apply as a prime recipient.
Topic Area 3 (all subtopics):
Federal agencies and instrumentalities (other than DOE and National Oceanic and Atmospheric Administration (NOAA)) are eligible to participate as a subrecipient but are not eligible to apply as a prime recipient.

Entities banned from doing business with the United States government such as entities debarred, suspended, or otherwise excluded from or ineligible for participating in Federal programs are not eligible.

Nonprofit organizations described in Section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995 are **not** eligible to apply for funding.

Topic Area 1 (all subtopics), Topic Area 3 (all subtopics), and Topic Area 4:
DOE/NNSA FFRDCs are eligible to apply for funding as a prime recipient and participate as a subrecipient.

Topic Area 2:
DOE/NNSA FFRDCs are eligible to participate as a subrecipient but are not eligible to apply for funding as a prime recipient.

ii. Foreign Entities

In limited circumstances, DOE may approve a waiver to allow a foreign entity to participate as a prime recipient or subrecipient. A foreign entity may submit a Full Application to this FOA, but the Full Application must be accompanied by an explicit written waiver request. Likewise, if the applicant seeks to include a foreign entity as a subrecipient, the applicant must submit a separate explicit written waiver request in the Full Application for each proposed foreign subrecipient.

Appendix B lists the information that must be included in a foreign entity waiver request. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

iii. Incorporated Consortia

Domestic incorporated consortia are eligible to participate as a prime recipient or subrecipient. For consortia incorporated (or otherwise formed) under the laws of a state or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated (or otherwise formed) in a foreign country, please refer to the requirements in "Foreign Entities" above.

Each consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the DOE Contracting Officer.

If the consortium includes foreign members, the applicant must submit a separate explicit written waiver request in the Full Application for each foreign member. See Appendix B.

iv. Unincorporated Consortia

Unincorporated Consortia must designate one member of the consortium to serve as the prime recipient/consortium representative. The prime recipient/consortium representative must qualify as a domestic entity.

Upon request, unincorporated consortia must provide the DOE Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should include the consortium's:

- Management structure;

- Method of making payments to consortium members;
- Means of ensuring and overseeing members' efforts on the project;
- Provisions for members' cost sharing contributions; and
- Provisions for ownership and rights in intellectual property developed previously or under the agreement.

If the consortium includes foreign members, the applicant must submit a separate explicit written waiver request in the Full Application for each foreign member. See Appendix B.

B. Cost Sharing

Cost share requirements vary by Topic Area/Subtopic Area as summarized in the table below:

Topic/Subtopic Area	Title	Minimum Cost Share Requirement
Subtopic 1a	HVDC Standards and Benchmark Systems Development for Offshore Wind	20%*
Subtopic 1b	Multi-Terminal HVDC Controls and Functional Requirements	20%*
Subtopic 1c	HVDC Curriculum Development for Education and Workforce Training	0%**
Topic Area 2	Advancing Deployment of Distributed (ADD) Wind	20%*
Subtopic 3a	Community Impacts of Offshore Wind Development	20%*
Subtopic 3b	Capacity Building for Community Participation in Offshore Wind	0%**
Topic Area 4	Bat Deterrent Technology Development	20%*

* For Institutions of Higher Education and Non-Profit Organizations cost sharing is not required under these Topic Areas and Subtopics.[80]

[80] Section 10725 of the Research and Development, Competition, and Innovation Act, P.L. 117-167 (Aug. 9, 2022) extends the cost share waiver pilot program enacted by Section 108 of the Department of Energy Research and Innovation Act, Public Law 115–246 (Innovation Act) and provides an exemption for institutions of higher

For Topics and Subtopics where 20% cost share is required:
The cost share must be at least 20% of the total project costs[81] for research and development projects.[82] The cost share must come from non-federal sources unless otherwise allowed by law.

**For Topics and Subtopics where 0% cost share is required:
Cost sharing is not required under these Topics and Subtopics.

To assist applicants in calculating proper cost share amounts, DOE has included a cost share information sheet and sample cost share calculation as Appendix A to this FOA.

i. Legal Responsibility

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the prime recipient, the prime recipient is legally responsible for paying the entire cost share. If the funding agreement is terminated prior to the end of the project period, the prime recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The prime recipient is solely responsible for managing cost share contributions by the project team and enforcing cost share obligation assumed by project team members in subawards or related agreements.

ii. Cost Share Allocation

Each project team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual project team members may vary, as long as the cost share requirement for the project as a whole is met.

education and non-profit organizations from the 20% cost share requirement for Research and Development activities. The exemption is available for the two-year period beginning on August 9, 2022. Codified at 42 U.S.C. 16352.

[81] Total project costs is the sum of the government share, including FFRDC costs if applicable, and the recipient share of project costs.

[82] Energy Policy Act of 2005, Pub.L. 109-58, sec. 988. Also see 2 CFR 200.306 and 2 CFR 910.130 for additional cost sharing requirements.

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable federal cost principles, as described in Section IV.I.i. of the FOA. In addition, cost share must be verifiable upon submission of the Full Application.

Project teams may provide cost share in the form of cash or in-kind contributions. Cost share may be provided by the prime recipient, subrecipients, or third parties (entities that do not have a role in performing the scope of work). Vendors/contractors may not provide cost share. Any partial donation of goods or services is considered a discount and is not allowable.

Cash contributions include, but are not limited to: personnel costs, fringe costs, supply and equipment costs, indirect costs and other direct costs.

In-kind contributions are those where a value of the contribution can be readily determined, verified, and justified but where no actual cash is transacted in securing the good or service comprising the contribution. Allowable in-kind contributions include but are not limited to: the donation of volunteer time or the donation of space or use of equipment.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding was not provided to the state or local government by the federal government.

The recipient may not use the following sources to meet its cost share obligations including, but not limited to:

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

Project teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the prime recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same federal regulations as federal dollars to the project. Every cost

share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants are encouraged to refer to 2 CFR 200.306 and 2 CFR 910.130 for additional cost sharing requirements.

iv. Cost Share Contributions by FFRDCs

Because FFRDCs are funded by the federal government, costs incurred by FFRDCs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-federal source.

v. Cost Share Verification

Applicants are required to provide written assurance of their proposed cost share contributions in their Full Applications.

Upon selection for award negotiations, applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to Appendix A of the FOA.

vi. Cost Share Payment

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

In limited circumstances, and where it is in the government's interest, the DOE Contracting Officer may approve a request by the prime recipient to meet its cost share requirements on a less frequent basis, such as monthly or quarterly. Regardless of the interval requested, the prime recipient must be up-to-date on cost share at each interval. Such requests must be sent to the Contracting Officer during award negotiations and include the following information: (1) a detailed justification for the request; (2) a proposed schedule of payments, including amounts and dates; (3) a written commitment to meet that schedule; and (4) such evidence as necessary to demonstrate that the prime recipient has

complied with its cost share obligations to date. The Contracting Officer must approve all such requests before they go into effect.

C. Compliance Criteria

All applicant submissions must:

- comply with the applicable content and form requirements listed in Section IV. of the FOA;
- include all required documents;
- be successfully uploaded in EERE Exchange https://eere-Exchange.energy.gov, including clicking the "Submit" button; and
- be submitted by the deadline stated in the FOA.

DOE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, or incomplete submissions.

Applicants are strongly encouraged to submit their Concept Papers and Full Applications at least 48 hours in advance of the submission deadline. Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Concept Paper or Full Application. Once the Concept Paper or Full Application is submitted in EERE Exchange, applicants may revise or update that submission until the expiration of the applicable deadline. If changes are made to any of these documents, the applicant must resubmit the Concept Paper or Full Application before the applicable deadline. DOE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

D. Responsiveness Criteria

All "Applications Specifically Not of Interest," as described in Section I.C. of the FOA, are deemed nonresponsive and are not reviewed or considered.

E. Other Eligibility Requirements

i. Requirements for DOE/NNSA FFRDCs Listed as the Applicant

A DOE/NNSA FFRDC is eligible to apply for funding under this FOA if its cognizant Contracting Officer provides written authorization and this authorization is submitted with the application.

The following wording is acceptable for the authorization:

> Authorization is granted for the Laboratory to participate in the proposed project. The work proposed for the Laboratory is consistent with or complementary to the missions of the Laboratory, and will not adversely impact execution of the DOE assigned programs at the Laboratory.

If a DOE/NNSA FFRDC is selected for award negotiation, the proposed work will be authorized under the DOE work authorization process and performed under the laboratory's Management and Operating (M&O) contract.

ii. Requirements for DOE/NNSA and non-DOE/NNSA FFRDCs Included as a Subrecipient

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a subrecipient on another entity's application subject to the following guidelines:

a. Authorization for non-DOE/NNSA FFRDCs
The federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

b. Authorization for DOE/NNSA FFRDCs
The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization:

> Authorization is granted for the Laboratory to participate in the proposed project. The work proposed for the Laboratory is consistent with or complementary to the missions of the Laboratory, and will not adversely impact execution of the DOE assigned programs at the Laboratory.

c. Value/Funding
The value of and funding for the FFRDC portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE/NNSA FFRDC through the DOE field work proposal (WP) system and non-DOE/NNSA FFRDC through an interagency agreement with the sponsoring agency.

d. Cost Share

Although the FFRDC portion of the work is usually excluded from the award to a successful applicant, the applicant's cost share requirement will be based on the total cost of the project, including the applicant's, the subrecipient's, and the FFRDC's portions of the project.

e. Responsibility
The prime recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues including, but not limited to disputes and claims arising out of any agreement between the prime recipient and the FFRDC.

f. Limit on FFRDC effort.

The scope of work to be performed by the FFRDC may not be more significant than the scope of work to be performed by the applicant.

iii. Agreement Requirements for DOE/NNSA FFRDCs Participating as a Subrecipient

DOE/NNSA FFRDCs participating as a subrecipient on a project and funded directly through the DOE WP System are strongly encouraged to establish a Cooperative Research and Development Agreement[83] (CRADA) or, if the role of the DOE/NNSA FFRDC is limited to technical assistance and intellectual property is not anticipated to be generated from the DOE/NNSA FFRDC's work, a Technical Assistance Agreement (TAA), with at least the prime recipient before any project work begins. Any questions regarding the use of a CRADA or TAA should be directed to the cognizant DOE field intellectual property (IP) counsel.

The CRADA or TAA is used to ensure accountability for project work and provide the appropriate management of intellectual property (IP), e.g., data protection and background IP. The DOE/NNSA FFRDC (or lead DOE/NNSA FFRDC, if more than one FFRDC is involved) must provide a Joint Work Statement to the DOE COs with cognizance over the DOE funding program and DOE/NNSA FFRDC during negotiations or prior commencing work on the project. The CRADA or TAA must be executed by all parties without substantive changes within 30 days of the start of the award period of performance.

[83] A cooperative research and development agreement is a contractual agreement between a national laboratory contractor and a private company or university to work together on research and development. For more information, see https://www.energy.gov/gc/downloads/doe-cooperative-research-and-development-agreements

F. Limitation on Number of Concept Papers and Full Applications Eligible for Review

The limitation on number of Concept Papers and Full Applications eligible for review varies under each Topic Area/Subtopic Area as described in the table below:

Topic Area/ Subtopic Area	Title	Limitation on number of Concept Paper and Full Application submissions
Topic Area 1 (includes Subtopic 1a, 1b, and 1c)	HVDC for Offshore Wind	An entity may only submit one Concept Paper and one Full Application for each Subtopic Area under Topic Area 1 of this FOA. If an entity submits more than one Concept Paper and one Full Application to the same Subtopic Area, DOE will request a determination from the applicant's authorizing representative as to which application should be reviewed. Any other submissions received listing the same entity as the applicant for the same Subtopic Area will not be eligible for further consideration. This limitation does not prohibit an applicant from collaborating on other applications (e.g., as a potential subrecipient or partner) so long as the entity is only listed as the applicant on one Concept Paper and one Full Application for each Subtopic Area under Topic Area 1 of this FOA.
Topic Area 2	Advancing Deployment of Distributed (ADD) Wind	An entity may only submit one Concept Paper and one Full Application to Topic Area 2 of this FOA. If an entity submits more than one Concept Paper and Full Application, DOE will request a determination from the applicant's authorizing representative as to which application should be reviewed. Any other submissions received listing the same entity as the applicant will not be eligible for further consideration. This limitation does not prohibit an applicant from collaborating on other applications (e.g., as a potential subrecipient or partner) so long as the entity

		is only listed as the applicant on one Concept Paper and one Full Application submitted under Topic Area 2 of this FOA.
Topic Area 3 (includes Subtopic 3a and 3b)	Offshore Wind Energy Social Science Research	An entity may submit more than one Concept Paper and Full Application to this Subtopic, provided that each application describes a unique, scientifically distinct project and provided that an eligible Concept Paper was submitted for each Full Application.
Topic Area 4	Bat Deterrent Technology Development	An entity may submit more than one Concept Paper and Full Application to this Topic Area, provided that each application describes a unique, scientifically distinct project and provided that an eligible Concept Paper was submitted for each Full Application.

G. Questions Regarding Eligibility

DOE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to submit an application in response to this FOA lies solely with the applicant.

IV. Application and Submission Information

A. Application Process

The application process includes two phases: a Concept Paper phase and a Full Application phase. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application**.

All submissions must conform to the form and content requirements described below, including maximum page lengths.

- Each must be submitted in Adobe PDF format unless stated otherwise;
- Each must be written in English;
- All pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Calibri typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement;

- A **control number** will be issued when an applicant begins the EERE Exchange application process. The control number must be included with all application documents. Specifically, the control number must be prominently displayed on the upper right corner of the header of every page and included in the file name (i.e., *Control Number_Applicant Name_Full Application*);
- Page numbers must be included in the footer of every page; and
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

i. Additional Information on EERE Exchange

EERE Exchange is designed to enforce the deadlines specified in this FOA. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines. Should applicants experience problems with EERE Exchange, the following information may be helpful.

Applicants that experience issues with submission PRIOR to the FOA deadline: In the event that an applicant experiences technical difficulties with a submission, the applicant should contact the EERE Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The EERE Exchange helpdesk and/or the EERE Exchange system administrators will assist applicants in resolving issues.

B. Application Forms

The application forms and instructions are available on EERE Exchange. To access these materials, go to https://eere-Exchange.energy.gov and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:

TechnicalVolume_Part_1
TechnicalVolume_Part_2

DOE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 10MB.

C. Content and Form of the Concept Paper

Each Concept Paper must be limited to a single concept or technology. The Concept Paper must conform to the requirements listed below, including the stated page limits.

Section	Page Limit	Description
Cover Page	1 page maximum	The cover page should include the project title, the specific announcement Topic Area or Subtopic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, the project location(s), and any statements regarding confidentiality.
Technology, Process, or Project Description	3 pages maximum	Applicants are required to describe succinctly: • The proposed technology, process, or project, including its basic principles and how it is unique and innovative; • The proposed project's target outcome and, if applicable, proposed target level of technical performance. Applicants should provide technical data or other support to show how the proposed target could be met; • The current state of the art or state of the science in the relevant field and application, including key shortcomings, limitations, and challenges; • How the proposed technology, process, or project will overcome the shortcomings, limitations, and challenges in the relevant field and application; • The potential impact that the proposed project would have on the relevant field and application; • How the location of the proposed project will support technology, process, or project development and long-term success; • The key technical risks/issues associated with the proposed technology, process, or project development plan; and • The impact that DOE funding would have on the proposed project. • Applicants may provide graphs, charts, or other data to supplement their Technology, Process, or Project Description. Graphs, charts, or other data contribute towards the maximum page limit.
Addendum	2 pages maximum	Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including: • Whether the Principal Investigator (PI) and Project Team have the skill and expertise needed to successfully execute the project plan;

		• Whether the applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity; • Whether the applicant has worked together with its teaming partners on prior projects or programs; • Whether the applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities; and • Applicants may provide graphs, charts, or other data to supplement their Technology, Process, or Project Description. Graphs, charts, or other data contribute towards the maximum page limit.

DOE makes an independent assessment of each Concept Paper based on the criteria in Section V. of the FOA. DOE will encourage a subset of applicants to submit Full Applications. Other applicants will be discouraged from submitting a Full Application. See Section VI.A.

D. Content and Form of the Full Application

Applicants must complete the following application forms found on the EERE Exchange website at https://eere-Exchange.energy.gov/.

Applicants will have approximately 30 days from receipt of the Concept Paper Encourage/Discourage notification on EERE Exchange to prepare and submit a Full Application. Regardless of the date the applicant receives the Encourage/Discourage notification, the submission deadline for the Full Application remains the date and time stated on the FOA cover page.

All Full Application documents must be marked with the control number issued to the applicant.

i. Full Application Content Requirements

Each Full Application must be limited to a single concept. Full Applications must conform to the following requirements, and must not exceed the stated page limits.

Please note that the Technical Volume page limit varies based on individual Topic Area as described in the table below.

Component	File Format	Page Limit	File Name
Technical Volume (Required)	PDF	Topic Areas 1, 2, and 3: 15 pages Topic Area 4: 30 pages	ControlNumber_LeadOrganization_TechnicalVolume
Resumes (Required)	PDF	3 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment (If applicable)	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives (Required)	MS Word	10	ControlNumber_LeadOrganization_SOPO
SF-424 (Required)	PDF	n/a	ControlNumber_LeadOrganization_App424
Budget Justification Workbook (Required)	MS Excel	n/a	ControlNumber_LeadOrganization_Budget_Justification
Summary/Abstract for Public Release (Required)	PDF	1	ControlNumber_LeadOrganization_Summary
Summary Slide (Required)	MS PowerPoint	1	ControlNumber_LeadOrganization_Slide
Subrecipient Budget Justification (If applicable)	MS Excel	n/a	ControlNumber_LeadOrganization_Subrecipient_Budget_Justification
DOE Work Proposal for FFRDC, if applicable (see DOE O 412.1A, Attachment 3) (If applicable)	PDF	n/a	ControlNumber_LeadOrganization_WP
Authorization from cognizant Contracting Officer for FFRDC (If applicable)	PDF	n/a	ControlNumber_LeadOrganization_FFRDCAuth
SF-LLL Disclosure of Lobbying Activities (Required)	PDF	n/a	ControlNumber_LeadOrganization_SF-LLL
Foreign Entity Waiver Requests and Foreign Work Waiver Requests (If applicable)	PDF	n/a	ControlNumber_LeadOrganization_Waiver
Open Source Software Distribution Plan (If applicable)	PDF	n/a	ControlNumber_LeadOrganization_OSSDP
R&D Community Benefits Plan (Required)	PDF	5	ControlNumber_LeadOrganization_CBP
Current and Pending Support (Required)	PDF	n/a	ControlNumber_LeadOrganization_CPS
Locations of Work (Required)	MS Excel	n/a	Control Number_LeadOrganization_LOW
Community Partnership Documentation (If applicable)	PDF	5	ControlNumber_LeadOrganization_PartnerDocs

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. See Section IV.B.

DOE provides detailed guidance on the content and form of each component below.

ii. Technical Volume (required)

The Technical Volume must conform to the following content and form requirements. This volume must address the technical review criteria as discussed in Section V. of the FOA. 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, DOE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 15 pages for applications submitted to Topic Area 1 (including Subtopic 1a, 1b, and 1c), Topic Area 2, and Topic Area 3 (including Subtopic 3a and 3b). The Technical Volume to the Full Application may not be more than 30 pages for Topic Area 4. These page limits include the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the technical review criterion (see Section V. of the FOA) when preparing the Technical Volume.

The Technical Volume should clearly describe and expand upon information provided in the Concept Paper.

Technical Volume Content Requirements	
SECTION/PAGE LIMIT	**DESCRIPTION**
Cover Page	The cover page should include the project title, the specific FOA Topic Area being addressed (if applicable), both the technical and business points of contact, names of all team member organizations, names of project managers, senior/key personnel and their organizations, the project location(s), and any statements regarding confidentiality.
Project Overview (Approximately 10% of the Technical Volume)	The Project Overview should contain the following information: • 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) relevant to the technical topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify how the proposed work will advance the state of the art and the critical success factors in achieving that goal. • DOE Impact: The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives. • Long-Term Constraints: Identify any potential long-term constraints the project will have on community's access to natural resources (e.g., water) and tribal cultural resources. If applicable, describe a long-term cleanup strategy that ensures communities and neighborhoods remain healthy and safe and not burdened with cleanup costs and waste. • Climate Resilience: The applicant should outline a climate resilience strategy that accounts for climate impacts and extreme weather patterns such as high winds (tornadoes and hurricanes), heat and freezing temperatures, drought, wildfire, and floods.
Technical Description, Innovation, and Impact (Approximately 30% of the Technical Volume)	The Technical Description should contain the following information: * Please also carefully review the "Specific Application Requirements" sections of topic area you are applying to for detailed information applicants should include.* • Relevance and Outcomes: The applicant should provide a detailed description of the technology or focus area, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets.

	The applicant should clearly specify the expected outcomes of the project. • Feasibility (Topic Areas 1,2 & 4): The applicant should demonstrate the technical feasibility of the proposed technology, process, or project and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. This section should also address the project's access to necessary infrastructure (e.g., transportation, water, electricity transmission), including any use of existing infrastructure, as well as to a skilled workforce. • Feasibility (Topic Area 3): The applicant should demonstrate the technical feasibility of the proposed technology, process, or project and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. This section should describe existing relationship with community partners and/or access to resources to build planned relationships necessary for completing proposed project. • Innovation and Impacts: The applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed focus area, the advantages of proposed approach over current and emerging approaches for accomplishing the same goal, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful.
Workplan (Approximately 40% of the Technical Volume)	The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, Go/No-Go decision points, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information: • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on Go/No-Go decision points). The applicant should describe the specific expected end result of each performance period, including milestones in the R&D Community Benefits Plan. • WBS and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the

	life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO. • Go/No-Go Decision Points (See Section VI.B.xiv. for more information on the Go/No-Go Review): Provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. At a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 24-month period) of the project. See Section VI.B.xiii. The applicant should also provide the specific technical and R&D Community Benefits Plan criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone. • End of Project Goal: The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO. • Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points. • Buy America Requirements for Infrastructure Projects: Within the first 2 pages of the Workplan, include a short statement on whether the project will involve the construction, alteration, and/or repair of infrastructure in the United States. See Appendix C for applicable definitions and other information to inform this statement.

	• Project Management: The applicant should discuss the team's proposed management plan, including the following:
	  ○ The overall approach to and organization for managing the work.
	  ○ The roles of each project team member.
	  ○ Any critical handoffs/interdependencies among project team members.
	  ○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices.
	  ○ The approach to project risk management, including a plan for securing a qualified workforce and mitigating risks to project performance including but not limited to community or labor disputes.
	  ○ A description of how project changes will be handled.
	  ○ If applicable, the approach to Quality Assurance/Control.
	  ○ How communications will be maintained among project team members.
	• Market Transformation Plan (Subtopic 1c, Topic Area 2, and Topic Area 4): The applicant should provide a market transformation plan, including the following:
	  ○ Identification of target market, competitors, and distribution channels for proposed technology, research findings, process, or project along with known or perceived barriers to market penetration, including a mitigation plan.
	  ○ If applicable, identification of a product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, data dissemination, and product distribution.
	• Market Transformation Plan (Subtopic 1a, 1b, Topic Area 3): Workplans submitted with applications to Subtopic 1a, Subtopic 1b, and Topic Area 3 are not required to include a Market Transformation Plan.

Technical Qualifications and Resources (Approximately 20% of the Technical Volume)	The Technical Qualifications and Resources should contain the following information: • Describe the project team's unique qualifications and expertise, including those of key subrecipients. • Describe the project team's existing equipment and facilities, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project;

	include a justification of any new equipment or facilities requested as part of the project.
	• This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives.
	• Describe the time commitment of the key team members to support the project.
	• Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable.
	• Describe the skills, certifications, or other credentials of the construction and ongoing operations workforce.
	• For multi-organizational projects, describe succinctly:
	  ○ The roles and the work to be performed by the Project Manager and senior/key personnel at the prime and sub levels;
	  ○ Business agreements between the applicant and sub;
	  ○ How the various efforts will be integrated and managed;
	  ○ Process for making decisions on technical direction;
	  ○ Publication arrangements;
	  ○ Intellectual Property issues; and
	  ○ Communication plans.

iii. Resumes (required)

A resume provides information that can be used by reviewers to evaluate the individual's skills, experience, and potential for leadership within the scientific community. Applicants must submit three-page resume for each Principal Investigator and Senior/Key Personnel that include the following:

1. Contact Information;
2. Education and training: Provide institution, major/area, degree, and year for undergraduate, graduate, and postdoctoral training;
3. Research and Professional Experience: Beginning with the current position, list professional/academic positions in chronological order with a brief description. List all current academic, professional, or institutional appointments, foreign or domestic, at the applicant institution or elsewhere, whether or not remuneration is received, and, whether full-time, part-time, or voluntary;
4. Awards and honors;

5. A list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically. Patents, copyrights, and software systems developed may be provided in addition to or substituted for publications. An abbreviated style such as the Physical Review Letters (PRL) convention for citations (list only the first author) may be used for publications with more than 10 authors;
6. Synergistic Activities: List up to five professional and scholarly activities related to the proposed effort; and
7. There should be no lapses in time over the past ten years or since age 18, which ever time period is shorter.

As an alternative to a resume, it is acceptable to use the biographical sketch format approved by the National Science Foundation (NSF). The biographical sketch format may be generated by the Science Experts Network Curriculum Vita (SciENcv), a cooperative venture maintained at https://www.ncbi.nlm.nih.gov/sciencv/, and is also available at https://nsf.gov/bfa/dias/policy/nsfapprovedformats/biosketch.pdf. The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats.

Save the resumes in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Resumes".

iv. Letters of Commitment (if applicable)

Submit letters of commitment from all subrecipient and third-party cost share providers. If applicable, the letter must state that the third party is committed to providing a specific minimum dollar amount or value of in-kind contributions allocated to cost sharing. The following information for each third party contributing to cost sharing should be identified: (1) the name of the organization; (2) the proposed dollar amount to be provided; and (3) the proposed cost sharing type – (cash or in-kind contributions). Each letter must not exceed 1 page. Save the letters of commitment in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_LOCs".

Letters of support or endorsement for the project from entities that do not have a substantive role in the project are not accepted.

v. Statement of Project Objectives (SOPO) (required)

Applicants are required to complete a SOPO. A SOPO template is available on EERE Exchange at https://eere-Exchange.energy.gov/. The SOPO, including the Milestone Table, must not exceed 10 pages when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point (except in figures or tables, which may be 10 point font). Save the SOPO in a single Microsoft Word file using the following convention for the title "ControlNumber_LeadOrganization_SOPO".

vi. SF-424: Application for Federal Assistance (required)

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_424".

vii. Budget Justification Workbook (required)

Applicants must complete the Budget Justification Workbook, which is available on EERE Exchange at https://eere-Exchange.energy.gov/. Applicants must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the prime recipient and its subrecipients and contractors. Applicants should include costs associated with implementing the various BIL-specific requirements (e.g., Davis Bacon, R&D Community Benefits Plan, reporting, oversight) and with required annual audits and incurred cost proposals in their proposed budget documents. Such costs may be reimbursed as a direct or indirect cost. The "Instructions and Summary" included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants must carefully read the "Instructions and Summary" tab provided within the Budget Justification Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Budget_Justification".

viii. Summary for Public Release (required)

Applicants must submit a one-page summary of their project that is suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal

investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (e.g., benefits, outcomes), major participants (for collaborative projects), and the project's commitments and goals described in the R&D Community Benefits Plan. This document must not include any proprietary or sensitive business information as DOE may make it available to the public after selections are made. The summary must not exceed 1 page when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the Summary for Public Release in a single PDF file using the following naming convention "ControlNumber_LeadOrganization_Summary".

ix. Summary Slide (required)

Applicants must provide a single slide summarizing the proposed project. The Summary Slide template must include the following information:

- A technology, process, or project summary;
- A description of the technology, process, or project's impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project's key idea/takeaway;
- Topline community benefits;
- Project title, prime recipient, Principal Investigator, and senior/key personnel information; and
- Requested DOE funds and proposed applicant cost share.

Save the Summary Slide in a single Microsoft PowerPoint file using the following convention for the title "ControlNumber_LeadOrganization_Slide".

x. Subrecipient Budget Justification (if applicable)

Applicants must provide a separate budget justification for each subrecipient that is expected to perform work estimated to be more than $250,000 or 25 percent of the total work effort (whichever is less). The budget justification must include the same justification information described in the "Budget Justification" section above. Save each subrecipient budget justification in a Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Subrecipient_Budget_Justification".

xi. Budget for DOE/NNSA FFRDC (if applicable)

If a DOE/NNSA FFRDC is to perform a portion of the work, the applicant must provide a DOE WP in accordance with the requirements in DOE Order 412.1A, Work Authorization System, Attachment 3, available at:

https://www.directives.doe.gov/directives-documents/400-series/0412.1-BOrder-a-chg1-AdmChg Save the WP in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_WP".

xii. Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)

The federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor's authority under its award. Save the Authorization in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FFRDCAuth".

xiii. SF-LLL: Disclosure of Lobbying Activities (required)

Recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (https://www.grants.gov/web/grants/forms/sf-424-individual-family.html) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

- An officer or employee of any federal agency;
- A member of Congress;
- An officer or employee of Congress; or
- An employee of a member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_SF-LLL".

xiv. Waiver Requests (if applicable)

Foreign Entity Participation

For projects selected under this FOA, as set forth in Section III., all recipients must qualify as domestic entities. See Section III. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix B lists the information that must be included in a waiver request.

Foreign Work Waiver Request
As set forth in Section IV.I.iii., all work for projects selected under this FOA must be performed in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix B lists the information that must be included in a foreign work waiver request.

Save the Waivers in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Waiver".

xv. Open Source Software Distribution Plan (if applicable)

While an open source software distribution is not required for any Topic Area under this FOA, if an applicant chooses to include open source software distribution as part of their project, the applicant must submit an Open Source Software Distribution Plan as part of their Full Application. This plan describes how software produced under this FOA will be distributed. Submission of an Open Source Software Distribution Plan is required; failure to submit a complete Plan may result in a determination of non-compliance for your Full Application. Guidance for preparing an Open Source Software Distribution Plan is included in Appendix D of the FOA. Save the Open Source Software Distribution Plan in a single Microsoft Word file using the following convention for the title "ControlNumber_LeadOrganization_OSSDP".

xvi. R&D Community Benefits Plan (required)

The R&D Community Benefits Plan must set forth the applicant's approach to ensuring the Federal investments advance the following three objectives: (1) advance diversity, equity, inclusion and accessibility (DEIA); (2) contribute to energy equity; and (3) invest in America's workforce. The below sections set forth the content requirements for the R&D Community Benefits Plan, which addresses each of the foregoing objectives. Applicants must address all three sections.

The applicant's R&D Community Benefits Plan must include at least one Specific, Measurable, Assignable, Relevant, and Timely (SMART) milestone per budget period to measure progress on the proposed actions. The R&D Community Benefits Plan will be evaluated as part of the technical review process. If EERE selects a project, EERE will incorporate the R&D Community Benefits Plan into the award and the recipient must implement its R&D Community Benefits Plan as part of carrying out its project. During the life of the EERE award, EERE will

evaluate the recipient's progress, including as part of the Go/No-Go review process.

The plan should be specific to the proposed project and not a restatement of an organizational policies. Applicants should describe the future implications or a milestone-based plan for identifying future implications of their research on energy equity, including, but not limited to, benefits for the U.S. workforce. These impacts may be uncertain, occur over a long period of time, and/or have many factors within and outside the specific proposed research. Applicants are encouraged to describe the influencing factors and the most likely workforce and energy equity implications of the proposed research if the research is successful. While some guidance and example activities are provided in Appendix F, applicants are encouraged to leverage promising practices and develop a plan that is tailored for their project.

The R&D Community Benefits Plan must not exceed five (5) pages. It must be submitted in PDF format using the following convention name for the title: "Control Number_LeadOrganization_CBP." This Plan must address the technical review criterion titled, "R&D Community Benefits Plan." See Section V. of the FOA.

The applicant's R&D Community Benefits Plan must address the following three sections:

1) **Diversity, Equity, Inclusion, and Accessibility:**
   To building a clean and equitable energy economy, it is important that there are opportunities for people of all racial, ethnic, socioeconomic and geographic backgrounds, sexual orientation, gender identity, persons with disabilities, and those re-entering the workforce from incarceration. This section of the plan must demonstrate how DEIA is incorporated in the technical project objectives. The plan must identify the specific action the applicant would undertake that integrated into the research goals and project teams. Submitting an institutional DEIA plan without specific integration into the project will be deemed insufficient.

2) **Energy Equity:**
   This section must articulate the applicant's consideration of long-term equity implications of the research. It must identify how the specific project integrates equity considerations into the project design to support equitable outcomes should the innovation be successful. Like cost reductions and

commercialization plans, the R&D Community Benefits Plan requires description of the equity implications of the innovation if successful.

3) **Workforce Implications:**
This section must articulate the applicant's consideration of long-term workforce impacts and opportunities of the research. It must identify how the project is designed and executed to include an understanding of the future workforce needs should the resulting innovation be successful.

See Appendix F for more guidance.

xvii. Current and Pending Support (required)

Current and pending support is intended to allow the identification of potential duplication, overcommitment, potential conflicts of interest or commitment, and all other sources of support. As part of the application, the principal investigator and all senior/key personnel at the applicant and subrecipient level must provide a list of all sponsored activities, awards, and appointments, whether paid or unpaid; provided as a gift with terms or conditions or provided as a gift without terms or conditions; full-time, part-time, or voluntary; faculty, visiting, adjunct, or honorary; cash or in-kind; foreign or domestic; governmental or private-sector; directly supporting the individual's research or indirectly supporting the individual by supporting students, research staff, space, equipment, or other research expenses. All connections with foreign government-sponsored talent recruitment programs must be identified in current and pending support.

For every activity, list the following items:

- The sponsor of the activity or the source of funding;
- The award or other identifying number;
- The title of the award or activity. If the title of the award or activity is not descriptive, add a brief description of the research being performed that would identify any overlaps or synergies with the proposed research;
- The total cost or value of the award or activity, including direct and indirect costs and cost share. For pending proposals, provide the total amount of requested funding;
- The award period (start date – end date); and
- The person-months of effort per year being dedicated to the award or activity.

To identify overlap, duplication of effort, or synergistic efforts, append a description of the other award or activity to the current and pending support.

Details of any obligations, contractual or otherwise, to any program, entity, or organization sponsored by a foreign government must be provided on request to either the applicant institution or DOE. Supporting documents of any identified source of support must be provided to DOE on request, including certified translations of any document.

PIs and senior/key personnel must provide a separate disclosure statement listing the required information above regarding current and pending support. Each individual must sign and date their respective disclosure statement and include the following certification statement:

> I, [Full Name and Title], certify to the best of my knowledge and belief that the information contained in this Current and Pending Support Disclosure Statement is true, complete, and accurate. I understand that any false, fictitious, or fraudulent information, misrepresentations, half-truths, or omissions of any material fact, may subject me to criminal, civil or administrative penalties for fraud, false statements, false claims or otherwise. (18 U.S.C. §§ 1001 and 287, and 31 U.S.C. §§ 3729-3733 and 3801-3812). I further understand and agree that (1) the statements and representations made herein are material to DOE's funding decision, and (2) I have a responsibility to update the disclosures during the period of performance of the award should circumstances change which impact the responses provided above.

The information may be provided in the format approved by the National Science Foundation (NSF), which may be generated by the Science Experts Network Curriculum Vita (SciENcv), a cooperative venture maintained at https://www.ncbi.nlm.nih.gov/sciencv/, and is also available at https://www.nsf.gov/bfa/dias/policy/nsfapprovedformats/cps.pdf. The use of a format required by another agency is intended to reduce the administrative burden to researchers by promoting the use of common formats. If the NSF format is used, the individual must still include a signature, date, and a certification statement using the language included in the paragraph above.

Save the Current and Pending Support in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_CPS".

Definitions:

Current and pending support – (a) All resources made available, or expected to be made available, to an individual in support of the individual's RD&D efforts, regardless of (i) whether the source is foreign or domestic; (ii) whether the resource is made available through the entity applying for an award or directly to the individual; or (iii) whether the resource has monetary value; and (b) includes in-kind contributions requiring a commitment of time and directly supporting the individual's RD&D efforts, such as the provision of office or laboratory space, equipment, supplies, employees, or students. This term has the same meaning as the term Other Support as applied to researchers in NSPM-33: For researchers, Other Support includes all resources made available to a researcher in support of and/or related to all of their professional RD&D efforts, including resources provided directly to the individual or through the organization, and regardless of whether or not they have monetary value (e.g., even if the support received is only in-kind, such as office/laboratory space, equipment, supplies, or employees). This includes resource and/or financial support from all foreign and domestic entities, including but not limited to, gifts provided with terms or conditions, financial support for laboratory personnel, and participation of student and visiting researchers supported by other sources of funding.

Foreign Government-Sponsored Talent Recruitment Program – An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to United States entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

Senior/key personnel – an individual who contributes in a substantive, meaningful way to the scientific development or execution of a research,

development and demonstration (RD&D) project proposed to be carried out with DOE award.[84]

xviii. Locations of Work (required)

The applicant must complete the supplied template by listing the city, state, and zip code + 4 for each location where project work will be performed by the prime recipient or subrecipient(s). Save the completed template as a MS Excel file using the following convention for the title "Control Number_LeadOrganization_LOW."

xix. Community Partnership Documentation (if applicable)

In support of the Community Benefits Plan, applicants may submit documentation to demonstrate existing or planned partnerships with community entities, such as, organizations that work with local stakeholders most vulnerable to or affected by the project, such as organizations that carry out workforce development programs, labor unions, tribal organizations, and community-based organizations that work with disadvantaged communities. The Partnership Documentation could be in the form of a letter on the partner's letterhead outlining the planned partnership signed by an officer of the entity, a Memorandum of Understanding, or other similar agreement. Such letters must state the specific nature of the partnership and must not be general letters of support. If the applicant intends to enter into a Workforce and Community Agreement as part of the Community Benefits Plan, please include letters from proposed partners as appropriate. Each letter must not exceed 1 page. In total, the partnership documentation must not exceed 5 pages. Save the partnership documentation in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_PartnerDoc".

E. Post Selection Information Requests

If selected for award negotiations, DOE reserves the right to require that selected applicants provide additional or clarifying information regarding the application submissions, the project, the project team, the award requirements, and any other matters related to anticipated award. The following is a nonexhaustive list of examples information that may be required:

[84] Typically, these individuals have doctoral or other professional degrees, although individuals at the masters or baccalaureate level may be considered senior/key personnel if their involvement meets this definition. Consultants, graduate students, and those with a postdoctoral role also may be considered senior/key personnel if they meet this definition.

- Personnel proposed to work on the project and collaborating organizations (See Section VI.B.xviii. Participants and Collaborating Organizations);
- Current and Pending Support (See Sections IV.D.xvii. and VI.B.xix. Current and Pending Support);
- An Intellectual Property Management Plan describing how the project team/consortia members will handle intellectual property rights and issues between themselves while ensuring compliance with federal intellectual property laws, regulations, and policies in accordance with Section VI.B.x. Intellectual Property Management Plan;
- A Data Management Plan describing how all research data displayed in publications resulting from the proposed work will be digitally accessible at the time of publications, in accordance with Section VI.B.xxii.;
- Indirect cost information;
- Other budget information;
- Letters of Commitment from third parties contributing to cost share, if applicable;
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Information for the DOE Office of Civil Rights to process assurance reviews under 10 CFR 1040;
- Representation of Limited Rights Data and Restricted Software, if applicable;
- Information related to Davis-Bacon Act Requirements;
- Environmental Questionnaire;
- Transparency of Foreign Connections; and
- Potentially Duplicative Funding Notice.

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

Each applicant (unless the applicant is an individual or federal awarding agency that is excepted from those requirements under 2 CFR 25.110(b) or (c), or has an exception approved by the federal awarding agency under 2 CFR 25.110(d)) is required to: (1) Be registered in the SAM at https://www.sam.gov before submitting its application; (2) provide a valid UEI number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active federal award or an application or plan under consideration by a federal awarding agency. DOE may not make a federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, the DOE will

determine that the applicant is not qualified to receive a federal award and use that determination as a basis for making a federal award to another applicant.

NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process, they should utilize the HELP feature on SAM.gov. SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: GSAFSD Tier 0 Knowledge Base - Validating your Entity.

G. Submission Dates and Times

All required submissions must be submitted in EERE Exchange no later than 5 p.m. ET on the dates provided on the cover page of this FOA.

H. Intergovernmental Review

This FOA is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

I. Funding Restrictions

i. Allowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable federal cost principles. Pursuant to 2 CFR 910.352, the cost principles in the Federal Acquisition Regulations (48 CFR 31.2) apply to for-profit entities. The cost principles contained in 2 CFR Part 200, Subpart E apply to all entities other than for-profits.

ii. Pre-Award Costs

Applicants selected for award negotiations (selectee) must request prior written approval to charge pre-award costs. Pre-award costs are those incurred prior to the effective date of the federal award directly pursuant to the negotiation and in anticipation of the federal award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are allowable only to the extent that they would have been allowable if incurred after the date of the

federal award and **only** with the written approval of the federal awarding agency, through the DOE Contracting Officer.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis.

Pre-award expenditures are made at the selectee's risk. EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; or (3) if an award is made for a lesser amount than the selectee anticipated.

National Environmental Policy Act (NEPA) Requirements Related to Pre-Award Costs

DOE's decision whether and how to distribute federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to DOE completing the NEPA review process.

DOE does not guarantee or assume any obligation to reimburse pre-award costs incurred prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that DOE determines may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the applicant is doing so at risk of not receiving federal funding for their project and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer override the requirement to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives. Likewise, if an application is selected for negotiation of award, and the prime recipient elects to undertake activities that are not authorized for federal funding by the Contracting Officer in advance of DOE completing a NEPA review, the prime recipient is doing so at risk of not receiving federal funding and such costs may not be recognized as allowable cost share.

iii. Performance of Work in the United States (Foreign Work Waiver)

1. **Requirement**
   All work performed under awards issued under this FOA must be performed in the United States. The prime recipient must flow down this requirement to its subrecipients.

2. **Failure to Comply**
   If the prime recipient fails to comply with the Performance of Work in the United States requirement, DOE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The prime recipient is responsible should any work under this award be performed outside the United States, absent a waiver, regardless of whether the work is performed by the prime recipient, subrecipients, contractors or other project partners.

3. **Waiver**
   To seek a foreign work waiver, the applicant must submit a written waiver request to DOE. Appendix B lists the information that must be included in a request for a foreign work waiver.

   Save the waiver request(s) in a single PDF file. The applicant does not have the right to appeal DOE's decision concerning a waiver request.

iv. Construction

Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

v. Foreign Travel

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. § 40118), commonly referred to as the "Fly America Act," and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a United States flag carrier, if service is available. Foreign travel costs are allowable only with the written prior approval of the Contracting Officer assigned to the award.

vi. Equipment and Supplies

Property disposition may be required at the end of a project if the current fair market value of property exceeds $5,000. For-profit entity disposition requirements are set forth at 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316.

vii. Buy America Requirements for Infrastructure Projects

Pursuant to the Build America Buy America Act, subtitle IX of BIL (Buy America, or "BABA"), federally assisted projects that involve infrastructure work, undertaken by applicable recipient types, require that:

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

Whether a given project must apply this requirement is project-specific and dependent on several factors, such as the recipient's entity type, whether the work involves "infrastructure," as that term is defined in Section 70914 of the BIL, and whether the infrastructure in question is publicly owned or serves a public function.

Applicants are strongly encouraged to consult Appendix C of this FOA to determine whether their project may have to apply this requirement, both to make an early determination as to the need of a waiver, as well as to determine what impact, if any, this requirement may have on the proposed project's budget.

Please note that, based on implementation guidance from the Office of Management and Budget (OMB) issued on April 18, 2022, the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a "non-Federal entity," e.g., a State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization. Subawards should conform to the terms of the prime award from which they flow; in other words, for-profit prime recipients are not required to flow down these Buy America requirements to subrecipients, even if those subrecipients are non-Federal entities as defined above. Conversely, prime recipients which are non-Federal entities must flow the Buy America requirements down to all subrecipients, even if those subrecipients are for-profit entities. Finally, for all

applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

The DOE financial assistance agreement will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and manufactured products domestically that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation. Applicants may seek waivers of these requirements in very limited circumstances and for good cause shown. Further details on requesting a waiver can be found in Appendix C and the terms and conditions of an award.

Applicants are strongly encouraged to consult Appendix C for more information

viii. Davis-Bacon Act Requirements

Projects awarded under this FOA will be funded under Division D of the Bipartisan Infrastructure Law. Accordingly, per Section 41101 of that law, all laborers and mechanics employed by the recipient, subrecipients, contractors or subcontractors in the performance of construction, alteration, or repair work funded in whole or in part under this FOA shall be paid wages at rates not less than those prevailing on similar projects in the locality, as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code commonly referred to as the "Davis-Bacon Act" (DBA).

Applicants shall provide written assurance acknowledging the DBA requirements above, and confirming that the laborers and mechanics performing construction, alteration, or repair work on projects funded in whole or in part by awards made as a result of this FOA are paid or will be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by subchapter IV of Chapter 31 of Title 40, United States Code (Davis-Bacon Act).

Applicants acknowledge that they will comply with all of the Davis-Bacon Act requirements, including but not limited to:

(1) ensuring that the wage determination(s) and appropriate Davis-Bacon clauses and requirements are flowed down to and incorporated into any applicable subcontracts or subrecipient awards.

(2) ensuring that if wage determination(s) and appropriate Davis-Bacon clauses and requirements are improperly omitted from contracts and subrecipient awards, the applicable wage determination(s) and clauses are retroactively incorporated to the start of performance.

(3) being responsible for compliance by any subcontractor or subrecipient with the Davis-Bacon labor standards.

(4) receiving and reviewing certified weekly payrolls submitted by all subcontractors and subrecipients for accuracy and to identify potential compliance issues.

(5) maintaining original certified weekly payrolls for 3 years after the completion of the project and must make those payrolls available to the DOE or the United States Department of Labor ("DOL") upon request, as required by 29 CFR 5.6(a)(2).

(6) conducting payroll and job-site reviews for construction work, including interviews with employees, with such frequency as may be necessary to assure compliance by its subcontractors and subrecipients and as requested or directed by the DOE.

(7) cooperating with any authorized representative of the DOL in their inspection of records, interviews with employees, and other actions undertaken as part of a DOL investigation.

(8) posting in a prominent and accessible place the wage determination(s) and DOL Publication: WH-1321, Notice to Employees Working on Federal or Federally Assisted Construction Projects.

(9) notifying the Contracting Officer of all labor standards issues, including all complaints regarding incorrect payment of prevailing wages and/or fringe benefits, received from the recipient, subrecipient, contractor, or subcontractor employees; significant labor standards violations, as defined in 29 CFR 5.7; disputes concerning labor standards pursuant to 29 CFR Parts 4, 6, and 8 and as defined in FAR 52.222-14; disputed labor standards determinations; DOL investigations; or legal or judicial proceedings related to the labor standards under this Contract, a subcontract, or subrecipient award.

(10) preparing and submitting to the Contracting Officer, the Office of Management and Budget Control Number 1910-5165, Davis Bacon Semi-

Annual Labor Compliance Report, by April 21 and October 21 of each year. Form submittal will be administered through the iBenefits system (https://doeibenefits2.energy.gov), its successor system, or other manner of compliance as directed by the Contracting Officer.

Recipients of funding under this FOA will also be required to undergo Davis-Bacon Act compliance training and to maintain competency in Davis-Bacon Act compliance. The Contracting Officer will notify the recipient of any DOE sponsored Davis-Bacon Act compliance trainings. The DOL offers free Prevailing Wage Seminars several times a year that meet this requirement, at https://www.dol.gov/agencies/whd/government-contracts/construction/seminars/events.

For additional guidance on how to comply with the Davis-Bacon provisions and clauses, see https://www.dol.gov/agencies/whd/government-contracts/construction and https://www.dol.gov/agencies/whd/government-contracts/protections-for-workers-in-construction.

DOE anticipates contracting with a third party for a Davis-Bacon Act electronic payroll compliance software application. Recipients of funding under this FOA must ensure the timely electronic submission of weekly certified payrolls through this software as part of its compliance with the Davis-Bacon Act unless a waiver is granted to a particular contractor or subcontractor because they are unable or limited in their ability to use or access. Applicants should indicate if a waiver will be sought.

ix. Lobbying

Recipients and subrecipients may not use any federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (https://www.grants.gov/web/grants/forms/sf-424-individual-family.html) to ensure that non-federal funds have not been paid and will not be paid to any person for influencing or attempting to influence any of the following in connection with the application:

- An officer or employee of any federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

x. Risk Assessment

Pursuant to 2 CFR 200.206, DOE will conduct an additional review of the risk posed by applications submitted under this FOA. Such risk assessment will consider:

1. Financial stability;
2. Quality of management systems and ability to meet the management standards prescribed in 2 CFR 200 as amended and adopted by 2 CFR 910;
3. History of performance;
4. Audit reports and findings; and
5. The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-federal entities.

DOE may make use of other publicly available information and the history of an applicant's performance under DOE or other federal agency awards.

Depending on the severity of the findings and whether the findings were resolved, DOE may elect not to fund the applicant.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR Part 180, and must require non-federal entities to comply with these provisions. These provisions restrict federal awards, subawards and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for participation in federal programs or activities.

Further, as DOE funds critical and emerging technology areas, DOE also considers possible vectors of undue foreign influence in evaluating risk. If high risks are identified and cannot be sufficiently mitigated, DOE may elect to not fund the applicant.

xi. Invoice Review and Approval

DOE employs a risk-based approach to determine the level of supporting documentation required for approving invoice payments. Recipients may be required to provide some or all of the following items with their requests for reimbursement:

- Summary of costs by cost categories;
- Timesheets or personnel hours report;

- Proof of compliance with Davis-Bacon and electronic submittals of certified payroll reports;
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs;
- UCC filing proof for equipment acquired with project funds by for-profit recipients and subrecipients;
- Explanation of cost share for invoicing period;
- Analogous information for some subrecipients; and
- Other items as required by DOE.

xii. Prohibition related to Foreign Government-Sponsored Talent Recruitment Programs

a. Prohibition

Persons participating in a *Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk* are prohibited from participating in projects selected for federal funding under this FOA. Should an award result from this FOA, the recipient must exercise ongoing due diligence to reasonably ensure that no individuals participating on the DOE-funded project are participating in a *Foreign Government-Sponsored Talent Recruitment Program of a Foreign Country of Risk*. Consequences for violations of this prohibition will be determined according to applicable law, regulations, and policy. Further, the recipient must notify DOE within five (5) business days upon learning that an individual on the project team is or is believed to be participating in a foreign government talent recruitment program of a foreign country of risk. DOE may modify and add requirements related to this prohibition to the extent required by law.

b. Definitions

1. **Foreign Government-Sponsored Talent Recruitment Program.** An effort directly or indirectly organized, managed, or funded by a foreign government, or a foreign government instrumentality or entity, to recruit science and technology professionals or students (regardless of citizenship or national origin, or whether having a full-time or part-time position). Some foreign government-sponsored talent recruitment programs operate with the intent to import or otherwise acquire from abroad, sometimes through illicit means, proprietary technology or software, unpublished data and methods, and intellectual property to further the military modernization goals and/or economic goals of a foreign government. Many, but not all, programs aim to incentivize the

targeted individual to relocate physically to the foreign state for the above purpose. Some programs allow for or encourage continued employment at United States research facilities or receipt of federal research funds while concurrently working at and/or receiving compensation from a foreign institution, and some direct participants not to disclose their participation to U.S. entities. Compensation could take many forms including cash, research funding, complimentary foreign travel, honorific titles, career advancement opportunities, promised future compensation, or other types of remuneration or consideration, including in-kind compensation.

2. **Foreign Country of Risk.** DOE has designated the following countries as foreign countries of risk: Iran, North Korea, Russia, and China. This list is subject to change.

xiii. Affirmative Action and Pay Transparency Requirements

All federally assisted construction contracts exceeding $10,000 annually will be subject to the requirements of Executive Order 11246:

(1) Recipients, subrecipients, and contractors are prohibited from discriminating in employment decisions on the basis of race, color, religion, sex, sexual orientation, gender identity or national origin.

(2) Recipients and Contractors are required to take affirmative action to ensure that equal opportunity is provided in all aspects of their employment. This includes flowing down the appropriate language to all subrecipients, contractors and subcontractors.

(3) Recipients, subrecipients, contractors and subcontractors are prohibited from taking adverse employment actions against applicants and employees for asking about, discussing, or sharing information about their pay or, under certain circumstances, the pay of their co-workers.

The Department of Labor's (DOL) Office of Federal Contractor Compliance Programs (OFCCP) uses a neutral process to schedule contractors for compliance evaluations. OFCCP's Technical Assistance Guide[85] should be consulted to gain an understanding of the requirements and possible actions the recipients, subrecipients, contractors and subcontractors must take.

[85] See OFCCP's Technical Assistance Guide at: https://www.dol.gov/sites/dolgov/files/ofccp/Construction/files/ConstructionTAG.pdf?msclkid=9e397d68c4b111ec9d8e6fecb6c710ec Also see the National Policy Assurances http://www.nsf.gov/awards/managing/rtc.jsp

xiv. Foreign Collaboration Considerations

Consideration of new collaborations with foreign entities and governments. The recipient will be required to provide DOE with advanced written notification of any potential collaboration with foreign entities or governments in connection with its DOE-funded award scope. The recipient will then be required to await further guidance from DOE prior to contacting the proposed foreign entity or government regarding the potential collaboration or negotiating the terms of any potential agreement.
Existing collaborations with foreign entities and governments. The recipient will be required to provide DOE with a written list of all existing foreign collaborations in which has entered in connection with its DOE-funded award scope.

Description of collaborations that should be reported: In general, a collaboration will involve some provision of a thing of value to, or from, the recipient. A thing of value includes but may not be limited to all resources made available to, or from, the recipient in support of and/or related to the DOE award, regardless of whether or not they have monetary value. Things of value also may include in-kind contributions (such as office/laboratory space, data, equipment, supplies, employees, students). In-kind contributions not intended for direct use on the DOE award but resulting in provision of a thing of value from or to the DOE award must also be reported. Collaborations do not include routine workshops, conferences, use of the recipient's services and facilities by foreign investigators resulting from its standard published process for evaluating requests for access, or the routine use of foreign facilities by awardee staff in accordance with the recipient's standard policies and procedures.

V. Application Review Information

A. Technical Review Criteria

i. Concept Papers

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

Concept Paper Criterion: Overall FOA Responsiveness and Viability of the Project (Weight: 100%)
This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed technology, process, or project, describes how the technology, process, or project is unique and innovative, and how the technology, process, or project will advance the current state of the art;

- The applicant has identified risks and challenges of the project, regulatory and financial aspects of the proposal including possible mitigation strategies, and has shown the impact that EERE funding and the proposed project would have on the relevant field and application;
- The applicant has the qualifications, experience, capabilities, and other resources necessary to complete the proposed project; and
- The proposed work, if successfully accomplished, would clearly meet the objectives as stated in the FOA.

ii. Full Applications

Applications will be evaluated against technical review criteria, specific to each Topic Area, as shown below. All sub-criteria are of equal weight.

Topic Area 1: High-Voltage Direct Current (HVDC) for Offshore Wind

(Includes Subtopic 1a: HVDC Standards and Benchmark Systems Development for Offshore Wind, Subtopic 1b: Multi-terminal HVDC Controls and Functional Requirements, and Subtopic 1c: HVDC Curriculum Development for Education and Workforce Training):

Criterion 1: Technical Merit, Innovation, and Impact (45%)

This criterion involves consideration of the following factors:

Technical Merit and Innovation

- Extent to which the proposed technology, research, process, or project is innovative and has demonstratable impact to the energy system and/or economy;
- Degree to which the current state of the technology or science and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state of the art to the proposed advancement;
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations and discussion of prior work with analyses that support the viability of the proposed work;
- Extent to which project has buy-in from needed stakeholders to ensure success; and
- Robustness of validation of models and tools (if applicable).

Impact of Technology Advancement

- The ability of the project to advance industry adoption;

- The extent the project supports the topic area objectives and target specifications and metrics;
- Extent to which the project facilitates stakeholder relationships across new or existing stakeholders to gain technical buy-in and increase project success; and
- Extent to which results dissemination will maximize project impact.

Criterion 2: Project Approach (25%)
This criterion involves consideration of the following factors:

Project Management
- Adequacy of proposed project management systems including the ability to track scope, cost, and schedule progress and changes;
- Reasonableness of budget and spend plan as detailed in the budget justification workbook for proposed project and objectives;
- Adequacy, reasonableness, and soundness of the project schedule, as well as periodic Go/No-Go decisions prior to further funds disbursement, interim milestones, and metrics to track process;
- Adequacy, reasonableness, and soundness of the project schedule, as well as annual Go/No-Go decisions prior to a budget period continuation application, interim milestones, and metrics to track process;
- Adequacy of the identification of risks and appropriate strategies for mitigation and resolution.

Workplan and SOPO
- Degree to which the approach and critical path have been clearly described and comprehensively considered; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.
- Comprehensiveness of project dissemination plan.

Criterion 3: Team and Resources (15%)
This criterion involves consideration of the following factors:
- The capability of the Project Manager(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- The diversity or expertise and perspectives of the team and the inclusion of industry partners that will amplify impact;
- The sufficiency of the facilities to support the work; and

- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan, Workplan;

Criterion 4: R&D Community Benefits Plan (15%)
This criterion involves the consideration of the following factors:

Diversity, Equity, Inclusion and Accessibility (DEIA)

- Clear articulation of the project's goals related to diversity, equity, inclusion, and accessibility;
- Quality of the project's DEIA goals, as measured by the goals' depth, breadth, likelihood of success, inclusion of appropriate and relevant SMART milestones, and overall project integration;
- Degree of applicant's commitment and ability to track progress towards meeting each of the diversity, equity, inclusion, and accessibility goals; and
- Extent of engagement of organizations that represent underserved communities as a core element of their mission, including MSIs, Minority Business Entities, and non-profit or community-based organizations.

Energy Equity

- Clear workplan tasks, staffing, research, and timeline for engaging energy equity stakeholders and/or evaluating the possible near and long-term implications of the project for the benefit of the American public, including, but not limited to the public health and public prosperity benefits;
- Approach, methodology, and expertise articulated in the plan for addressing energy equity and justice issues associated with the technology innovation; and
- Likelihood that the plan will result in improved understanding of distributional public benefits and costs related to the innovation if successful.

Workforce Implications

- Clear and comprehensive workplan tasks, staffing, research, and timeline for engaging workforce stakeholders and/or evaluating the possible near and long-term implications of the project for the U.S. workforce;
- Approach to document the knowledge, skills, and abilities of the workforce required for successful commercial deployment of innovations resulting from this research; and
- Likelihood that the plan will result in improved understanding of the workforce implications related to the innovation if successful.

Topic Area 2: Advancing Deployment of Distributed (ADD) Wind

Criterion 1: Technical Merit, Innovation, and Impact (50%)
This criterion involves consideration of the following factors:

Technical Merit and Innovation

- Extent to which the proposed solution is innovative and replicable;
- Degree to which the current state of the permitting and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the proposed project may reform permitting practices;
- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state-of-the-art to the proposed advancement; and
- Sufficiency of technical detail in the application to assess whether the proposed work is meritorious, including relevant data, calculations, and discussion of prior work in the literature with analyses that support the viability of the proposed work.

Impact of Process Advancement

- The ability of the project to advance technology deployment;
- The extent the project supports the topic area objectives;
- The potential impact of the project on advancing the state-of-the-art;
- Extent to which the project is replicable and may lead to future adoption;
- Extent to which the project facilitates stakeholder relationships across new or existing stakeholders to gain buy-in and increase potential for future deployments; and
- Degree to which the proposed work will provide benefit to communities through collaboration, consideration of community needs and questions, and other mechanisms.

Criterion 2: Project Approach and Market Transformation Plan (20%)
This criterion involves consideration of the following factors:

Project Approach, Workplan and SOPO

- Degree to which the approach and critical path have been clearly described and thoughtfully considered;
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals;

- Adequacy, reasonableness, and soundness of the project schedule, as well as periodic Go/No-Go decisions prior to further funds disbursement, interim milestones, and metrics to track process; and
- Degree of detail in the description, as applicable, of tools and resources to be developed

Identification of Technical Risks

- Discussion and demonstrated understanding of the key risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

Baseline, Metrics, and Deliverables

- The level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined project baseline, the strength of the quantifiable metrics, milestones, and a mid-point deliverable defined in the application, such that meaningful interim progress will be made.

Market Transformation Plan

Identification of target market, stakeholders, and distribution channels for proposed solution along with known or perceived barriers to market penetration, including mitigation plan.

Industry Adoption Plan

- Identification of the interest and extent of authority have jurisdiction adoption of the process or solution.

Criterion 3: Team and Resources (15%)

This criterion involves consideration of the following factors:

- The capability of the Project Manager(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- The degree to which the proposed team demonstrates the ability to facilitate and expedite further demonstration, development and adoption of the proposed solutions;
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan, Workplan; and
- The reasonableness of the budget and spend plan for the proposed project and objectives.

Criterion 4: R&D Community Benefits Plan (15%)

This criterion involves the consideration of the following factors:

Diversity, Equity, Inclusion and Accessibility (DEIA)

- Clear articulation of the project's goals related to diversity, equity, inclusion, and accessibility;
- Quality of the project's DEIA goals, as measured by the goals' depth, breadth, likelihood of success, inclusion of appropriate and relevant SMART milestones, and overall project integration;
- Degree of applicant's commitment and ability to track progress towards meeting each of the diversity, equity, inclusion, and accessibility goals; and
- Extent of engagement of organizations that represent underserved communities as a core element of their mission, including MSIs, Minority Business Entities, and non-profit or community-based organizations.

Energy Equity

- Clear workplan tasks, staffing, research, and timeline for engaging energy equity stakeholders and/or evaluating the possible near and long-term implications of the project for the benefit of the American public, including, but not limited to the public health and public prosperity benefits;
- Approach, methodology, and expertise articulated in the plan for addressing energy equity and justice issues associated with the technology innovation; and
- Likelihood that the plan will result in improved understanding of distributional public benefits and costs related to the innovation if successful.

Workforce Implications

- Clear and comprehensive workplan tasks, staffing, research, and timeline for engaging workforce stakeholders and/or evaluating the possible near and long-term implications of the project for the U.S. workforce;
- Approach to document the knowledge, skills, and abilities of the workforce required for successful commercial deployment of innovations resulting from this research; and
- Likelihood that the plan will result in improved understanding of the workforce implications related to the innovation if successful.

Topic Area 3: Offshore Wind Energy Social Science Research

(Includes Subtopic 3a: Research on Community Impacts of Offshore Wind Development and Subtopic 3b: Capacity Building for Community Participation in Offshore Wind):

Criterion 1: Project Merit, Innovation, and Impact (50%)
This criterion involves consideration of the following factors:

Project Merit and Innovation

- Extent to which the proposed project is innovative research;
- Degree to which the current state of research and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the proposed project may inform deployment practices;
- Sufficiency of research detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations, and discussion of established work in peer reviewed literature and/or non-academic activities with analyses that support the viability of proposed work.

Impact of Research Advancement

- How the project supports the Topic Area objective and target specifications and metrics;
- Degree to which the proposed work will provide benefit to communities during the study period through collaboration, consideration of community needs and questions, and other mechanisms;
- The potential impact of the project on advancing the state of the art of research.

Criterion 2: Project Research Plan (20%)
This criterion involves consideration of the following factors:

Research Approach, Workplan and SOPO

- Degree to which the approach and critical path have been clearly described and thoughtfully considered;
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed workplan and SOPO will succeed in meeting the project goals;
- Degree of detail in the description, as applicable, of tools and resources to be developed

Identification of Project Risks

- Discussion and demonstrated understanding of the key risk areas involved in the proposed work and the quality of the mitigation strategies to address them;
- Discussion of potential risks to communities posed by proposed work and plans for mitigation (e.g. extraction of data from communities; loss of community ownership of sensitive data);

Baseline, Metrics, and Deliverables

- The level of clarity in the definition of the baseline, metrics, and milestones of study;
- The level of clarity in the definition of how the study samples over a longitudinal period;
- Strength of the qualitative and/or qualitative metrics, milestones, and mid-point deliverables defined in the application such that meaningful interim progress will be made.

Criterion 3: Team and Resources (15%)

This criterion involves consideration of the following factors:

- The capability of the Project Manager(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- Clear description of collaboration with communities and role of participating members in study design/implantation/analysis/distribution as appropriate;
- The sufficiency of the facilities and field sites to support the work;
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the workplan;
- The reasonableness of the budget and spend plan for the proposed project and objectives.

Criterion 4: R&D Community Benefits Plan (15%)

This criterion involves the consideration of the following factors:

Diversity, Equity, Inclusion and Accessibility (DEIA)

- Clear articulation of the project's goals related to diversity, equity, inclusion, and accessibility;
- Quality of the project's DEIA goals, as measured by the goals' depth, breadth, likelihood of success, inclusion of appropriate and relevant SMART milestones, and overall project integration;
- Degree of applicant's commitment and ability to track progress towards meeting each of the diversity, equity, inclusion, and accessibility goals; and

- Extent of engagement of organizations that represent underserved communities as a core element of their mission, including MSIs, Minority Business Entities, and non-profit or community-based organizations.

Energy Equity

- Clear workplan tasks, staffing, research, and timeline for engaging energy equity stakeholders and/or evaluating the possible near and long-term implications of the project for the benefit of the American public, including, but not limited to the public health and public prosperity benefits;
- Approach, methodology, and expertise articulated in the plan for addressing energy equity and justice issues associated with the technology innovation; and
- Likelihood that the plan will result in improved understanding of distributional public benefits and costs related to the innovation if successful.

Workforce Implications

- Clear and comprehensive workplan tasks, staffing, research, and timeline for engaging workforce stakeholders and/or evaluating the possible near and long-term implications of the project for the U.S. workforce;
- Approach to document the knowledge, skills, and abilities of the workforce required for successful commercial deployment of innovations resulting from this research; and
- Likelihood that the plan will result in improved understanding of the workforce implications related to the innovation if successful.

Topic Area 4: Bat Deterrent Technology Development

Criterion 1: Technical Merit, Innovation, and Impact (35%)
This criterion involves consideration of the following factors:

Technical Merit and Innovation

- The degree the project meets the Research Objectives, Specific Application Requirements, and Study Methodology Expectations as described for the interest or interests included in the proposal;
- The degree to which the project will advance the state of knowledge by filling in key gaps and address priority challenges in developing effective deterrent technologies;
- The sufficiency of detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary/novel, including draft study methodology and power analysis (where appropriate), relevant

references and discussion of prior work in the literature that support the viability of the proposed work; and
- The extent to which the project has buy-in/support from relevant stakeholders to ensure potential impact of the project on advancing the state-of-the art.

Criterion 2: Project Approach (30%)
This criterion involves consideration of the following factors:

Research Approach, Workplan and SOPO
- The degree to which the approach and critical path have been clearly described and thoughtfully considered;
- The degree to which the proposed methodological approach (and power analysis, where appropriate) is scientifically sound and likely to address the research objectives of the element or elements included in the proposal; and
- The degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

Project Management
- The adequacy of proposed project management systems and staff including the ability to track scope, cost, and schedule progress/changes;
- The adequacy of contingency plan (where appropriate) based on quality of cost estimate and identified risks including supply chain issues, cost increases, and scheduling delays as applicable; and
- The soundness of a plan to expeditiously address environmental, siting, and other regulatory requirements for the project.

Identification of Technical Risks
- Discussion and demonstrated understanding of the key technical risk areas involved in the proposed work and the quality of the mitigation strategies to address them.

Baseline, Metrics, and Deliverables
- The level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined performance baseline, the strength of the performance metrics, milestones, and mid-point deliverables defined in the application, such that meaningful interim progress can be measured.

Criterion 3: Team and Resources (20%)
This criterion involves consideration of the following factors:

- The capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success;
- The qualifications, relevant expertise, and time commitment of the individuals on the team;
- The clarity, adequacy, and completeness of roles and contributions of each team member in development of the project;
- The degree to which the proposed team includes members of key stakeholder groups or the proposal outlines a process and structure to garner input from key stakeholders throughout the course of the project;
- Evidence of support of key stakeholder groups as described in the Topic Area;
- The sufficiency of the equipment, facilities or field sites to support the work and ensure project success;
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan;
- The reasonableness of the budget and spend plan for the proposed project and objectives.

Criterion 4: R&D Community Benefits Plan (15%)

This criterion involves the consideration of the following factors:

Diversity, Equity, Inclusion and Accessibility (DEIA)

- Clear articulation of the project's goals related to diversity, equity, inclusion, and accessibility;
- Quality of the project's DEIA goals, as measured by the goals' depth, breadth, likelihood of success, inclusion of appropriate and relevant SMART milestones, and overall project integration;
- Degree of applicant's commitment and ability to track progress towards meeting each of the diversity, equity, inclusion, and accessibility goals; and
- Extent of engagement of organizations that represent underserved communities as a core element of their mission, including MSIs, Minority Business Entities, and non-profit or community-based organizations.

Energy Equity

- Clear workplan tasks, staffing, research, and timeline for engaging energy equity stakeholders and/or evaluating the possible near and long-term implications of the project for the benefit of the American public, including, but not limited to the public health and public prosperity benefits;
- Approach, methodology, and expertise articulated in the plan for addressing energy equity and justice issues associated with the technology innovation; and

- Likelihood that the plan will result in improved understanding of distributional public benefits and costs related to the innovation if successful.

Workforce Implications

- Clear and comprehensive workplan tasks, staffing, research, and timeline for engaging workforce stakeholders and/or evaluating the possible near and long-term implications of the project for the U.S. workforce;
- Approach to document the knowledge, skills, and abilities of the workforce required for successful commercial deployment of innovations resulting from this research; and
- Likelihood that the plan will result in improved understanding of the workforce implications related to the innovation if successful.

B. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this FOA, by the standards set forth in EERE's Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "DOE Merit Review Guide for Financial Assistance," effective September 2020, which is available at: https://energy.gov/management/downloads/merit-review-guide-financial-assistance-and-unsolicited-proposals-current.

C. Other Selection Factors

i. Program Policy Factors

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

- The degree to which the proposed project exhibits technological diversity when compared to the existing DOE project portfolio and other projects selected from the subject FOA;
- The degree to which the proposed project, including proposed cost share, optimizes the use of available DOE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to accelerate demonstration and commercialization and overcome key market barriers;
- The degree to which the proposed project is likely to lead to increased high-quality employment and manufacturing in the United States;

- The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
- The degree to which the proposed project provides funding to disadvantaged communities or seeks to address environmental injustices that disproportionately affect disadvantaged communities in accordance with Executive Order 14008;
- The extent the proposed project will lead to advancements that will support the just transition of energy workers and communities to clean energy;
- The degree to which the proposed project, or group of projects, represent a desired geographic distribution (considering past awards and current applications);

- The degree to which the proposed project will employ procurement of U.S. iron, steel, manufactured products, and construction materials.

D. Evaluation and Selection Process

i. Overview

The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

ii. Pre-Selection Interviews

As part of the evaluation and selection process, DOE may invite one or more applicants to participate in pre-selection interviews. Pre-selection interviews are distinct from and more formal than pre-selection clarifications (See Section V.D.iii. of the FOA). The invited applicant(s) will meet with DOE representatives to provide clarification on the contents of the Full Applications and to provide DOE an opportunity to ask questions regarding the proposed project. The information provided by applicants to DOE through pre-selection interviews contributes to DOE's selection decisions.

DOE will arrange to meet with the invited applicants in person at DOE's offices or a mutually agreed upon location. DOE may also arrange site visits at certain applicants' facilities. In the alternative, DOE may invite certain applicants to participate in a one-on-one conference with DOE via webinar, videoconference, or conference call.

DOE will not reimburse applicants for travel and other expenses relating to the pre-selection interviews, nor will these costs be eligible for reimbursement as pre-award costs.

Participation in pre-selection interviews with DOE does not signify that applicants have been selected for award negotiations.

iii. Pre-Selection Clarification

DOE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application. The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written responses to DOE's written clarification questions or video or conference calls with DOE representatives.

The information provided by applicants to DOE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and DOE's selection decisions. If DOE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

DOE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

iv. Recipient Integrity and Performance Matters

DOE, prior to making a federal award with a total amount of federal share greater than the simplified acquisition threshold, is required to review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. § 2313).

The applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a federal awarding agency previously entered and is

currently in the designated integrity and performance system accessible through SAM.

DOE will consider any written comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.206.

v. Selection

The Selection Official may consider the technical merit, the Federal Consensus Board's recommendations, program policy factors, and the amount of funds available in arriving at selections for this FOA.

E. Anticipated Notice of Selection and Award Negotiation Dates

EERE anticipates notifying applicants selected for negotiation of award and negotiating awards by the dates provided on the cover page of this FOA.

VI. Award Administration Information

A. Award Notices

i. Ineligible Submissions

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Contracting Officer will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will state the basis upon which the Concept Paper or the Full Application is ineligible and not considered for further review.

ii. Concept Paper Notifications

DOE will notify applicants of its determination to encourage or discourage the submission of a Full Application. DOE will post these notifications to EERE Exchange. DOE may include general comments provided from reviewers on an applicant's Concept Paper in the encourage/discourage notifications.

Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, DOE intends to convey its lack of programmatic interest in the

proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

iii. Full Application Notifications

DOE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will inform the applicant whether or not its Full Application was selected for award negotiations. Alternatively, DOE may notify one or more applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

iv. Successful Applicants

Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by DOE to issue an award. Applicants do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement, accessible by the prime recipient in FedConnect.

The award negotiation process will take approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE Exchange with whom DOE will communicate to conduct award negotiations. The applicant must be responsive during award negotiations (i.e., provide requested documentation) and meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, DOE will cancel the award negotiations and rescind the Selection. DOE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.I.ii. of the FOA for guidance on pre-award costs.

v. Alternate Selection Determinations

In some instances, an applicant may receive a notification that its application was not selected for award and DOE designated the application to be an alternate. As an alternate, DOE may consider the Full Application for federal funding in the future. A notification letter stating the Full Application is designated as an alternate does not authorize the applicant to commence performance of the project. DOE may ultimately determine to select or not select the Full Application for award negotiations.

vi. Unsuccessful Applicants

DOE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

B. Administrative and National Policy Requirements

i. Registration Requirements

There are several one-time actions before submitting an application in response to this FOA, and it is vital that applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an applicant's ability to apply to this FOA, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

1. **EERE Exchange**
   Register and create an account on EERE Exchange at https://eere-Exchange.energy.gov. This account will then allow the user to register for any open EERE FOAs that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Applicants should also designate backup points of contact so they may be easily contacted if deemed necessary. **This step is required to apply to this FOA.** The EERE Exchange registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA.**

2. **System for Award Management**
   Register with the SAM at https://www.sam.gov. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called a Marketing Partner ID Number (MPIN) are important steps in SAM registration. Please update your SAM registration annually.

3. **FedConnect**
   Register in FedConnect at https://www.fedconnect.net. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf.

4. **Grants.gov**
   Register in Grants.gov (http://www.grants.gov) to receive automatic updates when Amendments to this FOA are posted. However, please note that Letters of Intent, Concept Papers, and Full Applications will not be accepted through Grants.gov.

5. **Electronic Authorization of Applications and Award Documents**
   Submission of an application and supplemental information under this FOA through electronic systems used by the DOE, including EERE Exchange and FedConnect.net, constitutes the authorized representative's approval and electronic signature.

ii. Award Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR Part 200 as amended by 2 CFR Part 910.

iii. Foreign National Participation

All applicants selected for an award under this FOA and project participants (including subrecipients and contractors) who anticipate involving foreign nationals in the performance of an award, may be required to provide DOE with specific information about each foreign national to satisfy requirements for foreign national participation. A "foreign national" is defined as any person who is not a United States citizen by birth or naturalization. The volume and type of information collected may depend on various factors associated with the award. DOE concurrence may be required before a foreign national can participate in the performance of any work under an award.

DOE may elect to deny foreign national's participation in the award. Likewise, DOE may elect to deny a foreign national's access to a DOE sites, information, technologies, equipment, programs, or personnel.

iv. Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier subrecipients. Prime recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

v. National Policy Requirements

The National Policy Assurances that are incorporated as a term and condition of award are located at: http://www.nsf.gov/awards/managing/rtc.jsp.

vi. Environmental Review in Accordance with National Environmental Policy Act (NEPA)

DOE's decision whether and how to distribute federal funds under this FOA is subject to NEPA (42 U.S.C. § 4321, *et seq.*). NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website, at https://www.energy.gov/nepa.

While NEPA compliance is a federal agency responsibility and the ultimate decisions remain with the federal agency, all recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations or environmental assessments), the recipient may be required to prepare the records and the costs to prepare the necessary records may be included as part of the project costs.

vii. Applicant Representations and Certifications

1. Lobbying Restrictions

By accepting funds under this award, the prime recipient agrees that none of the funds obligated on the award shall be expended, directly or indirectly, to influence Congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. § 1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

2. Corporate Felony Conviction and Federal Tax Liability Representations

In submitting an application in response to this FOA, the applicant represents that:

a. It is **not** a corporation that has been convicted of a felony criminal violation under any federal law within the preceding 24 months; and

b. It is **not** a corporation that has any unpaid federal tax liability that has been assessed, for which all judicial and administrative remedies have

been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

For purposes of these representations the following definitions apply:

A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States [but not foreign corporations]. It includes both for-profit and non-profit organizations.

3. Nondisclosure and Confidentiality Agreements Representations

In submitting an application in response to this FOA the applicant represents that:

a. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contactors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

b. It **does not and will not** use any federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:

(1) *''These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive Order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive Orders and statutory provisions are incorporated into this agreement and are controlling.''*

(2) The limitation above shall not contravene requirements applicable to Standard Form 312 Classified Information Nondisclosure Agreement (https://fas.org/sgp/othergov/sf312.pdf), Form 4414

Sensitive Compartmented Information Disclosure Agreement (https://fas.org/sgp/othergov/intel/sf4414.pdf), or any other form issued by a federal department or agency governing the nondisclosure of classified information.

(3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

viii. Statement of Federal Stewardship

DOE will exercise normal federal stewardship in overseeing the project activities performed under DOE awards. Stewardship Activities include, but are not limited to, conducting site visits; reviewing performance and financial reports; providing assistance and/or temporary intervention in unusual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

ix. Statement of Substantial Involvement

DOE has substantial involvement in work performed under awards made as a result of this FOA. DOE does not limit its involvement to the administrative requirements of the award. Instead, DOE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

1. DOE shares responsibility with the recipient for the management, control, direction, and performance of the project.

2. DOE may intervene in the conduct or performance of work under this award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.

3. DOE may redirect or discontinue funding the project based on the outcome of DOE's evaluation of the project at the Go/No-Go decision point(s).

4. DOE participates in major project decision-making processes.

x. Intellectual Property Management Plan (IPMP)

At the discretion of the DOE Contracting Officer, applicants may be required to submit an executed IPMP between the members of the consortia or team as a quarter 1 milestone if selected for award.

The award will set forth the treatment of and obligations related to intellectual property rights between DOE and the individual members. The IPMP should describe how the members will handle intellectual property rights and issues between themselves while ensuring compliance with federal intellectual property laws, regulations, and policies (see Sections VIII.K.-VIII.N. of this FOA for more details on applicable federal intellectual property laws and regulations). Guidance regarding the contents of IPMP is available from DOE upon request.

The following is a non-exhaustive list of examples of items that the IPMP may cover:

- The treatment of confidential information between members (e.g., the use of NDAs);
- The treatment of background intellectual property (e.g., any requirements for identifying it or making it available);
- The treatment of inventions made under the award (e.g., any requirements for disclosing to the other members on an application, filing patent applications, paying for patent prosecution, and cross-licensing or other licensing arrangements between the members);
- The treatment of data produced, including software, under the award (e.g., any publication process or other dissemination strategies, copyrighting strategy or arrangement between members);
- Any technology transfer and commercialization requirements or arrangements between the members;
- The treatment of any intellectual property issues that may arise due to a change in membership of the consortia or team; and
- The handling of disputes related to intellectual property between the members.

xi. Subject Invention Utilization Reporting

To ensure that prime recipients and subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, DOE may require that each prime recipient holding title to a subject invention submit annual reports for ten (10) years from the date the subject invention was disclosed to DOE on the utilization of the subject invention and efforts made by prime recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the prime recipient, and such other data and information as DOE may specify.

xii. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards.

xiii. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement.

Additional reporting requirements apply to projects funded by BIL. As part of tracking progress toward key departmental goals – ensuring justice and equity, investing in the American workforce, boosting domestic manufacturing, reducing greenhouse gas emissions, and advancing a pathway to private sector deployment – DOE may require specific data collection. Examples of data that may be collected include:

- New manufacturing production, or recycling capacity
- Number of trainings completed, trainees placed in full-time employment, and trainings with workforce partnerships involving employers, community-based organizations, or labor unions.
- R&D Community Benefits Plan data:
    - Activities implemented to advance DEIA goals;
    - Number of team members with substantive research roles, including students and postdocs from disadvantaged communities funded under the award and their next career step if known;
    - Number of members of labor unions funded under the award;
    - Number and type of stakeholder events and attendees, communities supported or represented by stakeholders;

- Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Disability Owned Businesses, and Veteran Owned Businesses acting as suppliers, vendors, and sub-contractors; and
- Other quantitative or qualitative data that would help DOE assess the effectiveness of DEIA efforts implemented by awardees.

- Number and type of energy efficient and clean energy equipment installed
- Non-DOE Investment, follow-on-funding, Intellectual Property (IP)generation and IP utilization

xiv. Go/No-Go Review

Each project selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. A Go/No-Go Review is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. At the Go/No-Go decision points, DOE will evaluate project performance, project schedule adherence, the extent milestone objectives are met, compliance with reporting requirements, and overall contribution to the program goals and objectives. Federal funding beyond the Go/No-Go decision point (continuation funding) is contingent upon (1) availability of federal funds appropriated by Congress for the purpose of this program; (2) the availability of future-year budget authority; (3) recipient's technical progress compared to the Milestone Summary Table stated in Attachment 1 of the award; (4) recipient's submittal of required reports; (5) recipient's compliance with the terms and conditions of the award; (6) DOE's Go/No-Go decision; (7) the recipient's submission of a continuation application[86]; and (8) written approval of the continuation application by the Contracting Officer.

[86] A continuation application is a non-competitive application for an additional budget period within a previously approved project period. At least ninety (90) days before the end of each budget period, the recipient must submit its continuation application, which includes the following information:

i. A progress report on the project objectives, including significant findings, conclusions, or developments, and an estimate of any unobligated balances remaining at the end of the budget period. If the remaining unobligated balance is estimated to exceed 20 percent of the funds available for the budget period, explain why the excess funds have not been obligated and how they will be used in the next budget period.

ii. A detailed budget and supporting justification if there are changes to the negotiated budget, or a budget for the upcoming budget period was not approved at the time of award.

iii. A description of any planned changes from the SOPO and/or Milestone Summary Table.

As a result of the Go/No-Go Review, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) recommend redirection of work under the project; (3) place a hold on federal funding for the project, pending further supporting data or funding; or (4) discontinue funding the project because of insufficient progress, change in strategic direction, or lack of funding.

The Go/No-Go decision is distinct from a non-compliance determination. In the event a recipient fails to comply with the requirements of an award, DOE may take appropriate action, including but not limited to, redirecting, suspending, or terminating the award.

xv. Conference Spending

The recipient shall not expend any funds on a conference not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded that would defray the cost to the United States government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the United States government would otherwise exceed $20,000, thereby circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such conference.

xvi. Uniform Commercial Code (UCC) Financing Statements

Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit recipient or subrecipient with federal funds, and when the federal share of the financial assistance agreement is more than $1,000,000, the recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of $5,000 purchased with project funds. These financing statement(s) must be approved in writing by the Contracting Officer prior to the recording, and they shall provide notice that the recipient's title to all equipment (not real property) purchased with federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the federal share of the equipment unless otherwise provided for in

the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the Contracting Officer may direct.

xvii. Implementation of Executive Order 13798, Promoting Free Speech and Religious Liberty

States, local governments, or other public entities may not condition sub-awards in a manner that would discriminate, or disadvantage sub-recipients based on their religious character.

xviii. Participants and Collaborating Organizations

If selected for award negotiations, the selected applicant must submit a list of personnel who are proposed to work on the project, both at the recipient and subrecipient level and a list of proposed collaborating organizations prior to award. Recipients will have an ongoing responsibility to notify DOE of changes to the personnel and collaborating organizations, and submit updated information during the life of the award.

xix. Current and Pending Support

If selected for award negotiations, within 30 days of the selection notice, the selectee must submit 1) current and pending support disclosures and resumes for any new PIs or senior/key personnel, and 2) updated disclosures if there have been any changes to the current and pending support submitted with the application. Throughout the life of the award, the recipient has an ongoing responsibility to submit 1) current and pending support disclosure statements and resumes for any new PI and senior/key personnel, and 2) updated disclosures if there are changes to the current and pending support previously submitted to DOE. Also See Section IV.D.xvii.

xx. U.S. Manufacturing Commitments

A primary objective of DOE's multi-billion dollar research, development, and demonstration investments is to cultivate new research and development ecosystems, manufacturing capabilities, and supply chains for and by United States industry and labor. Therefore, in exchange for receiving taxpayer dollars to support an applicant's project, the applicant must agree to a U.S. Competitiveness provision requiring that any products embodying any subject invention or produced through the use of any subject invention will be manufactured substantially in the United States unless the Recipient can show to the satisfaction of DOE that it is not commercially feasible. Award terms, including the specific U.S. Competitiveness Provision applicable to the various

types of Recipients and projects, are available at https://www.energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards.

Please note that a subject invention is any invention conceived or first actually reduced to practice in performance of work under an award. An invention is any invention or discovery which is or may be patentable. The recipient includes any awardee, recipient, sub-awardee, or sub-recipient.

As noted in the U.S. Competitiveness Provision, if an entity cannot meet the requirements of the U.S. Competitiveness Provision, the entity may request a modification or waiver of the U.S. Competitiveness Provision. For example, the entity may propose modifying the language of the U.S. Competitiveness Provision in order to change the scope of the requirements or to provide more specifics on the application of the requirements for a particular technology. As another example, the entity may request that the U.S. Competitiveness Provision be waived in lieu of a net benefits statement or United States manufacturing plan. The statement or plan would contain specific and enforceable commitments that would be beneficial to the United States economy and competitiveness. Examples of such commitments could include manufacturing specific products in the United States, making a specific investment in a new or existing United States manufacturing facility, keeping certain activities based in the United States or supporting a certain number of jobs in the United States related to the technology. DOE may, in its sole discretion, determine that the proposed modification or waiver promotes commercialization and provides substantial United States economic benefits, and grant the request. If granted, DOE will modify the award terms and conditions for the requesting entity accordingly.

More information and guidance on the waiver and modification request process can be found in the DOE Financial Assistance Letter on this topic, available at https://www.energy.gov/management/pf-2022-09-fal-2022-01-implementation-doe-determination-exceptional-circumstances-under. Additional information on DOE's Commitment to Domestic Manufacturing for DOE-funded R&D is available at https://www.energy.gov/gc/us-manufacturing.

The U.S. Competitiveness Provision is implemented by DOE pursuant to a Determination of Exceptional Circumstances (DEC) under the Bayh-Dole Act and DOE Patent Waivers. See Section VIII.J. Title to Subject Inventions of this FOA for more information on the DEC and DOE Patent Waivers.

xxi. Interim Conflict of Interest Policy for Financial Assistance

The DOE interim Conflict of Interest Policy for Financial Assistance (COI Policy)[87] is applicable to all non-Federal entities applying for, or that receive, DOE funding by means of a financial assistance award (e.g., a grant, cooperative agreement, or technology investment agreement) and, through the implementation of this policy by the entity, to each Investigator who is planning to participate in, or is participating in, the project funded wholly or in part under the DOE financial assistance award. The term "Investigator" means the PI and any other person, regardless of title or position, who is responsible for the purpose, design, conduct, or reporting of a project funded by DOE or proposed for funding by DOE. Recipients must flow down the requirements of the interim COI Policy to any subrecipient non-federal entities. Further, for DOE funded projects, the recipient must include all financial conflicts of interest (FCOI) (i.e., managed and unmanaged/ unmanageable) in their initial and ongoing FCOI reports.

It is understood that non-federal entities and individuals receiving DOE financial assistance awards will need sufficient time to come into full compliance with DOE's interim COI Policy. To provide some flexibility, DOE allows for a staggered implementation. Specifically, prior to award, applicants selected for award negotiations must: ensure all Investigators complete their significant financial disclosures; review the disclosures; determine whether a FCOI exists; develop and implement a management plan for FCOIs; and provide DOE with an initial FCOI report that includes all FCOIs (i.e., managed and unmanaged/ unmanageable). Recipients will have 180 days from the date of the award to come into full compliance with the other requirements set forth in DOE's interim COI Policy. Prior to award, the applicant must certify that it is, or will be within 180 days of the award, compliant with all requirements in the COI Policy.

xxii. Data Management Plan (DMP)

Each applicant whose Full Application is selected for award negotiations will be required to submit a DMP during the award negotiations phase. A DMP explains how, when appropriate, data generated in the course of the work performed under a DOE award will be shared and preserved in order to validate the results of the proposed work or how the results could be validated if the data is not shared or preserved. The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publications.

[87] DOE's interim COI Policy can be found at PF 2022-17 FAL 2022-02 Department of Energy Interim Conflict of Interest Policy Requirements for Financial Assistance.

xxiii. Fraud, Waste and Abuse

The mission of the DOE Office of Inspector General (OIG) is to strengthen the integrity, economy and efficiency of the Department's programs and operations including deterring and detecting fraud, waste, abuse, and mismanagement. The OIG accomplishes this mission primarily through investigations, audits, and inspections of DOE activities to include grants, cooperative agreements, loans, and contracts.

The OIG maintains a Hotline for reporting allegations of fraud, waste, abuse, or mismanagement. To report such allegations, please visit https://www.energy.gov/ig/ig-hotline.

Additionally, recipients of DOE awards must be cognizant of the requirements of 2 CFR 200.113 Mandatory disclosures, which states:

> The non-Federal entity or applicant for a Federal award must disclose, in a timely manner, in writing to the Federal awarding agency or pass-through entity all violations of Federal criminal law involving fraud, bribery, or gratuity violations potentially affecting the Federal award. Non-Federal entities that have received a Federal award including the term and condition outlined in appendix XII of 2 CFR Part 200 are required to report certain civil, criminal, or administrative proceedings to SAM (currently FAPIIS). Failure to make required disclosures can result in any of the remedies described in 2 CFR 200.339. (See also 2 CFR part 180, 31 U.S.C. § 3321, and 41 U.S.C. § 2313.) [85 FR 49539, Aug. 13, 2020]

Applicants and subrecipients (if applicable) are encouraged to allocate sufficient costs in the project budget to cover the costs associated for personnel and data infrastructure needs to support performance management and program evaluation needs including but not limited to independent program and project audits to mitigate risks for fraud, waste, and abuse.

xxiv. Human Subjects Research

Research involving human subjects, biospecimens, or identifiable private information conducted with DOE funding is subject to the requirements of DOE Order 443.1C, Protection of Human Research Subjects, 45 CFR Part 46, Protection of Human Subjects (subpart A which is referred to as the "Common Rule"), and 10 CFR Part 745, Protection of Human Subjects. Additional information on the DOE Human Subjects Research Program can be found at:

HUMAN SUBJECTS Human Subjects Pr... | U.S. DOE Office of Science (SC) (osti.gov).

xxv. Cybersecurity Plan

In accordance with BIL Section 40126, applicants selected for award negotiations must submit an acceptable cybersecurity plan to DOE prior to receiving funding.[88] These plans are intended to foster a cybersecurity-by-design approach for BIL efforts. The Department will also use these plans to ensure effective integration and coordination across its research, development, and demonstration programs. A cybersecurity plan is NOT required as part of the application submission for this FOA, but all projects selected under this FOA will be required to submit a cybersecurity plan during the award negotiation phase.

The Department recommends using open guidance and standards such as the National Institute of Standards and Technology's (NIST) Cybersecurity Framework (CSF) and the DOE Cybersecurity Capability Maturity Model (C2M2).[89] The cybersecurity plan created pursuant to Section 40126 should document any deviation from open standards, as well as the utilization of

[88] 42 U.S.C. § 18725

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

proprietary standards where the awardee determines that such deviation is necessary.

- Cybersecurity plans should be commensurate to the threats and vulnerabilities associated with the proposed efforts and demonstrate the cybersecurity maturity of the project.
- Cybersecurity plans may cover a range of topics relevant to the proposed project, e.g., software development lifecycle, third-party risks, and incident reporting.
- At a minimum, cybersecurity plans should address questions noted in BIL section 40126 (b) 'Contents of Cybersecurity Plan'.[90]

A draft version of supplementary guidance on the cybersecurity plan requirement will be available at https://www.energy.gov/ceser/bipartisan-infrastructure-law-implementation.

VII. Questions/Agency Contacts

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

All questions and answers related to this FOA will be posted on EERE Exchange at: https://eere-exchange.energy.gov. **You must first select this specific FOA Number to view the questions and answers specific to this FOA**. EERE will attempt to respond to a question within 3 business days, unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

VIII. Other Information

A. FOA Modifications

Amendments to this FOA will be posted on the EERE Exchange website and the Grants.gov system. However, you will only receive an email when an

[90] 42 U.S.C. § 18725

amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. EERE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

B. Government Right to Reject or Negotiate

DOE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

C. Commitment of Public Funds

The Contracting Officer is the only individual who can make awards or commit the government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either express or implied, is invalid.

D. Treatment of Application Information

Applicants should not include business sensitive (e.g., commercial or financial information that is privileged or confidential), trade secrets, proprietary, or otherwise confidential information in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA. Applicants are advised to not include any critically sensitive proprietary detail.

If an application includes business sensitive, trade secrets, proprietary, or otherwise confidential information, it is furnished to the federal government (government) in confidence with the understanding that the information shall be used or disclosed only for evaluation of the application. Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for merit review of the application or as otherwise authorized by law. This restriction does not limit the government's right to use the information if it is obtained from another source.

If an applicant chooses to submit business sensitive, trade secrets, proprietary, or otherwise confidential information, the applicant must provide **two copies** of the submission (e.g., Concept Paper, Full Application). The first copy should be marked, "non-confidential" with the information believed to be confidential deleted. The second copy should be marked "confidential" and must clearly and conspicuously identify the business sensitive, trade secrets, proprietary, or otherwise confidential information and must be 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 government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose as authorized by law.

The cover sheet of the Full Application, and other applicant submission must be marked as follows and identify the specific pages business sensitive, trade secrets, proprietary, or otherwise confidential information:

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

In addition, (1) the header and footer of every page that contains business sensitive, trade secrets, proprietary, or otherwise confidential information must be marked as follows: "Contains Business Sensitive, Trade Secrets, Proprietary, or Otherwise Confidential Information Exempt from Public Disclosure," and (2) every line or paragraph containing such information must be clearly marked with double brackets or highlighting. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

E. Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation, the Go/No-Go Reviews and Peer Reviews, the government may seek the advice of qualified non-federal personnel as reviewers. The government may also use non-federal personnel to conduct routine, nondiscretionary administrative activities, including DOE contractors. The applicant, by submitting its application, consents to the use of non-federal reviewers/administrators. Non-federal reviewers must sign conflict of interest (COI) and non-disclosure acknowledgements (NDA) prior to reviewing an application. Non-federal personnel conducting administrative activities must sign an NDA.

F. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this FOA include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the

collection and dissemination of information related to potential, planned, or pending legislation.

G. Notice of Right to Conduct a Review of Financial Capability

DOE reserves the right to conduct an independent third-party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

H. Requirement for Full and Complete Disclosure

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

I. Retention of Submissions

DOE expects to retain copies of all Full Applications and other submissions. No submissions will be returned. By applying to DOE for funding, applicants consent to DOE's retention of their submissions.

J. Title to Subject Inventions

Ownership of subject inventions is governed pursuant to the authorities listed below:

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and nonprofits may elect to retain title to their subject inventions;
- All other parties: The Federal Non-Nuclear Energy Act of 1974, 42. U.S.C. § 5908, provides that the government obtains title to new inventions unless a waiver is granted (see below);

- Class Patent Waiver: DOE has issued a class waiver that applies to this FOA. Under this class waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small

businesses, educational institutions, and nonprofits by law. In order to avail itself of the class waiver, a domestic large business must agree that any products embodying or produced through the use of a subject invention first created or reduced to practice under this program will be substantially manufactured in the United States.

- Advance and Identified Waivers: For an applicant not covered by a Class Patent Waiver or the Bayh-Dole Act, the applicant may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to DOE within the timeframes set forth in the award's intellectual property data terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

- DEC: On June 07, 2021, DOE approved a DETERMINATION OF EXCEPTIONAL CIRCUMSTANCES (DEC) UNDER THE BAYH-DOLE ACT TO FURTHER PROMOTE DOMESTIC MANUFACTURE OF DOE SCIENCE AND ENERGY TECHNOLOGIES. In accordance with this DEC, all awards, including sub-awards, under this FOA shall include the U.S. Competitiveness Provision in accordance with Section VI.B.xx. U.S. Manufacturing Commitments of this FOA. A copy of the DEC can be found at https://www.energy.gov/gc/determination-exceptional-circumstances-decs. Pursuant to 37 CFR 401.4, any nonprofit organization or small business firm as defined by 35 U.S.C. § 201 affected by any DEC has the right to appeal it by providing written notice to DOE within 30 working days from the time it receives a copy of the determination.

- DOE may issue and publish on the website above further DECs prior to the issuance of awards under this FOA. DOE may require additional submissions or requirements as authorized by any applicable DEC.

K. Government Rights in Subject Inventions

Where prime recipients and subrecipients retain title to subject inventions, the United States government retains certain rights.

Government Use License

The United States government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the government.

March-In Rights

The United States government retains march-in rights with respect to all subject inventions. Through "march-in rights," the government may require a prime recipient or subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third party. In addition, the government may grant licenses for use of the subject invention when a prime recipient, subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by federal statutes in a reasonably satisfied manner; or
- The United States manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

L. Rights in Technical Data

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

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

Subtopic Areas 1a and 1b, Topic Area 2, Subtopic Area 3a, and Topic Area 4:

Government Rights in Technical Data Produced Under Awards: The United States government normally retains unlimited rights in technical data produced under government financial assistance awards, including the right to distribute to the

public. However, pursuant to special statutory authority, certain categories of data generated under DOE awards may be protected from public disclosure for up to five years after the data is generated ("Protected Data"). For awards permitting Protected Data under Subtopic Areas 1a and 1b, Topic Area 2, Subtopic Area 3a, and Topic Area 4, the protected data must be marked as set forth in the awards intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

Subtopic Areas 1c and 3b:

Government Rights in Technical Data Produced Under Awards: The United States government retains unlimited rights in technical data produced under government financial assistance awards, including the right to distribute to the public. One exception to the foregoing is that invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application. Protected Data is not permitted for awards under Subtopic Areas 1c and 3b.

M. Copyright

The prime recipient and subrecipients may assert copyright in copyrightable works, such as software, first produced under the award without DOE approval. When copyright is asserted, the government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the government. In addition, for those awards requiring distribution of software as Open-Source Software (OSS), the additional information in Appendix D must be addressed in the application.

N. Export Control

The United States government regulates the transfer of information, commodities, technology, and software considered to be strategically important to the United States to protect national security, foreign policy, and economic interests without imposing undue regulatory burdens on legitimate international trade. There is a network of federal agencies and regulations that govern exports that are collectively referred to as "Export Controls". All recipients and subrecipients are responsible for ensuring compliance with all applicable United States Export Control laws and regulations relating to any work performed under a resulting award.

The recipient must immediately report to DOE any export control violations related to the project funded under the DOE award, at the recipient or subrecipient level, and provide the corrective action(s) to prevent future violations.

O. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment

As set forth in 2 CFR 200.216, recipients and subrecipients are prohibited from obligating or expending project funds (federal funds and recipient cost share) to procure or obtain; extend or renew a contract to procure or obtain; or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses *covered telecommunications equipment or services* as a substantial or essential component of any system, or as critical technology as part of any system. As described in Section 889 of Public Law 115-232, *covered telecommunications equipment* is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

See Public Law 115-232, Section 889, 2 CFR 200.216, and 2 CFR 200.471 for additional information.

P. Personally Identifiable Information (PII)

All information provided by the applicant must to the greatest extent possible exclude PII. The term "PII" refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name. (See OMB Memorandum M-07-16 dated May 22, 2007, found at: https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2007/m07-16.pdf

By way of example, applicants must screen resumes to ensure that they do not contain PII such as personal addresses, personal landline/cell phone numbers, and personal emails. **Under no circumstances should Social Security Numbers (SSNs) be included in the application**. Federal agencies are prohibited from the collecting, using, and displaying unnecessary SSNs. (See, the Federal Information Security Modernization Act of 2014 (Pub. L. No. 113-283, Dec 18, 2014; 44 U.S.C. § 3551).

Q. Annual Independent Audits

If a for-profit entity is a prime recipient and has expended $750,000 or more of DOE awards during the entity's fiscal year, an annual compliance audit performed by an independent auditor is required. For additional information, please refer to 2 CFR 910.501 and Subpart F.

If an educational institution, non-profit organization, or state/local government is a prime recipient or subrecipient and has expended $750,000 or more of federal awards during the non-federal entity's fiscal year, then a Single or Program-Specific Audit is required. For additional information, please refer to 2 CFR 200.501 and Subpart F.

Applicants and subrecipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. DOE will share in the cost of the audit at its applicable cost share ratio.

APPENDIX A – COST SHARE INFORMATION

Cost Sharing or Cost Matching

The terms "cost sharing" and "cost matching" are often used synonymously. Even the DOE Financial Assistance Regulations, 2 CFR 200.306, use both of the terms in the titles specific to regulations applicable to cost sharing. DOE almost always uses the term "cost sharing," as it conveys the concept that non-federal share is calculated as a percentage of the Total Project Cost. An exception is the State Energy Program Regulation, 10 CFR 420.12, State Matching Contribution. Here "cost matching" for the non-federal share is calculated as a percentage of the federal funds only, rather than the Total Project Cost.

How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. FFRDC costs must be included in Total Project Costs. The following is an example of how to calculate cost sharing amounts for a project with $1,000,000 in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share ($) divided by federal share (%) = Total Project Cost
  Example: $1,000,000 divided by 80% = $1,250,000

- Formula: Total Project Cost ($) minus federal share ($) = Non-federal share ($)
  Example: $1,250,000 minus $1,000,000 = $250,000

- Formula: Non-federal share ($) divided by Total Project Cost ($) = Non-federal share (%)
  Example: $250,000 divided by $1,250,000 = 20%

What Qualifies For Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under a DOE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the federal government under another award unless authorized by federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though are generally the same for all types of entities. The specific rules applicable to:

- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

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 as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, DOE generally does not allow pre-award costs for either cost share 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.

General Cost Sharing Rules on a DOE Award

1. Cash Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s), for costs incurred and paid for during the project. This includes when an organization pays for personnel, supplies, equipment for their own company with organizational resources. If the item or service is reimbursed for, it is cash cost share. All cost share items must be necessary to the performance of the project.

2. In-Kind Cost Share – encompasses all contributions to the project made by the recipient or subrecipient(s) that do not involve a payment or reimbursement and represent donated items or services. In-Kind cost share items include volunteer personnel hours, donated existing equipment, donated existing supplies. The cash value and calculations thereof for all In-Kind cost share items must be justified and explained in the Cost Share section of the project Budget Justification. All cost share items must be necessary to the performance of the project. If questions exist, consult your DOE contact before filling out the In-Kind cost share section of the Budget Justification.

3. Funds from other federal sources MAY NOT be counted as cost share. This prohibition includes FFRDC subrecipients. Non-federal sources include any source not originally derived from federal funds. Cost sharing commitment letters from subrecipients must be provided with the original application.

4. Fee or profit, including foregone fee or profit, are not allowable as project costs (including cost share) under any resulting award. The project may only incur those costs that are

allowable and allocable to the project (including cost share) as determined in accordance with the applicable cost principles prescribed in FAR Part 31 for For-Profit entities and 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

(A) Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the prime recipient's cost sharing if such contributions meet all of the following criteria:

(1) They are verifiable from the recipient's records.

(2) They are not included as contributions for any other federally-assisted project or program.

(3) They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.

(4) They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:

a. For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A–122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31 in the FAR, except that patent prosecution costs are not allowable unless specifically authorized in the award document. (v) Commercial Organizations. FAR Subpart 31.2—Contracts with Commercial Organizations; and

b. Other types of organizations. For all other non-federal entities, allowability of costs is determined in accordance with 2 CFR Part 200 Subpart E.

(5) They are not paid by the federal government under another award unless authorized by federal statute to be used for cost sharing or matching.

(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 mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, 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 cost sharing or 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 cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the

performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

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

ii. The value of loaned equipment must not exceed its fair rental value.

(5) Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.

b. The basis for determining the valuation for personal services and property must be documented.

APPENDIX B – WAIVER REQUESTS FOR: 1. FOREIGN ENTITY PARTICIPATION; AND 2. FOREIGN WORK

Waiver for Foreign Entity Participation

Many of the technology areas DOE funds fall in the category of critical and emerging technologies (CETs). CETs are a subset of advanced technologies that are potentially significant to United States national and economy security.[91] For projects selected under this FOA, all recipients and subrecipients must be organized, chartered, or incorporated (or otherwise formed) under the laws of a state or territory of the United States; have majority domestic ownership and control; and have a physical location for business operations in the United States. To request a waiver of this requirement, an applicant must submit an explicit waiver request in the Full Application.

Waiver Criteria

Foreign entities seeking to participate in a project funded under this FOA must demonstrate to the satisfaction of DOE that:

a. Its participation is in the best interest of the United States industry and United States economic development;
b. The project team has appropriate measures in place to control sensitive information and protect against unauthorized transfer of scientific and technical information;
c. Adequate protocols exist between the United States subsidiary and its foreign parent organization to comply with export control laws and any obligations to protect proprietary information from the foreign parent organization;
d. The work is conducted within the United States and the entity acknowledges and demonstrates that it has the intent and ability to comply with the U.S. Competitiveness Provision (see Section VI.B.xx.); and
e. The foreign entity will satisfy other conditions that may be deemed necessary by DOE to protect United States government interests.

Content for Waiver Request

A Foreign Entity waiver request must include the following:

a. Information about the entity: name, point of contact, and proposed type of involvement in the project;
b. Country of incorporation, the extent of the ownership/level control by foreign entities, whether the entity is state owned or controlled, a summary of the ownership breakdown of the foreign entity and the percentage of

[91] See Critical and Emerging Technologies List Update (whitehouse.gov).

ownership/control by foreign entities, foreign shareholders, foreign state or foreign individuals;

c. The rationale for proposing a foreign entity participate (must address criteria above);
d. A description of the project's anticipated contributions to the United States economy;
    - How the project will benefit the United States, including manufacturing, contributions to employment in the United States and growth in new markets and jobs in the United States;
    - How the project will promote domestic American manufacturing of products and/or services;
e. A description of how the foreign entity's participation is essential to the project;
f. A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP; and
g. Countries where the work will be performed (Note: if any work is proposed to be conducted outside the United States, the applicant must also complete a separate request foreign work waiver).

DOE may also require:

- A risk assessment with respect to IP and data protection protocols that includes the export control risk based on the data protection protocols, the technology being developed and the foreign entity and country. These submissions could be prepared by the project lead (if not the prime recipient), but the prime recipient must make a representation to DOE as to whether it believes the data protection protocols are adequate and make a representation of the risk assessment – high, medium, or low risk of data leakage to a foreign entity.
- Additional language be added to any agreement or subagreement to protect IP, mitigate risk or other related purposes.

DOE may require additional information before considering the waiver request.

The applicant does not have the right to appeal DOE's decision concerning a waiver request.

APPENDIX C – REQUIRED USE OF AMERICAN IRON, STEEL, MANUFACTURED PRODUCTS, AND CONSTRUCTION MATERIALS BUY AMERICA REQUIREMENTS FOR INFRASTRUCTURE PROJECTS

A. Definitions

For purposes of the Buy America requirements, based both on the statute and OMB Guidance Document dated April 18, 2022, the following definitions apply:

Construction materials includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives —that is or consists primarily of:

- non-ferrous metals;
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- glass (including optic glass);
- lumber; or
- drywall.

Infrastructure includes, at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. Infrastructure includes facilities that generate, transport, and distribute energy.

Moreover, according to the OMB guidance document:

When determining if a program has infrastructure expenditures, Federal agencies should interpret the term "infrastructure" broadly and consider the definition provided above as illustrative and not exhaustive. When determining if a particular construction project of a type not listed in the definition above constitutes "infrastructure," agencies should consider whether the project will serve a public function, including whether the project is publicly owned and operated, privately operated on behalf of the public, or is a place of public accommodation, as opposed to a project that is privately owned and not open to the public. Projects with the former qualities have greater indicia of infrastructure, while projects with the latter quality have fewer. Projects consisting solely of the purchase, construction, or improvement of a private home for personal use, for example, would not constitute an infrastructure project.

The Agency, not the applicant, will have the final say as to whether a given project includes infrastructure, as defined herein. Accordingly, in cases where the "public" nature of the infrastructure is unclear, but the other relevant criteria are met DOE strongly recommends that

applicants complete their full application with the assumption that Buy America requirements will apply to the proposed project.

Project means the construction, alteration, maintenance, or repair of infrastructure in the United States.

B. Buy America Requirements for Infrastructure Projects ("Buy America" requirements)
In accordance with Section 70914 of the BIL, none of the project funds (includes federal share and recipient cost share) may be used for a project for infrastructure unless:
(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;

(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

(3) all construction materials are produced in the United States—this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America requirements only apply to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does the Buy America requirements apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

These requirements must flow down to all sub-awards, all contracts, subcontracts, and purchase orders for work performed under the proposed project, except where the prime recipient is a for-profit entity. Based on guidance from the Office of Management and Budget (OMB), the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization.

For additional information related to the application and implementation of these Buy America requirements, please see OMB Memorandum M-22-11, issued April 18, 2022: https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf

Note that for all applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

C. Waivers

The DOE financial assistance agreement will require each recipient: (1) to fulfill the commitments made in its application regarding the procurement of U.S.-produced products and (2) to fulfill the commitments made in its application regarding the procurement of other key component metals and manufactured products domestically that are deemed available in sufficient and reasonably available quantities or of a satisfactory quality at the time of award negotiation.

In limited circumstances, DOE may waive the application of the Buy America requirements where DOE determines that:

(1) applying the Buy America requirements would be inconsistent with the public interest;

(2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or

(3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent.

If an applicant or recipient is seeking a waiver of the Buy America requirements, it may submit a waiver request after it has been notified of its selection for award negotiations. A waiver request must include:

- A detailed justification for the use of "non-domestic" iron, steel, manufactured products, or construction materials to include an explanation as to how the non-domestic item(s) is essential to the project
- A certification that the applicant or recipient made a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and nonproprietary communications with potential suppliers
- Applicant/Recipient name and Unique Entity Identifier (UEI)

- Total estimated project cost, DOE and cost-share amounts
- Project description and location (to the extent known)
- List and description of iron or steel item(s), manufactured goods, and construction material(s) the applicant or recipient seeks to waive from Domestic Content Procurement Preference requirement, including name, cost, country(ies) of origin (if known), and relevant PSC and NAICS code for each
- Waiver justification including due diligence performed (e.g., market research, industry outreach) by the applicant or recipient
- Anticipated impact if no waiver is issued

DOE may require additional information before considering the waiver request.
Waiver requests are subject to public comment periods of no less than 15 days and must be reviewed by the Made in America Office. There may be instances where an award qualifies, in whole or in part, for an existing waiver described at **[link to awarding agency web site with information on currently applicable general applicability waivers].**

Applicant does not have the right to appeal DOE's decision concerning a waiver request.

APPENDIX D – OPEN SOURCE SOFTWARE

Open Source Software Distribution Plan.

While an open source software distribution is not required for any Topic Area under this FOA, if an applicant chooses to include open source software distribution as part of their project, the applicant must submit a plan describing how software produced under this FOA will be distributed. For a DOE National Laboratory or a FFRDC, the data rights clause, including rights and requirements pertaining to computer software, in its M&O Contract shall apply and shall take precedence over any requirement set forth in this Appendix. The plan must include the following elements:

1. A complete description of any existing software that will be modified or incorporated into software produced under this FOA, including a description of the license rights. The license rights must allow the modified or incorporated software to be distributed as open source.

2. A discussion of the open source license that the applicant plans to use for the software it plans to produce under the FOA, and how that choice furthers the goals of this FOA. The discussion must also address how the license conforms to the conditions listed below.

3. A method for depositing the software in a source code repository.

4. A method for sharing and disseminating the software and other information to team members or others when multiple parties will contribute to the development of the software or the FOA requires that the software or other information be shared or disseminated to others.

Open Source Definition: Open source licenses must conform to all of the following conditions:

Free Redistribution
The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale. The rights attached to the software must apply to all to whom the software is redistributed without the need for execution of an additional license by those parties.

Source Code
The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable

reproduction cost preferably, i.e., downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code and intermediate forms such as the output of a preprocessor or translator are not allowed.

Derived Works
The license must allow modifications and derived works, and permit the option of distributing the modifications and derived works under the same terms as the license of the original software.

Integrity of the Author's Source Code
The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

No Restriction Against Fields of Endeavor
The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

License Must Not Be Specific to a Product or Technology
The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution. No provision of the license may be predicated on any individual technology or style of interface.

License Must Not Restrict Other Software
The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

Examples of Acceptable Licenses
Apache License, 2.0
http://www.apache.org/licenses

The 2.0 version of the Apache License was approved by the Apache Software Foundation (ASF) in 2004. The goals of this license revision were to reduce the number of frequently asked questions, to allow the license to be reusable without modification by any project (including

non-ASF projects), to allow the license to be included by reference instead of listed in every file, to clarify the license on submission of contributions, to require a patent license on contributions that necessarily infringe the contributor's own patents, and to move comments regarding Apache and other inherited attribution notices to a location outside the license terms

The result is a license that is compatible with other open source licenses, while remaining true to and supportive of collaborative development across both nonprofit and commercial organizations.

All packages produced by the ASF are implicitly licensed under the Apache License, Version 2.0, unless otherwise explicitly stated.

GNU General or Public License (GPLv3)
http://www.gnu.org/licenses/gpl.html

The GNU General Public License (GNU GPL or simply GPL) is the most widely used free software license, originally written by Richard Stallman for the GNU Project.

The GPL is the first copyleft license for general use, which means that derived works must be distributed under the same license terms. Under this philosophy, the GPL grants the recipients of a computer program the rights of the free software definition and uses copyleft to ensure the freedoms are preserved, even when the work is changed or additions are made. This aspect distinguishes the GPL from permissive free software licenses, including the BSD licenses. The license's copyright disallows modification of the license. Copying and distributing the license is allowed because the GPL requires recipients to get "a copy of this License along with the Program". According to the GPL FAQ, anyone can make a new license using a modified version of the GPL as long as he or she uses a different name for the license, does not mention "GNU", and removes the preamble, though the preamble can be used in a modified license if permission to use it is obtained from the Free Software Foundation (FSF).

GNU Library or “Lesser” General Public License (LGPLv3) http://www.gnu.org/licenses/lgpl.html

The GNU Lesser General Public License (formerly the GNU Library General Public License) or LGPL is a free software license published by the Free Software Foundation (FSF). It was designed as a compromise between the strong-copyleft GNU General Public License or GPL and permissive licenses such as the BSD licenses and the MIT License. The GNU Library General Public License (as the LGPL was originally named) was published in 1991, and adopted the version number 2 for parity with GPL version 2. The LGPL was revised in minor ways in the 2.1 point release, published in 1999, when it was renamed the GNU Lesser General Public License to reflect the FSF's position that not all libraries should use it. Version 3 of the LGPL was published in 2007 as a list of additional permissions applied to GPL version 3.

The LGPL places copyleft restrictions on the program governed under it but does not apply these restrictions to other software that merely link with the program. There are, however, certain other restrictions on this software.

The LGPL is primarily used for software libraries, although it is also used by some stand-alone applications, most notably Mozilla and OpenOffice.org.

The MIT License (MIT)
http://opensource.org/licenses/MIT

The MIT License is a free software license originating at the Massachusetts Institute of Technology (MIT). It is a permissive license, meaning that it permits reuse within proprietary software provided all copies of the licensed software include a copy of the MIT License terms. Such proprietary software retains its proprietary nature even though it incorporates software under the MIT License. The license is also GPL-compatible, meaning that the GPL permits combination and redistribution with software that uses the MIT License.

Software packages that use one of the versions of the MIT License include Expat, PuTTY, the Mono development platform class libraries, Ruby on Rails, Lua (from version 5.0 onwards), and the X Window System, for which the license was written.

Mozilla Public License 2.0 (MPL-2.0)
http://www.mozilla.org/MPL/2.0/

The Mozilla Public License (MPL) is a free and open source software license. Version 1.0 was developed by Mitchell Baker when she worked as a lawyer at Netscape Communications Corporation and version 1.1 at the Mozilla Foundation. Version 2.0 was developed in the open, overseen by Baker and led by Louis Villa. The MPL is characterized as a hybridization of the modified BSD license and GNU General Public License.

The MPL is the license for the Mozilla Application Suite, Mozilla Firefox, Mozilla Thunderbird and other Mozilla software. The MPL has been adapted by others as a license for their software, most notably Sun Microsystems, as the Common Development and Distribution License for OpenSolaris, the open source version of the Solaris 10 operating system, and by Adobe, as the license for its Flex product line.

APPENDIX E – LIST OF ACRONYMS

AC	Alternating Current
CETs	Critical and Emerging Technologies
CEJST	Climate and Economic Justice Screening Tool
COI	Conflict of Interest
CRADA	Cooperative Research and Development Agreement
DEC	Determination of Exceptional Circumstances
DEIA	Diversity, Equity, Inclusion, and Accessibility
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
DOL	Department of Labor
EERE	Energy Efficiency and Renewable Energy
FAPIIS	Federal Awardee Performance and Integrity Information System
FAR	Federal Acquisition Regulation
FCOI	Financial Conflicts of Interest
FFATA	Federal Funding and Transparency Act of 2006
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FFRDC	Federally Funded Research and Development Center
GAAP	Generally Accepted Accounting Principles
HBCUs	Historically Black Colleges and Universities
HSRD	Human Subjects Research Database
IPMP	Intellectual Property Management Plan
IRB	Institutional Review Board
HVDC	High Voltage Direct Current
M&O	Management and Operating
MFA	Multi-Factor Authentication
MPIN	Marketing Partner ID Number
MSI	Minority-Serving institution
MTDC	Multi-terminal HVDC
MYPP	Multi-Year Program Plan
NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
NSF	National Science Foundation
OFCCP	Office of Federal Contractor Compliance Programs
OHRP	Office of Human Research Protection
OIG	Office of Inspector General
OMB	Office of Management and Budget

OSS	Open-Source Software
OSTI	Office of Scientific and Technical Information
OTA	Other Transactions Authority
PII	Personal Identifiable Information
R&D	Research and Development
RFI	Request for Information
RFP	Request for Proposal
SAM	System for Award Management
SciENcv	Science Experts Network Curriculum Vita
SMART	Specific, Measurable, Achievable, Relevant, and Timely
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STEM	Science, Technology, Engineering, and Mathematics
TAA	Technical Assistance Agreement
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
WBS	Work Breakdown Structure
WP	Work Proposal

APPENDIX F – R&D COMMUNITY BENEFITS PLAN GUIDANCE

The DOE is committed to pushing the frontiers of science and engineering; catalyzing high-quality domestic clean energy jobs through research, development, demonstration, and deployment; and ensuring energy equity and energy justice[92] for disadvantaged communities. Therefore, and in accordance with the Administration's priority to empower workers and harness opportunities to create good union jobs as stated in EO 14008 (Executive Order on Tackling the Climate Crisis at Home and Abroad),[93] it is important to consider the impacts of the successful commercial deployment of any innovations resulting from this FOA on current and future workforce.

The goal of the three-section R&D Community Benefits Plan is to allow the application to illustrate engagement in critical thought about implications of how the proposed work will benefit the broadest swaths of American people and lead to broadly shared prosperity, including for workers and disadvantaged communities[94]. The sections of the R&D Community Benefits Plans are considered together because there may be significant overlap between audiences considered in workforce and disadvantaged communities.

Example DEIA, Energy Equity, and Workforce Plan Elements

Outlined below are examples of activities that applicants might consider when developing their R&D Community Benefits Plan. Applicants are not required to implement any of these specific examples and should propose the Plan that best fits

[92] At DOE, we define energy justice as "the goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on those disproportionately harmed by the energy system" (Initiative for Energy Justice, 2019). Aligned with that document, the remainder of this document refers to this as, 'energy equity,' and is meant to encompass energy justice as well as DOE's efforts related to Justice40. https://www.energy.gov/diversity/articles/how-energy-justice-presidential-initiatives-and-executive-orders-shape-equity

[93] https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad

[94] See footnote 2 for guidance on the definition and tools to locate and identify disadvantaged communities.

their research goals, institutional environment, team composition, and other factors. Creativity is encouraged.

DEIA

DOE strongly encourages applicants to involve individuals and entities from disadvantaged communities. ~~that are~~ Tapping all of the available talent requires intentional approaches and yields broad benefits.

Equity extends beyond diversity to equitable treatment. Equitable access to opportunity for members of the project team is paramount. This includes ensuring that all members of the team, including students, are paid a living wage, provided appropriate working conditions, and provided appropriate benefits. In the execution of their project plan, applicants are asked to describe efforts in diversity, equity, inclusion, and accessibility. In this context, efforts toward DEIA are defined as:[95]

> 1) the practice of including the many communities, identities, races, ethnicities, backgrounds, abilities, cultures, and beliefs of the American people,
> 2) the consistent and systematic fair, just, and impartial treatment of all individuals, including protecting workers rights and adhering to Equal Employment Opportunity laws,
> 3) the recognition, appreciation, and use of the talents and skills of employees of all backgrounds, and
> 4) the provision of accommodations so that all people, including people with disabilities, can fully and independently access facilities, information and communication technology, programs, and services.

Successful plans will not only describe how the project team seeks to increase DEIA, but will describe the overall approaches to retention, engagement, professional development, and career advancement. Specifically, they will demonstrate clear approaches to ensure all team members' strengths are meaningfully leveraged and all members are provided opportunities and paths for career development, especially including paths for interns and trainees to secure permanent positions. Diversity should be considered at all levels of the project team, not just leveraging early career individuals to meet diversity goals.

DOE strongly encourages applicants to consider partnerships as a means of promoting diversity, equity, inclusion, accessibility, justice, and workforce participation. Minority

[95] https://www.whitehouse.gov/wp-content/uploads/2021/11/Strategic-Plan-to-Advance-Diversity-Equity-Inclusion-and-Accessibility-in-the-Federal-Workforce-11.23.21.pdf

Serving Institutions, Minority Business Enterprises, Minority Owned Businesses, Disability Owned Business, Women Owned Businesses, Native American-owned Businesses, Veteran Owned Businesses, or entities located in an underserved community that meet the eligibility requirements are encouraged to lead these partnerships as the prime applicant or participate on an application as a proposed partner to the prime applicant.

When crafting the DEIA section of the Plan, applicants should describe the ways in which they will act to promote each of the four DEIA efforts above into their investigation. It is important to note that diversity, equity, inclusion, and accessibility are four different, but related, concepts that should not be conflated. That is, you can achieve diversity without equity; all four must be addressed. Applicants could discuss how the proposed investigation could contribute to training and developing a diverse scientific workforce. Applicants could describe the efforts they plan to take, or will continue to take, to create an inclusive workplace, free from retaliation, harassment, and discrimination. Applicants could outline any barriers to creating an equitable and inclusive workplace and address the ways in which the team will work to overcome these barriers within the bounds of the specific research project. The plan could detail specific efforts to inform project team members in any capacity of their labor rights and rights under Equal Employment Opportunity laws, and their free and fair chance to join a union. Note that this inclusion of informing project team members is also incorporated into awards through the National Policy Assurances.

Equal treatment of workers, including students, is necessary but overcoming institutional bias requires intentionally reducing sometimes hidden barriers to equal opportunity. Applicants could consider measures like childcare, flexible schedules, paid parental leave, pay transparency, and other supports to ensure that societal barriers are not hindering realization of DEIA intentions. Some of these considerations may result in common approaches in different sections of the plan, and that is acceptable, as long as the submission is not a singular approach to all sections.

EERE especially encourages applicants to form partnerships with diverse and often underrepresented institutions, such as Minority Serving Institutions, labor unions, and community colleges that otherwise meet the eligibility requirements. Underrepresented institutions that meet the eligibility requirements are encouraged to lead these partnerships as the prime applicant. The DEIA section of the Plan could include engagement with underrepresented institutions to broaden the participation of disadvantaged communities and/or with local stakeholders, such as residents and businesses, entities that carry out workforce development programs, labor unions, local government, and community-based organizations that represent, support, or work with disadvantaged communities. Applicants should ensure there is transparency,

accountability, and follow-through when engaging with community members and stakeholders.

Specific examples include:

- Building collaborations and partnerships with researchers and staff at Minority Serving Institutions
- Addressing barriers identified in climate surveys to remove inequities
- Providing anti-bias training and education in the project design and implementation teams
- Offering training, mentorship, education, and other support to students and early/mid-career professionals from disadvantaged communities
- Providing efforts toward improving a workplace culture of inclusion
- Developing technology and technology integration innovations to meet the needs of disadvantaged communities
- Creating partnerships with local communities, especially under-resourced and disadvantaged communities
- Voluntary recognition of a union and informing employees of their rights, regardless of their classification
- Making research products and engagement materials accessible in a greater variety of formats to increase accessibility of research outputs
- Implementing training or distributing materials to reduce stigma towards individuals with disabilities
- Designing technologies that strategically fit within the existing workforce for installation and maintenance of the potential innovation

Energy Equity

The Energy Equity section should articulate how project proposals will drive equitable access to, participation in, and distribution of the benefits produced from successful technology innovations to disadvantaged communities and groups. Intentional inclusion of energy equity requires evaluating the anticipated long-term costs and benefits that will accrue to disadvantaged groups as a result of the project, and how research questions and project plans are designed for and support historically disadvantaged communities' engagement in clean energy decisions. Similar to potential cost reductions or groundbreaking research findings resulting from the research, energy equity and justice benefits may be uncertain, occur over a long period of time, and have many factors within and outside the specific proposed research influencing them.

Applicants should describe the influencing factors, and the most likely energy equity implications of the proposed research. Applicants should describe any

long-term constraints the proposed technology may pose to communities' access to natural resources and Tribal Cultural resources. There may be existing equity research available to use and citation in this description or the applicant could describe milestone-based efforts toward developing that understanding through this innovation. These near and long term outcomes may include, but are not limited to: a decrease in the percent of income a household spends on energy costs (energy burden[96]); an increase in access to low-cost capital; a decrease in environmental exposure and burdens; increases in clean energy enterprise creation and contracting (e.g., women or minority-owned business enterprises); increased parity in clean energy technology access and adoption; increases in energy democracy, including community ownership; and an increase in energy resilience.

Specific examples include:

- Describing how a successful innovation will support economic development in diverse geographic or demographic communities
- Creating a plan to engage equity and justice stakeholders in evaluating the broader impacts of the innovation or in the development of the research methodology
- Describe how the proposed research strategy and methodology was informed by input from a wide variety of stakeholders
- A literature review of the equity and justice implications of the outcomes of the specific research if the innovation is successful or a plan with dedicated budget and expertise (staffing or subawardee) to evaluate the potential equity implications of successful innovation outcomes.

Workforce

The Workforce section of the R&D Community Benefits Plan should articulate the future workforce implications of the innovation or a milestone-driven plan for understanding those implications. This includes documenting the skills, knowledge, and abilities that would be required of workers installing, maintaining, and operating the technology that may be derivative of the applicant's research, as well as the training pathways and their accessibility for workers to acquire the necessary skills. There may be field-specific or relevant existing research that could be cited in this section. In addition, applicants could detail the process they will use to evaluate long-term impacts on jobs, including

[96] Energy burden is defined as the percentage of gross household income spent on energy costs: https://www.energy.gov/eere/slsc/low-income-community-energy-solutions

job growth or job loss, a change in job quality, disruptions to existing industry and resulting changes to relationships between employers and employees and improvements or reductions in the ability of workers to organize for collective representation, and anything else that could result in changes to regional or national labor markets.

For additional support with developing the Workforce section of a R&D Community Benefits Plan, please refer to the DOE's Community Benefits Plan Frequently Asked Questions (FAQs) webpage (https://www.energy.gov/bil/community-benefits-plan-frequently-asked-questions-faqs). This new resource, though created primarily for demonstration and deployment projects funded by the Bipartisan Infrastructure Law (BIL), may be useful for R&D projects which is the main subject of this FOA template. Applicants will find section 2 of the FAQ ("Investing in America's Workforce") particularly helpful for understanding key federal policies, terms and concepts, as well as workforce development strategies relevant to examination of the workforce implications of applicants' proposed research.

Specific examples include:

- Outlining the challenges and opportunities for commercializing the technology in the US
- Creating a literature review of the workforce implications of the outcomes of the specific research if the innovation is successful or a plan with dedicated budget and expertise (staffing or subawardee) to evaluate the potential equity implications of successful innovation outcomes
- Creating a plan and milestones for assessing how a successful innovation will have implications for job savings or loss, either at the macroeconomic level or within specific industries
- Describing how the project will support training of workforce to address needs of successful innovation
- Voluntary recognition of a union and informing employees of their rights, regardless of their classification
- Creating a plan to evaluate how a successful innovation, will result in potential workforce shifts between industries or geographies.

Inclusion of SMART milestones

EERE requires that the applicant's R&D Community Benefits Plan include one Specific, Measurable, Achievable, Relevant and Timely (SMART) milestone for

each budget period. An exemplar SMART milestone clearly answers the following questions:

- What needs to be accomplished?
- What measures and deliverables will be used to track progress toward accomplishment?
- What evidence suggests that the accomplishment is achievable?
- Why choose this milestone?
- When will the milestone be reached?