U.S. Department of Energy (DOE)
Office of Energy Efficiency and Renewable Energy (EERE)

Hydrogen and Fuel Cell Technologies Office FOA to Advance the National Clean Hydrogen Strategy

Funding Opportunity Announcement (FOA) Number: DE-FOA-0003213
FOA Type: Initial
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FOA Issue Date:	12/15/2023
Submission Deadline for Concept Papers:	1/26/2024 5:00 p.m. ET
Submission Deadline for Full Applications:	3/22/2024 5:00 p.m. ET
Expected Submission Deadline for Replies to Reviewer Comments:	5/3/2024 5:00 p.m. ET
Expected Date for EERE Selection Notifications:	July 2024
Expected Timeframe for Award Negotiations:	July – November 2024

- Applicants must submit a Letter of Intent and a Concept Paper by 5:00 p.m. 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) register in the SAM at **https://www.sam.gov** before submitting an application; (2) provide a valid UEI number in the application; and (3) maintain an active SAM registration with current information when the applicant 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, 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 number 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 use the HELP feature on SAM.gov. SAM.gov will address 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.

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Questions about this FOA? Email H2FCFOA@ee.doe.gov.
Problems with EERE Exchange? Email EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

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I. Funding Opportunity Description

A. Background and Context

i. Background and Purpose

The Office of Energy Efficiency and Renewable Energy (EERE) is issuing Funding Opportunity Announcement (FOA) DE-FOA-0003213 on behalf of the Hydrogen and Fuel Cell Technologies Office (HFTO), which coordinates hydrogen activities with offices across DOE as described in the ***DOE Hydrogen Program Plan***.[1] These activities align with the ***U.S. National Clean Hydrogen Strategy and Roadmap,***[2] the ***U.S. National Blueprint for Transportation Decarbonization***,[3] and other DOE initiatives as described below.

Building a clean and equitable energy economy and addressing the climate crisis are top priorities of the Biden Administration. This FOA will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035, "to deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions economy-wide by no later than 2050, to the benefit of all Americans". The Department of Energy is committed to pushing the frontiers of science and engineering; catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D); and ensuring environmental justice (EJ) and inclusion of underserved communities.

RDD&D activities to be funded under this FOA will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of clean energy technologies, which are critical for climate protection. Specifically, this FOA will support the goals of the H2@Scale Initiative,[4] which aims to advance affordable hydrogen production, transport, storage, and utilization to enable decarbonization and revenue opportunities across multiple sectors. These objectives align with DOE's Hydrogen Energy Earthshot™ (Hydrogen Shot),[5] which targets affordable clean hydrogen production at $1/kg by 2031. Advancing technologies that will facilitate the use of clean hydrogen will support the goal of net zero greenhouse gas (GHG) emissions by 2050.

[1] *Department of Energy Hydrogen Program Plan*, www.hydrogen.energy.gov/pdfs/hydrogen-program-plan-2020.pdf
[2] *U.S. National Clean Hydrogen Strategy and Roadmap,* www.hydrogen.energy.gov/library/roadmaps-vision/clean-hydrogen-strategy-roadmap
[3] *U.S. National Blueprint for Transportation Decarbonization,*

[4] *H2@Scale Initiative*, https://www.energy.gov/eere/fuelcells/h2scale
[5] *Hydrogen Shot*, https://www.energy.gov/eere/fuelcells/hydrogen-shot

In addition to RDD&D topics, this FOA will focus on enabling hydrogen deployments through safety and permitting support, equitable community engagement, and developing strategies for effective community benefits.

As part of the whole-of-government approach to advance equity, it is the policy of the Biden Administration that the federal government should pursue a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. As part of this approach, this FOA encourages the participation of underserved communities and underrepresented groups.

ii. Technology Space and Strategic Goals

This FOA supports the vision outlined in the ***U.S. National Clean Hydrogen Strategy and Roadmap*** of affordable clean hydrogen for a net-zero carbon future and a sustainable, resilient, and equitable economy. It targets five topics of interest critical to enabling increased adoption of clean hydrogen technologies across sectors, particularly in medium- and heavy-duty (MD/HD) vehicles and other heavy-duty transportation applications. This FOA's focus on MD/HD vehicles supports the vision of the ***U.S. National Blueprint for Transportation Decarbonization***, including its emphasis on the buildout of fueling corridors. Increased adoption of hydrogen technologies will help achieve economies of scale and drive down costs, supporting efforts to reach the Hydrogen Shot goal and achieve net-zero GHG emissions by 2050. This FOA directly supports DOE's Regional Clean Hydrogen Hubs (H2Hubs) Program,[6] an $8 billion federal investment to create networks of hydrogen producers, consumers, and local connective infrastructure to accelerate the use of hydrogen as a clean energy carrier. Improvements in clean hydrogen technologies will also contribute to the long-term viability of the H2Hubs and other commercial-scale deployments.

Hydrogen and fuel cell technologies are part of a comprehensive portfolio of solutions to address the climate crisis and position America as a global leader in clean energy technology and clean energy jobs. As shown in the H2@Scale vision illustrated in Figure 1, hydrogen is a uniquely versatile energy carrier that it can be produced using any form of energy, in almost any part of the country, and it can be used across all sectors of the economy. This versatility means that clean hydrogen can be used in high-impact applications, particularly in the hardest-to-decarbonize sectors of the economy (such as heavy-duty transportation and industrial applications). It can also support the expansion of clean-power generation by providing a means for long-duration energy storage and offering

[6] Regional Clean Hydrogen Hubs | Department of Energy

flexibility and multiple revenue streams for clean-power generators and providers. For hydrogen to achieve its potential as an energy carrier, key challenges around affordability, durability, and reliability must still be addressed. Innovations are needed to reduce the cost and improve the performance of technologies throughout the clean-hydrogen value chain, from production to storage, transportation, and use.

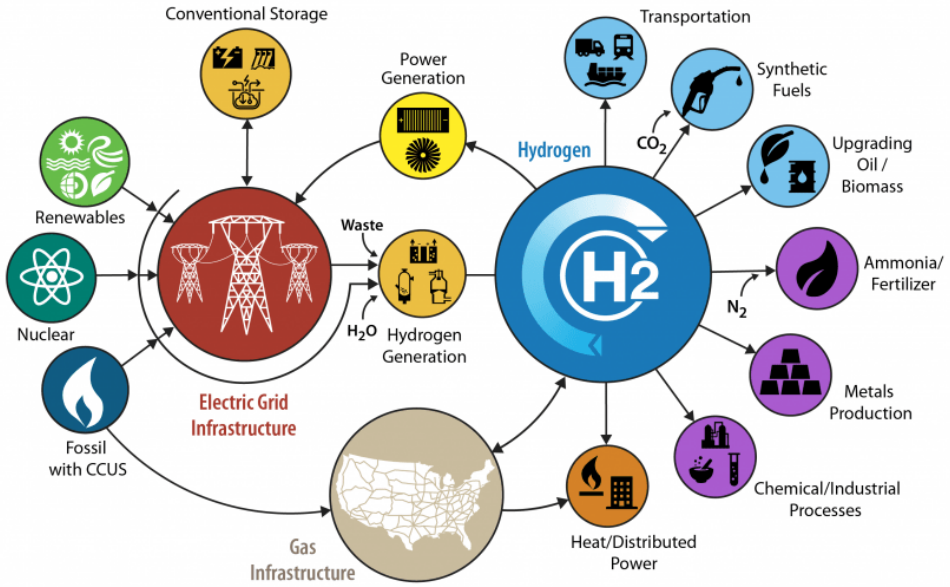

Figure 1. The H2@Scale vision

Achieving the Hydrogen Shot goal will unlock a significant increase in markets for clean hydrogen, including clean steel manufacturing, clean ammonia, energy storage, and heavy-duty transportation. This will, in turn, create more clean energy jobs, reduce GHG and criteria pollutant emissions, increase energy security and resiliency, and position America for leadership in global markets for clean hydrogen and its derivatives.

HFTO supports a broad portfolio of RDD&D projects for materials, components, and systems throughout the clean hydrogen value chain. These efforts are advancing technologies for renewable hydrogen production, hydrogen storage, hydrogen delivery and fueling infrastructure, and fuel cells (e.g., for MD/HD transportation applications), among others. HFTO also conducts demonstrations of systems in real-world operating conditions, including first-of-a-kind demonstrations of integrated energy systems. To support deployment and commercialization, HFTO supports a variety of enabling activities to advance processes and technologies for manufacturing hydrogen and fuel cell components and systems; improve supply chains and workforce capacity;

improve safety practices and awareness; enable the adoption of essential codes and standards; and support partnerships and activities that ensure the economic and environmental benefits of HFTO investments are available to disadvantaged communities.

The topics in this FOA are summarized below. More-detailed technical descriptions of each topic are provided in the sections that follow.

Topic 1: Components for Hydrogen Fueling of Medium- and Heavy-Duty Vehicles

This topic seeks proposals to develop advanced components that will enable gaseous and/or liquid hydrogen fueling at refueling stations for MD/HD hydrogen-powered vehicles. The ***U.S. National Clean Hydrogen Strategy and Roadmap*** identifies MD/HD transportation as a key sector where clean hydrogen can help achieve decarbonization goals, and where limited alternatives exist. Today, the manufacturers of MD/HD hydrogen vehicles have not yet achieved consensus on whether compressed gas or liquid hydrogen will be the preferred mode for onboard storage. Without significant research and development (R&D) advances, components currently employed at compressed gas stations for refueling light-duty vehicles (LDVs) cannot provide the high flowrates needed for fueling MD/HD trucks. The ultimate DOE MD/HD targets for fueling flowrates are an average of 10 kg H_2/minute over a 100 kg H_2 fill, with a peak capability of at least 18 kg H_2/minute.

Topic 2: Standardized Hydrogen Refueling Station of the Future

This topic seeks proposals to develop and demonstrate a low-cost, standardized, and replicable advanced hydrogen fueling station of the future – one that can meet the needs of commercial scale MD/HD truck fueling. Outcomes from this topic will help support several of the recently announced H2Hubs, which include significant plans for rollout of MD/HD trucks and buses, including the necessary hydrogen infrastructure such as hydrogen fueling stations. Projects proposed under this topic will be required to include station designs that not only reduce operating and capital cost but also offer scalability, standardization, reliability, and hydrogen fuel flexibility (i.e., different modes of onboard hydrogen storage). Proposed station designs will need to provide fast fueling for MD/HD trucks up to 100 kg per fill using 700-bar hydrogen tanks. However, DOE encourages designs that offer flexibility to accommodate other hydrogen applications, such as LDVs (using 700 bar hydrogen storage) and buses (potentially using 350-bar storage), and the potential for build-out and retrofitting to accommodate onboard liquid hydrogen fueling.

Topic 3: Hydrogen Fuel-Cell Powered Port Equipment

This topic seeks proposals to develop innovative zero-emissions port equipment. The recent announcement of H2Hubs includes significant plans for rollout of hydrogen fuel-cell powered port equipment. To support this rollout, projects funded under this topic will design, develop, and demonstrate hydrogen fuel cell port equipment such as cargo-handling equipment or shore power to docked vessels. Innovative equipment with new designs or retrofit kits of existing port equipment are both encouraged. Of particular interest are designs that offer the potential for significant emission reductions and large-scale offtake of hydrogen that can be replicable across many ports.

Topic 4: Enabling Permitting and Safety for Hydrogen Deployment
This topic seeks proposals to help determine the primary challenges to siting, permitting, and installation across the value chain from hydrogen production through end-use, and help identify opportunities to address them. A robust permitting process is essential for ensuring equitable deployment of energy infrastructure (e.g., by ensuring disadvantaged communities are not overburdened with health concerns and safety risks), but the current variation in permitting requirements throughout the United States can introduce significant obstacles to deployment. In addition, widespread availability and dissemination of safety-related information are crucial to enabling the safe use of hydrogen in all applications.

Topic 5: Equitable Hydrogen Technology Community Engagement
This topic seeks proposals to improve the capacity of DOE and DOE-funded projects to conduct effective community-engagement activities. Ensuring that the benefits (as well as any potential negative impacts) of clean-hydrogen installations are equitably shared across communities and that sustainability and EJ are addressed are key priorities for DOE and other federal agencies, as laid out in the ***U.S. National Clean Hydrogen Strategy and Roadmap***. To address these priorities, it will be essential to improve understanding of how to effectively engage with communities (particularly disadvantaged communities). Projects funded under this topic will conduct engagement activities with a disadvantaged community to gain better understanding of their concerns and provide them with important information about hydrogen and related technologies. To help inform future community engagement, projects will use their experience conducting these activities to develop lessons learned and best practices.

iii. Teaming Partner List (Optional)

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

The Teaming Partner List will be available on EERE eXCHANGE and will be regularly updated to reflect new teaming partners who provide their organization's information.

SUBMISSION INSTRUCTIONS: View the Teaming Partner List by visiting the EERE eXCHANGE homepage and clicking on "Teaming Partners" within the left-hand navigation pane. This page allows users to view published Teaming Partner Lists. To join the Teaming Partner List, submit a request within eXCHANGE. Select the appropriate Teaming Partner List from the drop-down menu 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 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.

B. Topic Areas

i. Topic 1: Components for Hydrogen Fueling of Medium- and Heavy-Duty Vehicles

Topic 1: Introduction and Background

As identified in the ***U.S. National Clean Hydrogen Strategy and Roadmap*** and the ***U.S. National Blueprint for Transportation Decarbonization***, hydrogen and fuel cell technologies can play a key role in decarbonizing the MD/HD transportation sector. MD/HD vehicles have significantly different demands from LDVs, the hydrogen fueling infrastructure necessary for MD/HD requires the development of advanced hydrogen fueling components that address the challenges of fueling/transfer times, hydrogen losses, materials compatibility, cost, and safety. The development of these technologies will also support several of the H2Hubs, which are planning to deploy hydrogen-fueled MD/HD vehicles and hydrogen fueling stations.

While current LDV hydrogen fueling stations may be able to operate using compressed gaseous hydrogen (GH_2) delivered via tube trailers, fueling stations for MD/HD vehicles and for other heavy-transportation applications, such as marine and rail, are expected to require tons of hydrogen per day, and thus tube trailer delivery of GH_2 is not expected to be viable. In a previous FOA, EERE sought proposals for

projects to advance liquid hydrogen (LH_2) fueling and transfer systems and components. While progress is being made in this area, there is no consensus in the MD/HD transportation sector on whether GH_2, LH_2, or a combination of both, will be the preferred mode for onboard hydrogen storage, particularly in the near term. MD/HD hydrogen fueling will require hydrogen flowrates that are at least five times greater (at least 10 kg/min)[7] than those in current LDV hydrogen fueling stations.[8]

The high flowrates required for both GH_2 and LH_2 MD/HD fueling will require upgraded transfer and fueling components such as cryogenic transfer lines, large-bore piping, couplings, valves, and meters. Today's components cannot reliably or cost-effectively meet these demands. Currently available GH_2 LDV fueling station components (such as chillers, dispensers, couplings, and meters) have limited capabilities and cannot be easily adapted to achieve high flowrates without major RDD&D advances. Improvements in cryogenic transfer lines are needed to reduce heat ingress, thereby mitigating hydrogen losses. In addition, ensuring durability and reliability of components is needed, particularly from two-phase flow operation, where both liquid and gaseous hydrogen are simultaneously present. Furthermore, there are limited material and configuration options for GH_2 piping and fittings that will enable high flowrates. This can increase piping costs, limit the performance of junctions, and reduce options for welding. With higher flowrates, accurately controlling and measuring hydrogen delivered in fueling and transfer operations is also challenging and will require improved valves and meters. To enable large-scale deployment of vehicles using LH_2, a full suite of cryogenic fueling components must be developed. To provide expected fueling flowrates, RDD&D advances are needed to develop components and subsystems, such as high-flow pumps and high-pressure pumps.

To achieve the anticipated delivered cost of hydrogen needed for widespread deployment of hydrogen-fueled MD/HD vehicles, the availability/up-time of hydrogen fueling stations needs to be increased. This will require improvements in cycle life, reliability, and repair/replacement times for both GH_2 and LH_2 fueling station components.

Enabling the large-scale hydrogen fueling operations necessary for MD/HD transportation requires the development of advanced GH_2 and LH_2 fueling components that address the challenges of fueling times, hydrogen losses, reliability,

[7] U.S. Department of Energy "Hydrogen Class 8 Long Haul Truck Targets" Program Record, December 12, 2019, https://www.hydrogen.energy.gov/pdfs/19006_hydrogen_class8_long_haul_truck_targets.pdf.

[8] https://www.sae.org/standards/content/j2601_202005/

and cost. The development of these fueling components is needed to facilitate the adoption of hydrogen to support decarbonization in the MD/HD transportation sector.

Topic 1: Anticipated Funding and Award Details

DOE's anticipated funding levels, including the federal funding per award are given below:

Topic Area	Total Funding Level	Anticipated Number of Awards	Federal Funding per Award	Max. Project Duration (Months)	Min Required Non-Federal Cost Share %
Topic 1: Components for Hydrogen Fueling of Medium- and Heavy-Duty Vehicles	**Up to $10,000,000**	**4 to 5**	**$1,000,000 to $3,000,000**	**36**	**20%**

Topic 1: Description and Objectives

Through this topic, EERE seeks proposals to develop advanced components that will enable GH_2 and/or LH_2 fueling at MD/HD vehicle refueling stations. Proposed components should address the challenges and barriers related to high-flow hydrogen fueling, which include fueling times, hydrogen losses and loss recovery, reliability, and cost. Applications will be evaluated based on the expected performance, projected cost, and commercialization potential of the proposed technologies. Ultimate MD/HD targets for fueling flowrates are an average of 10 kg H_2/min over a 100 kg H_2 fill, with a peak capability of at least 18 kg H_2/min.

EERE is particularly interested in proposals for projects with a high likelihood of successfully demonstrating components with a clear pathway to commercial adoption. Examples of components of interest include, but are not limited to:

- High-flow LH_2 pumps;
- High-performance LH_2 transfer lines (durable, low-degradation, and with either low-loss or loss recovery);
- Advanced LH_2 flow meters, preferably capable of handling two-phase flow;
- Novel LH_2 vaporizers (e.g., with reduced footprint, icing mitigation/elimination);
- Advanced LH_2 transfer/fueling couplings (reliable, durable, preferably not requiring more than low grade personal protective equipment);
- Economic, scalable cryocoolers (e.g., for loss mitigation/recovery or supporting subcooled LH_2 fueling systems); and

- Components that include novel, advanced cryogenic sealing materials for improved durability and operability under cryogenic hydrogen transfer and fueling conditions.

Topic 1: General Requirements

Applications must include a detailed description of the component(s) to be developed, the relevant hydrogen refueling modes (e.g., liquid, compressed gas), and the specific performance metrics that will be targeted by the proposed work. They should provide sufficient justification supported by analysis that the proposed technology has the potential to achieve stated performance targets. Applicants should include a detailed description and evaluation of how the proposed technology relates to the current state-of-the-art, and its relevance to future MD/HD station needs and designs. Applications should also address the scalability of the proposed technology, including clearly identifying cost, manufacturing, and any other adoption challenges. If addressing such challenges is not in the scope of the proposal, applications must provide sufficient evidence of commercial viability of the proposed technology and clearly identify pathways to commercial success.

By the end of the project, it is expected that the performance of the proposed technology will be validated against stated performance targets. Projects should target the technical readiness level (TRL) range of 3-6 over the project period. This range represents the bridge from scientific research to engineering. Projects should not rely solely on the successful development of new materials to achieve the stated project objectives. Subscale demonstrations are allowed, but they must be convincingly translatable (via detailed analysis) to a full-scale fueling component technology. Designs should conform to available safety codes and standards to the greatest extent possible.

Topic 1: Community Benefits Plan

A Community Benefits Plan (CBP) is required for this topic to ensure the federal investments advance the following three objectives: (1) Diversity, Equity, Inclusion, and Accessibility (DEIA); (2) energy equity; and (3) investing in America's workforce. The applicant's RDD&D Community Benefits Plan must include at least one Specific, Measurable, Attainable, Realistic, and Timely (SMART) milestone per budget period to measure progress on the proposed actions. These milestones should also be included in the Work Plan, in the SOPO and accounted for in the project budget. Please see Section IV.D.vii. RDD&D Community Benefits Plan for details.

Topic 1: Project Structure

Applicants should propose projects up to three years in length for a maximum total DOE funding of $3,000,000 per project plus a minimum 20% non-federal cost share (e.g., $3,000,000 DOE share and at least $600,000 applicant cost share for up to $3,600,000 total). The funding request should be commensurate with the level of

work proposed. Applicants should plan projects with two or three phases with a quantitative go/no-go decision point separating each phase (budget period). Each budget period should nominally be 12 to 18 months long.

Projects must satisfy the agreed upon quantitative performance criteria for each go/no-go decision point before DOE will commit support for additional phases. DOE anticipates that not all selected projects will achieve their go/no-go criteria. A no-go decision will result in a discontinuation of support beyond the applicable phase. Projects must include at least 20% cost share, consistent with other DOE-funded R&D projects.

Topic 1: Teaming Arrangements

Teaming arrangements that include multiple stakeholders across industry, academia, and national laboratories (as appropriate) are encouraged. Applicants should succinctly describe the qualifications, experience, and capabilities of the proposed project team to execute the project plan successfully. If the project lead does not have the facilities/capabilities to carry out the component manufacturing, or operability and performance testing, it will be necessary to include a project partner or partners who can perform that role. Strong preference will be given to applicants with domestic manufacturing capabilities and intent to manufacture in the United States.

Topic 1: Applications Specifically Not of Interest

Under this topic, EERE is not interested in applications focused primarily on the following:

- Materials development studies;
- Materials compatibility studies;
- Development of components that are not relevant to MD/HD fueling stations; and
- Complete systems such as fueling stations or mobile refuelers.

ii. Topic 2: Standardized Hydrogen Refueling Station of the Future

Topic 2: Introduction and Background

Low-cost hydrogen fueling stations will be essential for enabling the deployment of hydrogen-powered MD/HD vehicles, and for successful operation of several of the recently announced H2Hubs, which include significant rollout plans of MD/HD trucks and buses. Today, however, there are very few MD/HD hydrogen fueling stations in operation. Those that exist, such as the National Renewable Energy Laboratory's research fueling station,[9] are challenged with high capital and operating costs driven

[9] Innovating Hydrogen Station: Heavy-Duty Fueling (energy.gov)

by complex designs and components that are either custom built or over-designed as they are typically borrowed from other applications and modified. Hydrogen fueling stations also have a history of reliability challenges[10] and are typically designed and built on a one-off basis. As a result, there is a lack of standardized key subsystems such as bulk storage, compression, and dispensing. Furthermore, operational data from California show that when hydrogen is produced offsite and delivered to a fueling station, the total cost of hydrogen dispensed to a vehicle at that station can be more than $13/kg, more than three times higher than the cost required to be competitive.[11]

To simultaneously address the three primary drivers of the levelized cost of hydrogen at fueling stations (compression, storage, and dispensing), innovation to reduce costs, improving reliability, and increasing throughput will need to take an integrated total-system approach, addressing the design of the entire station. In addition, standardization, replication, and scalability of station components and designs will further bring down costs and improve quality and durability. This topic seeks proposals to develop and demonstrate a low-cost, standardized, and replicable hydrogen fueling station. Outcomes will help achieve DOE's 2030 target of $4/kg hydrogen produced, delivered, and dispensed.[12]

Topic 2: Anticipated Funding and Award Details

DOE's anticipated funding levels, including the federal funding per award are given below:

Topic Area	Total Funding Level	Anticipated Number of Awards	Federal Funding per Award	Max. Project Duration (Months)	Min Required Non-Federal Cost Share %
Topic 2: Standardized Hydrogen Refueling Station of the Future	**Up to $30,000,000**	**2 to 3**	**Up to $10,000,000**	**48**	**50%**

[10] Next Generation Hydrogen Station Composite Data Products: Retail Stations | Hydrogen and Fuel Cells | NREL

[11] California Fuel Cell Partnership, "Cost to refill," https://cafcp.org/content/cost-refill (reflects costs pre-COVID supply chain constraints)

[12] U.S. DOE Hydrogen Program Annual Merit Review (AMR) Plenary Remarks (energy.gov) (slide #28)

Topic 2: Description and Objectives

This topic seeks proposals for station designs using delivered hydrogen that optimize across a range of station performance metrics such as fill time, station reliability and up-time, overall hydrogen capacity (including per-hour throughput), operational costs, and construction costs. Proposed projects must include both a standardized, low-cost station design and at least one actual station demonstration validating that design.

Station designs should also incorporate *design for manufacturing*[13] approaches to enable modularized stations that can be built off-site in controlled factory environments and then transported to fueling sites. This approach will reduce construction times, and consistency in the designs will help streamline permitting and local approval. Designs should be forward-thinking with emphasis on reducing cost as much as possible through innovative operating approaches that minimize both station components and overall footprint.

Proposals must consider and reference relevant codes within NFPA 2, relevant MD/HD fueling protocols within SAE (e.g., J2601-5, J2799) and ISO, and any future heavy-duty protocols that are currently under development, which cover key station operating parameters such as fill rates, ramp rates, vehicle-station communications, fuel purity, and setback distances, among others. Proposed stations should also include hydrogen flow meters that comply with applicable metrology standards (e.g., NIST Handbook 44 – 2023 3.39. Hydrogen Gas-Measuring Device of 5.0 % accuracy).[14]

Proposed station designs must have a throughput capacity of at least two metric tons per day, at least 100 kg per fill, and at least 250 kg of H_2/hour. Preference will be given to proposed station designs that can accommodate back-to-back fills and meet DOE's 2030 and Ultimate average fill rate targets of 8 and 10 kg H_2/min respectively.[15] Proposals should balance these performance metrics with other metrics for reliability as well as operating and capital costs. The station should be capable of fueling MD/HD trucks that utilize 700 bar onboard tanks while ideally also having the flexibility to fuel light-duty applications and 350 bar for applications such as buses. Some truck manufactures are also looking at onboard LH_2 storage, so the station should be designed and built to accommodate onboard LH_2 storage or at least have the potential for easily building out or retrofitting in the future to accommodate onboard LH_2 refueling in case the need arises.

[13] https://www.unm.edu/~bgreen/ME360/dfm.pdf
[14] T. Tolerances, NIST3-39-23-HB44 (1).pdf
[15] DOE Hydrogen and Fuel Cells Program Record 19006: Hydrogen Class 8 Long Haul Truck Targets (energy.gov)

Proposed fueling stations should minimize hydrogen releases, leaks, and fugitive emissions. Station designs involving LH_2 should also include boil-off capture and management, with the aim of less than 1% losses (or at most 2% in the near term with a pathway to less than 1% in the long term) of the station's daily throughput capacity. Hydrogen sensors to detect and minimize hydrogen leakage must be included in fueling station designs. If hydrogen is delivered as a liquid, hydrogen venting should be minimized during truck delivery and unloading and ideally, any controlled venting during fuel transfer should be captured and utilized (or at least flared/oxidized) to minimize hydrogen release to the atmosphere.

This topic also seeks proposals that aim for at least 50% utilization once the station is operational. High station utilization is essential to reduce the cost of hydrogen to the end user. To ensure sufficient demand and help establish higher utilization, teams submitting proposals are encouraged to include (or have established agreements with) end-users such as trucking fleets. User agreements such as letters of intent submitted with the application are highly encouraged.

Proposed station designs should aim for up-time and station availability of at least 95% (including scheduled maintenance). This is an essential aspect of the design as it will ensure end-users have reliable fueling service for their trucks. Interruptions or delays in service could be very costly to fleet operators.

Proposed station demonstrations should have at least one dispenser that is publicly accessible (i.e., allowing non-contract users access to the station), with standard user interfaces such as credit card readers and digital displays. This will encourage and support future deployments of fuel cell electric trucks. While not a firm requirement, preference will be given to proposed station demonstrations co-located with existing fueling stations, as they will provide customer conveniences such as convenience stores, dining and restroom facilities, and overnight parking. To minimize potential environmental and community impacts, projects are encouraged to leverage existing/former fueling stations or previously developed/disturbed land and utilize existing facility infrastructure to the maximum extent possible.

EERE expects station performance to be shared with EERE and/or a third party selected by EERE such as the National Renewable Energy Laboratory, which has traditionally collected and compiled data for a variety of transportation and fueling station projects.[16] In addition, projects will be required to provide publicly available station reference designs with flow diagrams and bills of material, to the extent practicable (excluding intellectual property).

[16] Next Generation Hydrogen Station Analysis (energy.gov)

Proposals should include an initial technoeconomic analysis (TEA) that details how the proposed station design will reduce both capital and operating costs over traditional approaches. Once awarded, projects will also be required to further refine their TEA throughout the life of the project and validate the TEA model against the final station demonstration.

Finally, all proposals should describe in detail their plans to obtain bulk hydrogen since on-site hydrogen production should not be included. Proposals are encouraged, but not required, to use hydrogen produced at the H2Hubs. Proposals should also highlight any other government agency programs that will be leveraged in the execution of their project and clearly specify how duplication is avoided.

Topic 2: General Requirements

This topic requires: (i) proposals for fueling station designs that can meet metrics as noted above and any applicable codes and standards, such as SAE J2601-5 and J2799 and NFPA 2, as well as future heavy-duty protocols that are currently under development; (ii) proposals for designs that emphasize reducing hydrogen releases, including leakage, venting, and purging; (iii) detailed technoeconomic analysis comparing proposed designs with traditional approaches; (iv) a detailed community benefits plan (more information provided below); and (v) processes to collect and share data with DOE and/or DOE-selected third-parties. Proposals should describe the station's overall concepts and basic parameters to achieve the topic's goals.

Topic 2: Community Benefits Plan

A Community Benefits Plan (CBP) is required for this topic to ensure the federal investments advance the following three objectives: (1) Diversity, Equity, Inclusion, and Accessibility (DEIA); (2) energy equity; and (3) investing in America's workforce. The applicant's RDD&D Community Benefits Plan must include at least one Specific, Measurable, Attainable, Realistic, and Timely (SMART) milestone per budget period to measure progress on the proposed actions. These milestones should also be included the Work Plan in the SOPO and accounted for in the project budget. Please see Section IV.D.vii. RDD&D Community Benefits Plan for details.

When writing CBPs, applicants are encouraged to include opportunities for projects to benefit disadvantaged communities (DACs). Applicants should use consent-based siting for their project, particularly if siting in a DAC.[17] Projects should coordinate with the local community during the station design, construction, and demonstration. The project workplan and SMART milestones to engage communities should be outlined and integrated in the Technical Volume/SOPO, with a clear description and explanation of tasks in the CBP.

[17] https://www.energy.gov/ne/consent-based-siting

CBPs are required to describe how the project will:

- Engage underserved communities to discuss how investments in fueling station can benefit the community;
- Determine which fueling station benefits align with community priorities;
- Identify potential fueling station sites that benefit the surrounding communities;
- Evaluate whether the fueling station provides the anticipated benefits;
- Examples of benefits from fueling station demonstration that could flow to communities include:
    - Reduced exposure to transportation emissions for communities;
    - Increased enterprise creation and economic development opportunities in communities;
    - Increased clean energy job pipeline and job training for communities;
    - Increased energy resiliency;
    - Increased energy democracy;[18] and
    - Reduced noise from conventional internal combustion engine trucks.

Additional Requirements:

Project teams are required to:

1. Engage with potential site hosts and surrounding communities in priority fueling station locations and secure site host commitments for fueling station installation during the Design and Development phase;
2. Install the fueling station in a location that benefits underserved communities, based on information received from community engagement activities; and
3. Develop a plan for tracking and reporting metrics on the benefits that flow to underserved communities from the demonstrated fueling station.
4. Projects are encouraged to leverage and repurpose current/former fueling stations or previously developed/disturbed land and utilize existing facility infrastructure to the greatest extent possible to minimize potential environmental and community impacts.

For each underserved community that is a committed or prospective partner, applications must specify:

- Geographic area;
- Project partners representing the relevant communities; and

[18] Energy democracy is a way to frame the struggle of working people, low-income communities, communities of color, and their allies, to take control of energy resources and decision-making from the corporate energy establishment and use those resources to empower their communities. It means a decentralized energy system, one characterized by social and community-based control and ownership of energy resources, a shared resource developed in harmony with the Earth ecosystems. Democratizing energy is a central aspect of just transition from a fossil-fuel economy to a new renewable energy economy grounded in economic and social justice. https://energydemocracy.us/

- If the community is identified as a DAC.[19]

Topic 2: Project Structure

Applicants should propose projects up to four years in length for a maximum total DOE funding of $10,000,000 per project plus a minimum 50% non-federal cost share (e.g., $10,000,000 DOE share and at least $10,000,000 applicant cost share for up to $20,000,000 total). The funding requested should be commensurate with the level of work proposed. Applicants should plan projects as three or four multi-phase efforts with SMART (specific, measurable, achievable, relevant, and timely) objectives, and go/no-go decision points separating each phase (each budget period). Suggested phases can include initial design, construction, and operation. DOE encourages proposals with operation phases long enough to generate substantial data, and preference will be given to stations with a high likelihood of remaining operational well after the DOE-funded phases of the project are complete.

Topic 2: Teaming Arrangements

At a minimum, the project team should consist of the following:

- A station developer;
- A station operator;
- A hydrogen fuel supplier;
- MD/HD truck end-user to utilize the station if possible (truck simulator could be used in worst case scenario for station validation); and
- A community partner who can help communicate the energy, environmental, economic, social, and/or other relevant needs that the proposed station would address, as well as local development and regulatory requirements. Examples include local community leadership groups; local planning, zoning, and code officials; community-based organizations; local EJ organizations; state, local, and Tribal governments; building owners and developers.

Topic 2: Applications Specifically Not of Interest

Under this topic EERE is not interested in proposals involving:

- On-site hydrogen production equipment and systems; and
- R&D of station system components e.g., compressors, storage tanks, dispensers, etc.

[19] https://screeningtool.geoplatform.gov/en

iii. Topic 3: Hydrogen Fuel Cell Powered Port Equipment

Topic 3: Introduction and Background

Ports play a vital role in the movement of goods all over the world;. 80% of cargo volumes and approximately 11 trillion dollars of goods move through the world's ports each year.[20] Ports are also the nexus of multiple cargo-handling equipment modes and intermodal transportation services. They represent diverse ecosystems, with many difficult-to-decarbonize applications working in harmony to provide a range of vital services. However, surrounding communities are often exposed to pollution generated at ports, particularly due to the large quantities of diesel fuel used to power port operations. A recent U.S. Department of Transportation Maritime Administration (MARAD) study indicated that a single U.S. port can produce more than 140,000 tonnes of CO_{2e} per year from cargo-handling equipment alone.[21] This makes ports an ideal proving ground for future clean energy technologies that can have an immediate impact on DACs.

As outlined in the ***U.S. National Clean Hydrogen Strategy and Roadmap***, port equipment can be one of the key high-impact areas for the use of clean hydrogen. Drayage trucks, shore power (electricity for ships while docked), and cargo equipment all offer opportunities for clean hydrogen to reduce GHG and criteria pollutant emissions. Due to the concentration of heavy equipment and other demands for hydrogen at ports, they also offer an opportunity to develop infrastructure in targeted regions to serve multiple demands, enabling more rapid scale-up. In 2019, DOE held an H2@Ports workshop in collaboration with MARAD and the European Commission Fuel Cells and Hydrogen Joint Undertaking to identify opportunities and challenges related to the use of hydrogen at ports[22] . While there have been successful demonstrations of drayage trucks and sub-megawatt shore power applications in previous port programs, to date there have not been any demonstrations of cargo-handling equipment at ports or the integrated operation of an entire hydrogen-based port ecosystem.

This topic seeks proposals to design and develop first-of-a-kind hydrogen fuel-cell port equipment and demonstrate zero-emissions cargo movement at ports using clean hydrogen, with the goal of de-risking pathways to the use of clean hydrogen to achieve deep decarbonization of freight movement. Funded projects will help spur the commercial-scale development of hydrogen-powered port equipment needed to support several of the recently announced H2Hubs that include plans for use of clean hydrogen at ports.

[20] https://tyndall.ac.uk/news/new-shipping-emissions-report/

[21] "Macroeconomic and Environmental Impacts of Port Electrification: Four Port Case Studies" MARAD, 2020

[22] H2@Ports Workshop | Department of Energy

Topic 3: Anticipated Funding and Award Details

DOE's anticipated funding levels, including the federal funding per award are given below:

Topic Area	Total Funding Level	Anticipated Number of Awards	Federal Funding per Award	Max. Project Duration (Months)	Min Required Non-Federal Cost Share %
Topic 3: Hydrogen Fuel Cell Powered Port Equipment	**Up to $10,000,000**	**2 to 3**	**Up to $4,000,000**	**48**	**50**

Topic 3: Description and Objectives

Through this topic, EERE seeks proposals to design, develop, and demonstrate innovative new equipment or retrofit kits for existing port equipment. Examples of port equipment include, but are not limited to, various types of cargo-handling equipment; such as overhead fixed cranes, top loaders, rubber tire gantries, rail equipment, shore power to docked vessels, and the associated refueling equipment to support port equipment. Drayage trucks and yard tractors are not of interest for this topic.

Cargo-Handling Equipment: In 2009, under the American Recovery and Reinvestment Act (ARRA) investment, DOE funded 713 fuel cell powered lift-truck demonstrations.[23] This initial investment has led to over 60,000 fuel cell forklifts operating today in the United States. [24] Many of the lessons learned at inland warehouses using these forklifts are directly applicable to cargo-handling operations at ports. Through this topic, DOE is aiming to initiate similar market liftoff for fuel-cell powered cargo-handling equipment at ports (e.g., overhead fixed cranes, top loaders, and rubber tire gantries).

Shore Power for Vessels: For vessels at berth, a significant amount of AC electric power is required to support their hotel loads and other engineering and deck operations (e.g., line handling, ballast pumps, crane operations, etc.) not related to propulsion or navigation. For shore power applications, this topic seeks proposals for dispatchable fuel cell power greater than 1 MW and capable of three-phase 480 VAC electrical power.

[23] DOE Hydrogen and Fuel Cells Program Record 18002: Industry Deployed Fuel Cell Powered Lift Trucks (energy.gov)

[24] https://www.ir.plugpower.com/press-releases/news-details/2023/Plug-to-Provide-STEF-with-Green-Hydrogen-and-Fuel-Cell-Solutions-for-Cold-Storage-Distribution-Centers/default.aspx

Fueling solutions: Development of *standalone* mobile refuelers or novel refueling strategies are not of interest in this topic; however, refueling technologies, such as mobile refuelers or swappable hydrogen storage tanks may be included as a companion technology to enable demonstrations of cargo-handling equipment if they are not already funded through a separate effort and are required for demonstration of the equipment. Unlike forklifts in warehouses, some types of port equipment have limited mobility, so they won't be able to access conventional centralized fueling stations. Therefore, unique fueling solutions will be required for certain applications. Any proposed fueling solution will need to provide fill rates comparable to incumbent technologies while also meeting applicable codes and standards.

Proposed projects should focus on solutions to decarbonize the cargo-handling ecosystem, with particular attention using hydrogen in applications with high potential for emissions-reduction when deployed at scale. Emissions abatement from the equipment should be tracked and reported at the conclusion of the project. Lessons learned from development and demonstration should be shared publicly and used to de-risk commercialization of hydrogen systems at ports.

Applicants should either explain how their proposed projects will leverage the recently announced H2Hubs through offtake agreements (or letters of support), or they should articulate how their project will be an important anchor for the expansion of clean hydrogen in other regions. Projects should also identify any other government programs they plan to leverage, for example, EPA's Clean Ports program[25] or MARAD's Ports Infrastructure Development Program.[26] Proposals must include realistic plans for how hydrogen will be acquired and how fueling will take place throughout the duration of the project, as well as how successful demonstrations can lead to enduring operations at partner ports and terminal operators.

Applicants should consider a holistic, systems-of-systems approach to cargo movement. From ship, to shore, to intermodal freight networks, decarbonization of goods movement requires the coordinated operation of many pieces of equipment working in concert with their operators in a space-constrained environment. Proposals should be based on solutions that consider the port as an integrated system.

All pieces of port equipment have unique operational requirements, and applicants should work with terminal operators to develop technical specifications that will meet the rigorous requirements of the ports. Sixteen hours of continuous operation

[25] https://www.epa.gov/ports-initiative/cleanports

[26] https://www.maritime.dot.gov/PIDPgrants

over two eight-hour shifts are common for port equipment. The flexibility to add a third eight-hour shift is often needed during emergency situations. Therefore, equipment must be able to support 24-hour operations with refueling times commensurate with diesel (e.g., refill times of 10-15 minutes, subject to refinement with input from terminal operator partners). Port equipment has many characteristics in common with MD/HD vehicles; for example, a rubber tire gantry crane consumes 10 gallons of diesel per hour over a 16-hour operational period, requiring 160 gallons of diesel onboard which is comparable to a Class 8 truck. Therefore, where applicable, efforts should be made to leverage technology developments in the MD/HD truck sector.

Proposals should also explain the technical and commercial merits of the proposed work in detail, by:

- Providing a description of the port equipment(s) to be developed and highlighting the key equipment characteristics, innovations, and objectives;
- Articulating key operations at the port the applicant is targeting for decarbonization and why the proposed technology is the right solution;
- Describing how the proposed technology fits into the competitive landscape and how it compares to the incumbent diesel technology in terms of performance and cost;
- Articulating why hydrogen fuel cells are the proper choice as opposed to other low-carbon or zero-emissions technologies like battery electric or hydrogen internal combustion applications; and
- Describing how the technology will be commercialized and lead to liftoff of the hydrogen economy and how the technology will lead to enduring changes at the port.

Proposals should also describe the technical approach needed to meet the project objectives, by:

- Outlining quantitative milestones and go/no-go decision points;
- Clearly identifying important risks or long lead-time items in the description of the technical approach;
- Assessing the TRL of the proposed technologies prior to the proposed work; and
- Enumerating key performance parameters with both a threshold and objective value and identifying how these are critical for successful demonstration and commercialization of the technology.

Proposals should also describe the anticipated benefits of the project, for example, by identifying the anticipated CO_2, NOx, particulate, and diesel reduction potential of the proposed work.

Topic 3 General Requirements

This topic requires: (i) proposed designs that meet applicable codes and standards, such as NFPA 2;[27] (ii) proposed designs that emphasize reducing hydrogen releases, including leakage, venting, purging, and operation; (iii) a phased workplan that includes detailed technoeconomic analysis comparing proposed designs with incumbent technologies; (iv) a detailed community benefits plan; and (v) processes to collect and share data with DOE and/or DOE-selected third-parties.

Topic 3: Community Benefits Plan

A CBP is required for this topic to ensure the federal investments advance the following three objectives: (1) Diversity, Equity, Inclusion, and Accessibility (DEIA); (2) energy equity; and (3) investing in America's workforce. The applicant's RDD&D CBP must include at least one Specific, Measurable, Attainable, Realistic, and Timely (SMART) milestone per budget period to measure progress on the proposed actions. These milestones should also be included the Work Plan in the SOPO and accounted for in the project budget. Please see Section IV.D.vii. RDD&D Community Benefits Plan for details.

When writing CBPS, applicants are encouraged to focus on project benefits for DACs. Applicants should use consent-based siting for their project, particularly if siting in a DAC. Projects should coordinate with the local community during the design, construction, and demonstration phases. The project workplan and SMART milestones to engage communities should be outlined and integrated in the Technical Volume/SOPO, with a clear description and explanation of tasks in the community benefits plan.

Community benefits plans are required to describe how the proposed project will:

- Engage with underserved communities to discuss how investments in port equipment can benefit them;
- Determine which port equipment benefits align with community priorities;
- Identify potential demonstration sites that benefit the surrounding communities;
- Evaluate whether port equipment provided anticipated benefits to fenceline communities;
- Examples of benefits from port demonstration that could flow to communities include:
    - Reduced exposure to emissions from diesel-powered port equipment;
    - Increased enterprise creation and economic development opportunities;

[27] https://www.nfpa.org/codes-and-standards/2/2?l=45

- Increased clean energy job pipeline and job training;
- Increased energy resiliency; and
- Increased energy democracy.

Additional Requirements

Project teams are required to:

1. Engage with potential site hosts and surrounding communities during the design and development;
2. Install port equipment in locations that benefit underserved communities following community engagement activities; and
3. Develop and implement a plan for tracking and reporting metrics for the benefits that flow to underserved communities from the demonstrated port equipment.

For each underserved community that is a committed or prospective partner, applications must specify:

- Geographic area;
- Project partners representing the relevant communities; and
- If the community is identified as a DAC.

Topic 3: Project Structure

Applicants should propose projects up to four years in length for a maximum total DOE funding of $4,000,000 per project plus a minimum 50% non-federal cost share (e.g., $4,000,000 DOE share and at least $4,000,000 applicant cost share for up to $8,000,000 total). The funding request should be commensurate with the level of work proposed. Applicants should plan projects as three or four multi-phase efforts with a SMART go/no-go decision point separating each phase (budget period).

Topic 3: Teaming Arrangements

Project teams should be diverse and consist of team members with the following attributes:

- An equipment developer/manufacturer;
- A hydrogen fuel supplier;
- A terminal operator at a U.S. port; and
- A community partner, who can help communicate the energy, environmental, economic, social, and/or other relevant needs that the proposed port equipment would address, as well as local development and regulatory requirements. Examples include local organized labor; local community leadership groups; local planning, zoning, and code officials; community-based organizations; local EJ organizations; state, local, and Tribal governments; building owners and developers.

Topic 3: Applications Specifically Not of Interest

Under this topic EERE is not interested in proposals involving:

- Drayage Trucks; and
- Yard Tractors

iv. Topic 4: Enabling Permitting and Safety for Hydrogen Deployment

Topic 4 Introduction and Background

Robust permitting processes are essential to enabling safe, equitable, and efficient deployment of energy infrastructure. Specifically, they can help ensure that disadvantaged communities are not overburdened with health concerns and safety risks. However, the variation in permitting requirements throughout the United States can introduce significant obstacles to deployment. This is a particularly salient issue for hydrogen, given the limited experience with siting and permitting of hydrogen installations. In addition, widespread availability and communication of safety-related information are crucial to enabling the safe use of hydrogen in all applications and all communities.

Numerous stakeholders, including hydrogen producers, end users, and infrastructure providers as well as environmental organizations, Tribal groups, and EJ communities, have provided feedback through various listening sessions to inform the ***U.S. National Clean Hydrogen Strategy and Roadmap***, which included discussion on activities relevant to this FOA topic. In addition, in July 2023, the Fuel Cell & Hydrogen Energy Association hosted a listening session specifically to address state and local permitting-process barriers, gather feedback from hydrogen stakeholders and communities, and identify solutions to support authorities having jurisdiction (AHJs). When asked about their community's hydrogen readiness, key concerns, and potential solutions, participants identified several common needs:

- Permitters, local government, safety officials, and community members need education and knowledge resources, and safety is a necessary element of that education;
- AHJs would benefit from standardized processes, best practices guidance, and/or workshops on permitting hydrogen technologies;
- Information sharing and networks are valuable for many users in the permitting space; and
- Community engagement is essential to a successful and effective permitting process.

This topic seeks applications that will help identify and address the primary challenges to permitting, siting, and installation across the value chain from hydrogen production through end-use. This topic also targets activities that enable AHJs to make informed decisions about implementing codes that facilitate public safety, while addressing challenges to efficient permitting. Through this activity, DOE

aims to empower communities to develop resources tailored to their needs and to be at the forefront of clean hydrogen technology deployment.

Topic 4: Anticipated Funding and Award Details

DOE's anticipated funding levels, including the federal funding per award are given below:

Topic Area	Total Funding Level	Anticipated Number of Awards	Federal Funding per Award	Max. Project Duration (Months)	Min Required Non-Federal Cost Share %
Topic 4: Enabling Permitting and Safety for Hydrogen Deployment	**Up to $6,000,000**	**6 to 12**	**$500,000 to $1,000,000**	**36**	**N/A**

Topic 4: Description and Objectives

For this topic, EERE seeks proposals to identify and address the primary challenges to siting, permitting, and installation of hydrogen technologies. Proposals should identify key challenges to siting, permitting, and installation, and related topics, with a focus on the state, community, or region represented by the project team, as appropriate. Projects selected under this topic will be expected to coordinate, to enable a cohesive approach to lessons learned, best practices, and dissemination of information.

This topic seeks proposals from teams with in-depth technical knowledge of hydrogen including safety across production, infrastructure, and end use with expertise to provide critical information on potential risks and risk mitigation approaches throughout the duration of the project. The greatest impact can be achieved when those who best understand the unique needs of their community are involved directly in developing appropriate programs and resources, this topic seeks proposals from diverse teams that include community organizations and entities active in deployment and permitting processes in that community's geographic region.

In addition to articulating challenges to the siting, permitting, and installation of hydrogen technologies, applicants should identify specific actions they will take to address those challenges. These activities should advance the permitting process for hydrogen technologies and empower communities to be at the forefront of

hydrogen technology deployment, while also addressing the needs of relevant stakeholders. Examples of activities of interest include, but are not limited to:

- Providing specific recommendations and case studies on how permitting may be streamlined for the most efficient deployments, while simultaneously addressing safety, community, and environmental concerns;
- Sharing and disseminating lessons learned and best practices developed by AHJs, first responders, and others involved in the permitting process for hydrogen deployments to increase transparency;
- Hosting local permitting, safety, or codes and standards forums (e.g., in coordination with local fire departments);
- Developing and distributing tailored community-based resources on hydrogen safety and permitting/siting best practices;
- Addressing the inclusioninclusion of hydrogen and fuel cell emergency response in national first-responder training programs;
- Incorporating hydrogen and fuel cell safety into existing training materials or resources for handling of flammable gases;
- Developing and implementing train-the-trainer programs for first responders or code officials;
- Developing and deploying technology-based AHJ tools and resources (e.g., apps or web-based platforms) to verify whether installations are compliant with relevant codes and standards;
- Integrating hydrogen-specific permitting into existing state and/or local government-sponsored permitting tools; and
- Developing innovative hydrogen safety knowledge resources for code officials, including training webinars and online tools for AHJs.

Topic 4: General Requirements

Proposals may represent a range of project sizes, and applicants may choose to address some or all the areas within this topic. Applicants should identify the specific challenges to siting, installation, and permitting that they intend to focus on, describe in detail the actions that will be taken, and provide a compelling case on how the proposed solutions will address the permitting process, community needs, and technology deployment considerations.

Applicants should also establish clear performance metrics. If the project has a regional focus, applicants should include metrics specific to that region and explain how deliverables could be leveraged in the future to address challenges in other regions as well. Applicants are encouraged to focus on regions with favorable conditions for market growth of the hydrogen industry and should explain the reason a given region was chosen.

Applicants are encouraged to leverage existing resources and should avoid developing duplicate materials. Activities that incorporate hydrogen into existing resources, or that add region-specific content to existing resources are acceptable. Deliverables may include, but are not limited to:

- Guidance, lessons learned, and best practice resources on specific gaps/barriers and potential solutions at local, state, and federal levels to enable efficient permitting, while also addressing environmental, EJ, and disadvantaged community concerns;
- Development and deployment of hydrogen safety, codes, and standards training opportunities (e.g., training on implementation of relevant hydrogen codes and standards; safety best practices during the design and operation of a hydrogen facility; and incident response planning, including training for emergency responders);
- Tools and resources on hydrogen safety, codes, and standards for local and regional officials or AHJs; and
- Examples from the list in the previous section.

Topic 4: Community Benefits Plan

A CBP is required for this topic to ensure the federal investments advance the following three objectives: (1) Diversity, Equity, Inclusion, and Accessibility (DEIA); (2) energy equity; and (3) investing in America's workforce. The applicant's RDD&D Community Benefits Plan must include at least one Specific, Measurable, Attainable, Realistic, and Timely (SMART) milestone per budget period to measure progress on the proposed actions. These milestones should also be included the Work Plan in the SOPO and accounted for in the project budget. Please see Section IV.D.vii. RDD&D Community Benefits Plan for details.

Topic 4: Project Structure

Applicants should propose projects up to three years in length for a maximum total DOE funding of $1,000,000 per project. The funding request should be commensurate with the level of work proposed. Applicants should plan projects as two or three multi-phase efforts with a quantitative go/no-go decision point separating each phase (budget period).

Topic 4: Teaming Arrangements

Project teams should include at least one community organization and are encouraged to include entities directly involved in permitting. Teams are also encouraged to include environmental organizations or NGOs, relevant professional organizations (e.g., associations or training academies), and industry partners (e.g., project developers or end users of hydrogen). Teams are also encouraged to include universities and national labs as applicable and if they offer relevant resources and expertise.

Topic 4: Applications Specifically Not of Interest

Under this topic EERE is not interested in proposals focused primarily on the following:

- Activities focused on permitting for a specific hydrogen infrastructure deployment. Activities should be focused on relieving permitting issues across the hydrogen landscape rather than at a single site; and
- Activities that duplicate existing resources or programs (e.g., programs already being funded by other government agencies). Applications with similarities to other existing activities should specify key differences.

v. Topic 5: Equitable Hydrogen Technology Community Engagement

Topic 5: Introduction and Background

Hydrogen technologies can provide significant benefits to the nation as well as to local communities, such as improved resiliency, reduced emissions, improved air quality, and economic prosperity across sectors. However, some communities have expressed concerns about hydrogen technologies, including concerns about increased water and energy usage, hydrogen safety, leakage, use of ammonia as a hydrogen carrier, potential impacts of carbon capture and storage, use of nuclear power, and life cycle impacts of hydrogen produced via fossil pathways such as steam methane reforming.

To ensure that the benefits of clean hydrogen are maximized and shared, and to ensure that potential risks to communities are minimized and mitigated, hydrogen technologies will need to be deployed in an equitable and sustainable manner. In support of this goal, the ***U.S. National Clean Hydrogen Strategy and Roadmap*** identifies equity, sustainability, and EJ as key priorities for DOE and other federal agencies. The "guiding principles" of the national strategy specifically state that a holistic approach, including EJ concerns, must be addressed as the scale of clean hydrogen deployments grows and market liftoff is achieved. In addition to the overarching goals within the *Strategy and Roadmap*, the Justice40 Initiative[28] sets a goal of ensuring that at least 40% of all the benefits from covered programs[29] go to DACs.

Community benefits plans (CBPs) are a high priority in the FOA process, designed to address EJ concerns in DOE-funded projects. CBPs are based on the following four

[28] "Justice40 Initiative," U.S. Department of Energy, www.energy.gov/diversity/justice40-initiative.

[29] A "covered program" is a federal government program that falls in the scope of the Justice40 initiative because it includes investments that can benefit disadvantaged communities across one or more of the following seven areas: climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure. For more information, see www.energy.gov/justice/doe-justice40-covered-programs.

categories of benefits: investing in America's workforce, engaging communities and labor, advancing diversity, equity, inclusion, and accessibility (DEIA), and implementing Justice40. The content of CBPs varies depending on whether a DOE-funded project is primarily focused on R&D or demonstration and deployment (D&D). All CBPs for both R&D and D&D focused projects will need to address energy equity (in alignment with the Justice40 Initiative); workforce development; and DEIA. However, since D&D focused projects can potentially have a more direct impact on surrounding communities (including DACs) applicants proposing D&D projects are expected to develop CBPs that specifically address these direct impacts, particularly through community and labor agreements.

DOE's guidance for developing CBPs is intentionally flexible to help applicants provide benefits and mitigate negative impacts in a manner tailored specifically to their project and the challenges of the local community. Each CBP must include SMART milestones, which will then be incorporated into the contractual obligations of the awardee.

While CBPs can be a valuable tool to support the implementation of equity and justice in D&D and R&D projects, DOE has received feedback from applicants, FOA reviewers and the public that more information is needed regarding what makes an effective CBP. As a relatively new aspect of DOE's work and the lack of prior experience and best practices, CBPs can be challenging to write and implement. Furthermore, communities are not always engaged early enough in the application process and the prime applicant may not necessarily understand community concerns and priorities around hydrogen technologies. Since the use of hydrogen can involve complex systems and processes, spanning multiple production processes from diverse sources and various approaches to delivery and storage infrastructure, and since most communities have had little or no exposure to clean hydrogen, they typically do not have sufficient information on either its advantages or potential negative impacts. Additionally, communities are unfamiliar with how to engage in the CBP process.

Effective CBPs include activities in the following pillar areas:

- **Community and Labor Engagement**
    - Conducting literature reviews and community-centered analysis of best practices for community and labor engagement such as community advisory boards. Other activities could leverage the firsthand experience of community and labor representatives who have served on advisory boards, and ultimately provide actionable guidance for the boards associated with hydrogen projects;

  - Obtaining community-centered input on holding effective community meetings (e.g., how to enable feedback, reflection, and consensus building);
  - Developing guidance on compliance, accountability, and monitoring of hydrogen projects; and
  - Developing formalized grievance/other accountability processes within CBPs.
- **Diversity, Equity, Inclusion, and Accessibility (DEIA)**
  - Conducting literature reviews and developing toolkits for effective DEIA assessments across R&D and D&D projects. This could include developing processes for identifying measurable goals based on DEIA assessments and creating toolkits and processes that can be implemented by hydrogen projects to meet those goals; and
  - Developing best practices for effective DEIA training within hydrogen projects and developing processes for hiring, recruitment, and retention that will help ensure DEIA throughout the clean hydrogen industry.
- **Justice40**
  - Developing metrics and data tools for tracking and sharing progress on DOE's eight Justice40 policy priorities, including methods for tracking the flow of benefits to communities and calculating whether 40% of a project's benefits are received by a community;
  - Developing ideas for measuring benefits in ways that are meaningful and accessible to communities and include relevant metrics;
  - Developing accessible training materials to help communities and labor organizations develop project labor agreements (PLAs) and community benefits agreements (CBAs) including, e.g., advice on budgeting and negotiation processes and best-practices from existing PLAs and CBAs;
  - Developing tools and practices for developing emergency response plans as well as online tools and guidance for developing emergency response systems. These should be informed by community-based case studies and design needs elicited from community engagement;
  - Identifying technologies that communities may need to ensure safe and equitable deployment of hydrogen technologies (e.g., community-serving monitoring and data tools) and any potential RDD&D needs to provide those technologies. For example:
    - Air quality monitors to ensure compliance with ambient air standards for NOx and other criteria pollutants; and
    - Streamlined notification processes and access to reliable power provided by hydrogen during grid outages or for disaster relief.

  - Exploring effective ways to educate communities about hydrogen safety;
  - Providing additional benefits if their engagement activities result not just in lessons learned but also in the actual development of viable solutions (such as emergency response plans and/or systems and functional safety training resources); and
  - Conducting community-engaged and responsive lifecycle assessments for hydrogen projects, including, for example, the use of land and water and regional environmental impacts (e.g., deforestation, wetlands infringement).
- **Workforce**
  - Developing tools and metrics related to local workforce development needs (e.g., best practices for identifying needs related to reskilling the local workforce to ensure local communities can benefit from employment opportunities from hydrogen deployments); and
  - Conducting studies to identify barriers to hydrogen workforce access for DACs and strategies to address those barriers.

Topic 5: Anticipated Funding and Award Details

DOE's anticipated funding levels, including the federal funding per award are given below:

Topic Area	Total Funding Level	Anticipated Number of Awards	Federal Funding per Award	Max. Project Duration (Months)	Min Required Non-Federal Cost Share %
Topic 5: Equitable Community Engagement and Ownership in Hydrogen Technology Deployment	**Up to $3,000,000**	**3 to 9**	**$300,000 to $1,000,000**	**36**	**N/A**

Topic 5: Description and Objectives

For this topic, DOE seeks proposals to be coordinated between HFTO and relevant DOE offices including the Office of Energy Justice and Equity, the Office of Fossil Energy and Carbon Management, the Office of Nuclear Energy, and the Office of Clean Energy Demonstrations. Projects selected under this topic will be expected to coordinate, to enable a cohesive approach to lessons learned, best practices, and dissemination of information.

This cross-office topic aims to address the challenges described above by supporting projects that will be conducted in partnership with communities to inform best practices for community engagement processes and development of CBPs for both R&D and D&D focused hydrogen projects funded by DOE and provide education to communities about hydrogen technologies.

The primary objectives of this topic are:

1. To develop lessons learned and best practices for at least one CBP pillar as described in the Introduction and Background (above);
2. To develop lessons learned and best practices about the community engagement process, through direct engagement with a specific community; and
3. To improve understanding of a specific community's concerns and help educate that community about hydrogen, through direct, equitable, and reciprocal engagement.

Projects are expected to deliver reports that detail: lessons learned about engaging with communities on hydrogen technologies for one or more pillars of CBPs; best practices for developing and implementing hydrogen CBPs; and specific priorities that selected DACs would like to see addressed in R&D and D&D CBPs. The reports should also contain templates for CBPs with clear examples of best practices for the applicable CBP pillar(s). Projects may also include additional deliverables such as but not limited to, online tools, educational materials, and other media supporting their project and/or the building of capacity around hydrogen community engagement.

These outcomes will serve the longer-term interests of the entire hydrogen community by growing the body of knowledge about how to best ensure community interests are meaningfully incorporated into all hydrogen projects (especially, but not limited to, those funded by DOE).

This topic seeks proposals that will develop these lessons learned and best practices by conducting community engaged project activities directed at:

1. Improving effective development and implementation of CBPs in hydrogen projects;
2. Improving community understanding of hydrogen technologies including how to maximize community benefits and minimize potential risks of the technologies;
3. Improving DOE's and interagency understanding of concerns and priorities within communities (especially DACs) related to hydrogen technologies; and
4. Identifying potential solutions to maximize benefits and minimize harm to communities.

Project deliverables will be useful across the DOE Hydrogen Program and all agencies involved in the Hydrogen Interagency Taskforce (HIT),[30] with the potential to serve as a blueprint for community engagement for future hydrogen deployments. These reports will ultimately be compiled into a larger resource or resources (e.g., as a full catalogue published on a DOE or HIT webpage) for use by applicants and communities developing CBPs and active projects conducting any form of community engagement. Additionally, project activities will build the capacity for DACs to engage with hydrogen projects and CBPs.

Applicants may propose community engagement activities for hydrogen produced from one or more feedstocks (renewables, nuclear, and fossil fuels with carbon capture and sequestration) and used in various applications such as industry (ammonia, steel production, etc.), heavy duty transportation (e.g., trucks, buses, rail, marine), and stationary power generation (e.g., fuel cells, turbines). The nature of community concerns and the content of CBPs will vary depending on whether hydrogen is produced from fossil fuels with carbon capture and sequestration versus nuclear or renewable resources, or how hydrogen is stored and delivered (e.g., pipelines, ammonia) and the best practices will need to cover these differences for maximum community benefit. Similarly, the end-uses of hydrogen will significantly affect community concerns and the content of CBPs and should be considered in developing best practices.

Applicants must address one or more of the CBP pillars (as described in the background section) in their work plan. Once selected, project performers will be expected to share information across all recipients through a variety of mechanisms such as virtual meetings, site visits, and engagement with the H2Hubs as applicable.

Topic 5: General Requirements

Proposals should include: a narrative outlining their teaming arrangement; a description of any prior engagement or partnership with the DAC(s) the program team will engage with; a budget outlining how the funds will be used, including how the funds will benefit the DAC and how participants will be compensated for their participation in community engagements; and an evaluation plan for the community engagement. They should also include a timeline for the community engagement plan.

The proposal may also include (but is not limited to) information about:

- Plans to use existing DOE Hydrogen materials such as *Pathways to Commercial Liftoff: Clean Hydrogen* and the *U.S. National Clean Hydrogen Strategy and Roadmap* in their engagements;

[30] www.hydrogen.gov

- Plans to use existing community resources and assessment frameworks used by involved stakeholders (e.g., the Envision project sustainability rating system from the Institute for Sustainable Infrastructure);
- Type(s) of outreach proposed (e.g., community-based participatory research, community forums, workshops, multimedia community campaigns, etc.); and
- Plans to collect feedback from communities regarding sentiments/concerns/questions about hydrogen technologies.

Awardees will be required to:

- **Develop a community engagement plan** around hydrogen and related technologies and at least one of the CBP pillars as outlined in the introduction. This plan must demonstrate that at least one of the community or communities the team would like to partner with (or is already a part of) is: (a) a DAC as verifiable by the Climate and Economic Justice Screening Tool (CEJST) tool and, (b) interested in learning about hydrogen and providing feedback and input into DOE's community engagement efforts.
- **Implement the community engagement plan** and document information garnered about community concerns and priorities related to hydrogen technologies as well as potential solutions to maximize benefits and minimize harm to communities.
- **Compile a report from implementing their plan** to develop lessons-learned and best practices for community engagement. This report should include the following:
  - Narrative of the implementation of the community engagement plan, including the hydrogen education component;
  - Results of the community engagement plan (e.g., how many participants engaged, the outcomes of the engagements including what benefits communities prioritized);
  - Lessons learned and best practices from community engagement(s), including CBP best practices; and
  - Community engagement resources such as template for applicable CBP pillar(s). Projects may also include additional deliverables such as, but not limited to, online tools, educational materials, and other media supporting their project and/or the building of capacity around hydrogen community engagement.

Topic 5: Community Benefits Plan

Due to the focus on CBPs within the topic itself, applicants are not required to submit a separate CBP as part of the application.

Topic 5: Project Structure

Applicants should propose projects up to three years in length for a maximum total DOE funding of $1,000,000 per project. The funding request should be commensurate with the level of work proposed.

Topic 5: Teaming Arrangements

The prime applicant must be a nonprofit, federally recognized tribe, Minority-Serving Institution (MSI), Historically Black College and University (HBCU), Tribal College and University (TCU), Tribal entity, or Minority Business Enterprise (MBE). The prime recipient is expected to distribute volunteer participation funds to the DAC participants with which the project is working. The subrecipient(s) must be one of the aforementioned groups or a labor organization. Industry partners (e.g., project developers or end users of hydrogen) are also encouraged on the teams, though not required. Applicant teams are also encouraged to include national labs (as applicable and if they offer relevant resources and expertise). If applicable to the topic area, each team must demonstrate they have thorough knowledge of hydrogen safety.

Topic 5: Applications Specifically Not of Interest

Under this topic EERE is not interested in applications focused primarily on the following:

- Implementing an existing CBP (this is done through an existing project).
- Development of community benefit concepts that are not primarily directed by community organizations.

All work under EERE funding agreements must be performed in the United States. See Section IV.J.iii. Performance of Work in the United States (Foreign Work Waiver) and Appendix C. Waiver Requests for: 1. Foreign Entity Participation; and 2. Foreign Work.

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. Responsiveness Criteria of the FOA):

- Applications that fall outside the technical parameters specified in Sections I.A. Background and Context and I.B. Topic Areas of the FOA.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications for proposed efforts described as specifically not of interest under each topic description.

D. RDD&D Community Benefits Plan

It is the policy of the Biden Administration that:

The Federal Government should pursue a comprehensive approach to advancing equity[31] for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments, and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity.

By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.[32]

As part of this whole of government approach, this FOA seeks to encourage the participation of underserved communities[33] and underrepresented groups. Applicants are highly encouraged to include individuals from groups historically underrepresented[3435] in STEM on their project teams. As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project.

Further, Minority Serving Institutions[33], Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or entities located in an underserved community that meet the eligibility requirements (See Section III. Eligibility Information) are encouraged to apply as the prime applicant or participate on an application as a proposed partner to the prime

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

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

[33] Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities/Other Minority Institutions as educational entities recognized by the Office of Civil Rights (OCR), U.S. Department of Education, and identified on the OCR's Department of Education U.S. accredited postsecondary minorities' institution list. See https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html.

applicant. The Selection Official may consider the inclusion of these types of entities as part of the selection decision (see Section V.C. Other Selection Factors).

To support the goal of building a clean and equitable energy economy, projects funded under this 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 RDD&D Community Benefits Plan (CBP) that addresses the three objectives stated above. See Section IV.D.vii. RDD&D Community Benefits Plan and Appendix H. RDD&D Community Benefits Plan Guidance for more information on the RDD&D CBP content requirements. Applicants submitting proposals for Topics 2 and 3 will also need to address the specific CBP requirements laid out in the topic descriptions.

E. Authorizing Statutes

The programmatic authorizing statute is the Energy Policy Act of 2005 (EPAct 2005) Public Law 109-58 (Aug. 8, 2005), Title VIII, Sections 801 to 816; 42 U.S.C. Sections 16151 to 16165.

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

II. Award Information

A. Award Overview

i. Estimated Funding

EERE expects to make a total of approximately $59,000,000 of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 17 to 32 awards under this FOA. EERE may issue one, multiple, or no awards. Individual awards may vary between $250,000 and $10,000,000.

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

Topic Area Number	Topic Area Title	Anticipated Number of Awards	Anticipated Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards	Anticipated Period of Performance (months)

1	Components for Hydrogen Fueling of Medium- and Heavy-Duty Vehicles	4 to 5	$1,000,000 to $3,000,000	$10,000,000	24-36
2	Standardized Hydrogen Refueling Station of the Future	2 to 3	$10,000,000	$30,000,000	36-48
3	Hydrogen Fuel Cell Powered Port Equipment	2 to 3	$2,000,000 to $4,000,000	$10,000,000	36-48
4	Enabling Permitting and Safety for Hydrogen Deployment	6 to 12	$250,000 to $1,000,000	$6,000,000	24-36
5	Equitable Hydrogen Technology Community Engagement	3 to 9	$300,000 to $1,000,000	$3,000,000	24-36

EERE 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.

ii. Period of Performance

EERE anticipates making awards that will run from 2 years up to 4 years in length, comprised of one or more budget periods. Project continuation will be contingent upon several elements, including satisfactory performance and Go/No-Go decision. For a complete list, see Section VI.B.xv. Go/No-Go Review.

iii. New Applications Only

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

B. EERE Funding Agreements

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

i. Cooperative Agreements

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

Through cooperative agreements, EERE 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.

EERE has substantial involvement in all projects funded via cooperative agreement. See Section VI.B.x. Statement of Substantial Involvement of the FOA for more information on what substantial involvement may involve.

ii. Funding Agreements with Federally Funded Research and Development Center (FFRDCs)[34]

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. Other Eligibility Requirements.

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.

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. Nonprofit entities; and
4. State and local governmental entities and federally recognized Indian Tribes (Indian Tribes).

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.

[34] FFRDCs are public-private partnerships that conduct research for the U.S. government. A listing of FFRDCs can be found at http://www.nsf.gov/statistics/ffrdclist/.

DOE/NNSA FFRDCs are eligible to apply for funding as a subrecipient but are not eligible to apply as a prime recipient.

Non-DOE/NNSA FFRDCs are eligible to participate as a subrecipient but are not eligible to apply as a prime recipient.

Federal agencies and instrumentalities (other than DOE) are eligible to participate as a subrecipient on any topic but are not eligible to apply as a prime recipient.

Entities banned from doing business with the U.S. 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.

For Topic 5, HFTO intends to restrict eligibility such that only Minority-Serving Institutions (MSIs), Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), Tribal entities, 501(c)(3) nonprofits, and Minority-Serving Business Enterprises (MBEs) can apply as a prime recipient. This topic area also restricts subrecipients to any of the aforementioned groups as well as labor organizations.

ii. Foreign Entities

In limited circumstances, EERE 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 C Waiver Requests For: 1. Foreign Entity Participation; and 2. Foreign Work lists the information that must be included in a foreign entity waiver request. The applicant does not have the right to appeal EERE's decision concerning a waiver request.

B. Cost Sharing

Applicants are bound by the cost share proposed in their Full Applications if selected for award negotiations. Cost share requirements differ by topic area, as summarized in the table below:

Topic Area Number	Topic Area Title	Cost Share Requirement
1	Components for Hydrogen Fueling of Medium- and Heavy-Duty Vehicles	20%
2	Standardized Hydrogen Refueling Station of the Future	50%
3	Hydrogen Fuel Cell Powered Port Equipment	50%
4	Enabling Permitting and Safety for Hydrogen Deployment	0%
5	Equitable Hydrogen Technology Community Engagement	0%

The cost share must be at least 20% of the total project costs[35] for R&D projects and 50% of the total project costs for demonstration and commercial application projects.[36] The cost share must come from non-federal sources unless otherwise allowed by law.

To help applicants calculate proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation as Appendix A. Cost Share Information and Appendix B. Sample Cost Share Calculation for Blended Cost Share Percentage to this FOA.

i. Legal Responsibility

Although the cost share requirement applies to the entire project, 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.

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

[36] 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.

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 entire project is met.

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable federal cost principles, as described in Section IV.J.i. Allowable Costs of the FOA. In addition, cost share must be verifiable upon submission of the Full Application. Cost share may be provided in the form of cash or cash equivalents, or in-kind contributions. Cost share must come from non-federal sources (unless otherwise allowed by law), such as project participants, state or local governments, or other third-party financing. Federal financing, such as DOE Loan Guarantee, cannot be leveraged by applicants to provide the required cost share or otherwise support the same scope that is proposed under a project.

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 federal government did not provide the funding to the state or local government.

The recipient may not use the following sources to meet its cost share obligations:

- 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 as amended by 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 Cost Share Information 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 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. Application and Submission Information of the FOA;
- Include all required documents;
- Be uploaded and submitted to EERE eXCHANGE https://eere-eXCHANGE.energy.gov; and
- Be submitted by the deadline stated in the FOA.

EERE 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, Full Applications, and Replies to Reviewer Comments at least 48 hours in advance of the submission deadline. Under normal conditions (i.e., at least 48 hours before the submission deadline), applicants should allow at least one hour to submit a Concept Paper, Full Application, or Reply to Reviewer Comments. Once theConcept Paper, Full Application, or Reply to Reviewer Comments 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, Full Application, or Reply to Reviewer Comments before the applicable deadline. EERE 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. Applications Specifically Not of Interest of the FOA and as described in each Topic description, are deemed nonresponsive and are not reviewed or considered.

E. Other Eligibility Requirements

i. 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. Funding, Cost Share, and Subaward with FFRDCs
The value of and funding for the FFRDC portion of the work will not normally be included in the award. DOE/NNSA FFRDCs participating as a subrecipient on a project will be funded directly through the DOE field work proposal (WP) process. Non-DOE/NNSA FFRDCs participating as a subrecipient will be funded through an interagency agreement with the sponsoring agency. Although the FFRDC portion of the work is excluded from the award, 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.

Unless instructed otherwise by the DOE Contracting Officer for the DOE award, all FFRDCs are required to enter into a Cooperative Research and Development Agreement[37] (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 IP, e.g., data protection and background IP. The CRADA or TAA must be agreed upon by all parties and submitted to DOE or other sponsoring agency, when applicable, for approval, or submitted to DOE for notice under the Master Scope of Work process, when applicable, using any DOE or other sponsoring agency approved CRADA or TAA template without substantive changes by the time the award is made to the prime recipient.

d. 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.

e. Limit on FFRDC Effort
The FFRDC effort, in aggregate, shall not exceed 25% of the total estimated cost of the project, including the applicant's and the FFRDC's portions of the effort.

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

An entity may submit more than one Concept Paper and Full Application to this FOA, provided that each application describes a unique, scientifically distinct project and an eligible Concept Paper was submitted for each Full Application.

[37] 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

G. Questions Regarding Eligibility

EERE 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 apply in response to this FOA lies solely with the applicant.

IV. Application and Submission Information

A. Application Process

The application process includes two submission phases: Concept Paper, and Full Application. **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" 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, EERE 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.

Applicants who experience technical difficulties with submission PRIOR to the FOA deadline should contact the EERE eXCHANGE helpdesk for assistance (EERE-eXCHANGESupport@hq.doe.gov).

B. Application Forms

The application forms and instructions are available at EERE Funding Application and Management Forms and on EERE eXCHANGE. To access these materials on EERE eXCHANGE, 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 50MB. Files larger than 50MB cannot be uploaded and hence cannot be submitted for review. If a file is larger than 50MB 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 50MB.

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 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 Description	3 pages maximum	Applicants are required to succinctly describe: • The proposed technology, including its basic operating principles and how it is unique and innovative; • The proposed technology's target level of performance (applicants should provide technical data or other support to show how the proposed target could be met);

		• The current state of the art in the relevant field and application, including key shortcomings, limitations, and challenges; • How the proposed technology 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 proposed location of the proposed project will support technology development and long-term success; • The key technical risks/issues associated with the proposed technology development plan; and • The impact that EERE funding would have on the proposed project.
RDD&D Community Benefits Plan (Topics 1-4)	1 page maximum	Applicants are required to succinctly describe their approach to the Community Benefits Plan, addressing the three core elements: • Advance diversity, equity, inclusion, and accessibility (DEIA); • Contribute to energy equity; and • Invest in America's workforce.
Addendum	1 page 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 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 Description.

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

D. Content and Form of the Full Application

Applicants must complete the following application forms found at EERE Funding Application and Management Forms and 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.

Component	File Format	Page Limit	File Name
SF-424: Application for Federal Assistance	PDF	n/a	ControlNumber_LeadOrganization_App424
Technical Volume: **Topics 1, 4, and 5**	PDF	15 pages	ControlNumber_LeadOrganization_TechnicalVolume
Technical Volume: **Topics 2 and 3**	PDF	25 pages	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	3 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment and/or Cost Share Commitment letters	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives	MS Word	10 pages	ControlNumber_LeadOrganization_SOPO
RDD&D Community Benefits Plan: **Topics 1 and 4**	PDF	5 pages	ControlNumber_LeadOrganization_CBP
RDD&D Community Benefits Plan: **Topics 2 and 3**	PDF	10 pages	ControlNumber_LeadOrganization_CBP
Budget Justification Workbook	MS Excel	n/a	ControlNumber_LeadOrganization_Budget_Justification
Summary/Abstract for Public Release	PDF	1	ControlNumber_LeadOrganization_Summary

Summary Slide	MS PowerPoint	1	ControlNumber_LeadOrganization_ Slide
Subrecipient Budget Justification	MS Excel	n/a	ControlNumber_LeadOrganization_ Subrecipient_Budget_Justification
DOE Work Proposal for FFRDC, (see DOE O 412.1A, Attachment 2)	PDF	n/a	ControlNumber_LeadOrganization_ WP
Authorization from cognizant Contracting Officer for FFRDC	PDF	n/a	ControlNumber_LeadOrganization_ FFRDCAuth
SF-LLL Disclosure of Lobbying Activities (prime and subrecipients)	PDF	n/a	ControlNumber_LeadOrganization_ SF-LLL
Waiver Requests	PDF	n/a	ControlNumber_LeadOrganization_ Waiver
Current and Pending Support	PDF	n/a	ControlNumber_LeadOrganization_ CPS
Location(s) of Work	Excel	n/a	ControlNumber_LeadOrganization_ LOW
Transparency of Foreign Connections	PDF	n/a	ControlNumber_LeadOrganization_ TFC
Potentially Duplicative Funding Notice	PDF	n/a	ControlNumber_LeadOrganization_ PDFN

Note: The maximum file size that can be uploaded to the EERE eXCHANGE website is 50MB. See Section IV.B. Application Forms.

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

ii. SF-424: Application for Federal Assistance

Applicants must complete the SF-424 Application for Federal Assistance, which is available on EERE Funding Application and Management Forms.

Effective January 1, 2020, the System for Award Management (SAM) is the central repository for common government-wide certifications and representations required of Federal grants recipients. As registration in SAM is required for eligibility for a federal award and registration must be updated annually, Federal agencies use SAM information to comply with award requirements and avoid increased burden and costs of separate requests for such information, unless the recipient fails to meet a federal award requirement, or there is a need to make updates to their SAM registration for other purposes.

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".

iii. Technical Volume

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. Application Review Information 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, EERE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 15 pages for Topics 1, 4, and 5, and 25 pages for Topics 2 and 3, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all information in the table below. The applicant should consider the weighting of each of the technical review criteria (see Section V.A.ii. Full Applications 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 the PI, Senior/Key Personnel and their organizations, the project location(s), and any statements regarding confidentiality.

Project Overview: Topics 1-4 (Approximately 10% of the Technical Volume)	The Project Overview should contain the following information: • Background: The applicant should discuss the background of its 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 the targeted improvements to the baseline technology 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.
Project Overview: Topic 5 (Approximately 10% of the Technical Volume)	The Project Overview should contain the following information: • Background: The applicant should discuss the background of its organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify the project objectives, target specifications, metrics, 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.
Technical Description, Innovation, and Impact (Approximately 30% of the Technical Volume)	The Technical Description should contain the following information: • Relevance and Outcomes: The applicant should provide a detailed description of the technology, 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: The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The applicant should describe the current state-of-the-art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology

	over current and emerging technologies, and the overall impact on advancing the state-of-the-art/technical baseline if the project is successful.
Workplan and Market Transformation Plan -- Market Transformation Plan not required for Topics 4 and 5 (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. • 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 Specific, Measurable, Attainable, Realistic, and Timely (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.xv. Go/No-Go Review for more information on the Go/No-Go Review): The applicant should 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 18-month period) of the project. The applicant should also provide the specific technical 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 two 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 D 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: o The overall approach to and organization for managing the work; o The roles of each project team member; o Any critical handoffs/interdependencies among project team members; o The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices; o The approach to project risk management; o A description of how project changes will be handled; o If applicable, the approach to Quality Assurance/Control; o How communications will be maintained among project team members.

	• Market Transformation Plan: The applicant for Topics 1, 2, and 3 (not required for Topics 4 and 5) should provide a market transformation plan, including the following:
	  ○ Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan;
	  ○ 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.

Technical Qualifications and Resources (Approximately 20% of the Technical Volume)	The Technical Qualifications and Resources should contain the following information:
	• A description of the project team's unique qualifications and expertise, including those of key subrecipients;
	• A description of 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;
	• Relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives;
	• The time commitment of the key team members to support the project;
	• A description of the technical services to be provided by DOE/NNSA FFRDCs, if applicable;
	• 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 PI 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

iv. Resumes

A resume provides information reviewers can use to evaluate an individual's skills, experience, and potential for leadership within the scientific community. Applicants must submit a resume (limited to three pages) for each Principal Investigator and Senior/Key Personnel that includes the following:

1. Contact information;
2. Education and training: Provide name of 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 10 years or since age 18, whichever 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/, also available at https://www.nsf.gov/bfa/dias/policy/researchprotection/commonform_biographicalsketch.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".

v. Letters of Commitment

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 one 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 will not be accepted.

vi. Statement of Project Objectives (SOPO)

Applicants must complete a SOPO. A SOPO template is available on EERE Funding Application and Management Forms and 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".

vii. RDD&D Community Benefits Plan

The RDD&D Community Benefits Plan is required for Topics 1-4 and is not required for Topic 5. The RDD&D Community Benefits Plan must set forth the applicant's approach to ensuring the federal investments advance the following three objectives: (1) DEIA; (2) energy equity; and (3) investing in America's workforce. The below sections describe the content requirements for the RDD&D Community Benefits Plan, which addresses each of these objectives. Applicants must address all three sections. Applicants submitting proposals for Topics 2 and 3 will also need to address the specific CBP requirements for those Topics as laid out in the topic descriptions in Section I.B. Topic Areas of the FOA.

The applicant's RDD&D Community Benefits Plan must include at least one Specific, Measurable, Attainable, Realistic, and Timely (SMART) milestone per budget period to measure progress on the proposed actions. These milestones should also be included in the Work Plan and in the SOPO and be accounted for

in the project budget. The RDD&D Community Benefits Plan will be evaluated as part of the technical review process. If a project is selected, EERE will incorporate the RDD&D Community Benefits Plan into the award and the recipient must implement its RDD&D Community Benefits Plan when carrying out its project. EERE will evaluate the recipient's progress throughout the life of the award, 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 organization's policies. Applicants should describe 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 G, applicants are encouraged to leverage promising practices and develop a plan tailored to their project.

The RDD&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: "ControlNumber_LeadOrganization_CBP." This Plan must address the technical review criterion titled "RDD&D Community Benefits Plan." See Section V. Application Review Information of the FOA.

The RDD&D Community Benefits Plan must address the following three sections:

i. **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 take that integrates into the research goals and project teams. Submitting an institutional DEIA plan without specific integration into the project will be deemed insufficient.

ii. **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 if the innovation is successful. Like cost reductions and commercialization plans, the RDD&D Community Benefits Plan requires

description of the equity implications of the innovation.

iii. **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 if the innovation is successful.

See Appendix H. RDD&D Community Benefits Plan Guidance for more guidance.

viii. Budget Justification Workbook

Applicants must complete the Budget Justification Workbook, which is available on EERE Funding Application and Management Forms and on EERE eXCHANGE at https://eere-eXCHANGE.energy.gov/. Applicants must complete each tab of the Budget Justification Workbook for the project, including all work to be performed by the prime recipient and its subrecipients and contractors. Applicants should include costs associated with required annual audits and incurred cost proposals in their proposed budget documents. 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".

ix. Summary for Public Release

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), and major participants (for collaborative projects). This document must not include any proprietary or business-sensitive information as DOE may make it available to the public after selections are made. The summary must not exceed one 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 convention for the title "ControlNumber_LeadOrganization_Summary".

x. Summary Slide

Applicants must provide a single slide summarizing the proposed project. The Summary Slide template is available on EERE eXCHANGE at https://eere-eXCHANGE.energy.gov/ and must include the following information:

- A technology summary;
- A description of the technology's impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project's key idea/takeaway;
- Project title, prime recipient, PI, and Senior/Key Personnel information; and
- Requested EERE 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".

xi. 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% 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".

xii. 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 work proposal (WP) in accordance with the requirements in DOE Order 412.1A, Work Authorization System, Attachment 2, 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".

xiii. 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".

xiv. SF-LLL: Disclosure of Lobbying Activities

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.

Prime 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".

xv. Waiver Requests (if applicable)

Foreign Entity Participation

For projects selected under this FOA, all recipients and subrecipients must qualify as domestic entities. See Section III.A. Eligible Applicants To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix C. Waiver Requests For: 1. Foreign Entity Participation; and 2. Foreign Work lists the information that must be included in a waiver request.

Performance of Work in the United States (Foreign Work Waiver Request)

As set forth in Section IV.J.iii., Performance of Work in the United States (Foreign Work Waiver) 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 C. Waiver

Requests For: 1. Foreign Entity Participation; and 2. Foreign Work 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".

xvi. Open-Source Software Distribution Plan (if applicable)

For Topic 4, if software will be produced as part of the proposed project, applicants are required to 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 E. Open-Source Software 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".

xvii. Current and Pending Support

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 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 through end date); and

- The person-months of effort per year 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 approved common disclosure format available at Common Form for Current and Pending (Other) Support (nsf.gov).

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 RDD&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 RDD&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 RDD&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 physically relocate 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 (RDD&D) project proposed to be carried out with a DOE award.[38]

[38] 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.

xviii. Locations of Work

The applicant must provide a list of locations where project work will be performed by the prime recipient or subrecipient(s) including the following information for each location:

- Location Type
- Location Type Category
- Is this a Principal Place of Performance?
- Prime or Subrecipient Location?
- If Subrecipient, Subrecipient/Community Name
- Facility Name (if applicable)
- Is location in a foreign country?
- Street Address, City, State, 5-Digit Zip Code - +4
- Briefly describe the primary activity at this location or with this population. For example, management headquarters; construction, operations, production; raw materials extraction, etc.
- Latitude/Longitude
- Does the location or community qualify as a disadvantaged community (DAC) according to the Climate and Economic Justice Screening Tool (CEJST)?
- If DAC, add the census tract number or describe the distributed disadvantaged community served (e.g., migrant workers)
- % of work performed at this location

For your convenience, a Locations of Work template is available on EERE eXCHANGE at https://eere-eXCHANGE.energy.gov/. Applicants are strongly encouraged to use the template. If the template is not used, the submission must include all of the elements described above, and as outlined in the template.

Applicants must provide the Locations of Work Documentation as a Microsoft Excel file using the following convention for the title: "Control Number_LeadOrganization_LOW."

xix. Transparency of Foreign Connections

Applicants must provide the following as it relates to the proposed recipient and subrecipients. Include a separate disclosure for the applicant and each proposed subrecipient. U.S. National Laboratories, domestic government entities, and institutions of higher education are only required to respond to items 1, 2 and 9, and if applying as to serve as the prime recipient, must provide complete responses for project team members that are not U.S. National Laboratories, domestic government entities, or institutions of higher education.

1. Entity name, website address, and mailing address;
2. The identity of all owners, principal investigators, project managers, and Senior/Key Personnel who are a party to any *Foreign Government-Sponsored Talent Recruitment Program* of a foreign country of risk (i.e., China, Iran, North Korea, and Russia);
3. The existence of any joint venture or subsidiary that is based in, funded by, or has a foreign affiliation with any foreign country of risk;
4. Any current or pending contractual or financial obligation or other agreement specific to a business arrangement, or joint venture-like arrangement with an enterprise owned by a foreign state or any foreign entity;
5. Percentage, if any, that the proposed recipient or subrecipient has foreign ownership or control;
6. Percentage, if any, that the proposed recipient or subrecipient is wholly or partially owned by an entity in a foreign country of risk;
7. Percentage, if any, of venture capital or institutional investment by an entity that has a general partner or individual holding a leadership role in such entity who has a foreign affiliation with any foreign country of risk;
8. Any technology licensing or intellectual property sales to a foreign country of risk, during the 5-year period preceding submission of the proposal;
9. Any foreign business entity, offshore entity, or entity outside the United States related to the proposed recipient or subrecipient;
10. Complete list of all directors (and board observers), including their full name, citizenship and shareholder affiliation, date of appointment, duration of term, as well as a description of observer rights as applicable;
11. Complete capitalization table for your entity, including all equity interests (including LLC and partnership interests, as well as derivative securities). Include both the number of shares issued to each equity holder, as well as the percentage of that series and all equity on a fully diluted basis. Identify the principal place of incorporation (or organization) for each equity holder. If the equity holder is a natural person, identify the citizenship(s). If the recipient or subrecipient is a publicly traded company, provide the above information for shareholders with an interest greater than 5%;
12. A summary table identifying all rounds of financing, the purchase dates, the investors for each round, and all the associated governance and information rights obtained by investors during each round of financing; and
13. An organization chart to illustrate the relationship between your entity and the immediate parent, ultimate parent, and any intermediate parent, as well as any subsidiary or affiliates. Identify where each entity is incorporated.

DOE reserves the right to request additional or clarifying information based on the information submitted.

Save the Transparency of Foreign Connections information in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_TFC."

xx. Potentially Duplicative Funding Notice

If the applicant or project team member has other active awards of federal funds, the applicant must determine whether the activities of those awards potentially overlap with the activities set forth in its application to this FOA. If there is a potential overlap, the applicant must notify DOE in writing of the potential overlap and state how it will ensure any project funds (i.e., recipient cost share and federal funds) will not be used for identical cost items under multiple awards. Likewise, for projects that receive funding under this FOA, if a recipient or project team member receives any other award of federal funds for activities that potentially overlap with the activities funded under the DOE award, the recipient must promptly notify DOE in writing of the potential overlap and state whether project funds from any of those other federal awards have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items under the DOE award. If there are identical cost items, the recipient must promptly notify the Contracting Officer in writing of the potential duplication and eliminate any inappropriate duplication of funding.

Save the Potentially Duplicative Funding Notice in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_PDFN."

E. Content and Form of Replies to Reviewer Comments (Optional)

EERE will provide applicants with reviewer comments following the evaluation of all eligible Full Applications. Applicants will have a brief opportunity to prepare a short Reply to Reviewer Comments (Reply). The Reply must not exceed three pages. If a Reply is more than three pages in length, EERE will review only the first three pages and disregard additional pages. Applicants may use the Reply to respond to one or more comments or to supplement their Full Application. The Reply may include text, graphs, charts, or data.

EERE will post the reviewer comments in EERE eXCHANGE. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor EERE eXCHANGE if the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their Reply due to failure to

check EERE eXCHANGE or relying on the expected date alone. Applicants should anticipate having approximately three (3) business days to submit a Reply.

Applicants are not required to submit a Reply to Reviewer Comments. EERE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

F. Post Selection Information Requests

If selected for award negotiations, EERE 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 list of examples of information that may be required:

- Personnel proposed to work on the project and collaborating organizations (See Section VI.B.xx. Participants and Collaborating Organizations);
- Current and Pending Support (See Sections IV.D.xvii. Current and Pending Support and VI.B.xxi. Current and Pending Support);
- An Intellectual Property Management Plan (if applicable) 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.xi. Intellectual Property Management Plan (if applicable);
- A Data Management Plan (if applicable) 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.xxiv. Data Management Plan (if applicable);
- 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;
- Information related to any proposed Workforce and Community Agreement, as defined above in "RDD&D Community Benefits Plan" that applicants may have made with the relevant community; and
- Representation of Limited Rights Data and Restricted Software, if applicable; and
- Environmental Questionnaire.

G. 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) register in the SAM at https://www.sam.gov before submitting an application; (2) provide a valid UEI in the application; and (3) 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. If an applicant has not fully complied with the requirements by the time DOE is ready to make a federal award, 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 use 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.

H. 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.

I. Intergovernmental Review

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

J. 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 (selectees) 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 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.

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

   EERE'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 EERE completing the NEPA review process.

   EERE 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 overrides 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 EERE 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 EERE awards 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, EERE 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 EERE. Appendix C. Waiver Requests For: 1. Foreign Entity Participation; and 2. Foreign Work 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 EERE'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

Foreign travel costs are only allowed for Topics 1-3 and require written prior approval by the Contracting Officer assigned to the award. 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 USC 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 not allowable for Topics 4 and 5 under this FOA.

vi. Equipment and Supplies

To the greatest extent practicable, all equipment and products purchased with funds made available under this FOA should be American-made. This requirement does not apply to used or leased equipment.

vii. Build America 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 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 D 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 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 to: (1) fulfill the commitments made in its application regarding the procurement of U.S.-produced products and (2) fulfill the commitments made in its application regarding the procurement of other key component metals and domestically manufactured products 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 D and the terms and conditions of an award.

Applicants are strongly encouraged to consult Appendix D for more information.

viii. 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.

ix. 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 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 invests in critical infrastructure and funds critical and emerging technology areas, DOE also considers possible threats to United States research, technology, and economic security from undue foreign government influence when evaluating risk. If high risks are identified and cannot be sufficiently mitigated, DOE may elect to not fund the applicant. As part of the research, technology, and economic security risk review, DOE may contact the applicant and/or proposed project team members for additional information to inform the review.

x. 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;

- 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.

xi. 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.

xii. Affirmative Action and Pay Transparency Requirements

All applicants must comply with all applicable federal labor and employment laws, including but not limited to Title VII of the Civil Rights Act of 1964, the Fair Labor Standards Act, the Occupational Safety and Health Act, and the National Labor Relations Act, which protects employees' right to bargain collectively and engage in concerted activities for the purpose of workers' mutual aid or protection.

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

(1) Recipients, subrecipients, contractors, and subcontractors 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.

DOL's Office of Federal Contractor Compliance Programs (OFCCP) uses a neutral process to schedule compliance evaluations. Consult OFCCP's Technical Assistance Guide[39] to gain an understanding of the requirements and possible

[39] 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

actions the recipients, subrecipients, contractors, and subcontractors must take. Additional guidance may also be found in the National Policy Assurances, produced by DOE.

xiii. Foreign Collaboration Considerations

a. Consideration of new collaborations with foreign entities, organizations, and governments. The recipient will be required to provide DOE with advanced written notification of any potential collaboration with foreign entities, organizations, 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, organization, or government regarding the potential collaboration or negotiating the terms of any potential agreement.

b. Existing collaborations with foreign entities, organizations, 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.

c. 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 of the following factors. All sub-criteria are of equal weight.

Concept Paper Criterion for Topics 1, 2, and 3: 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, how the technology is unique and innovative, and how the technology will advance the current state of the art;
- The applicant has identified risks and challenges of the technology, 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.

Concept Paper Criterion for Topics 4 and 5: Overall FOA Responsiveness and Viability of the Project (Weight: 100%)
This criterion involves consideration of the following factors:

- The applicant clearly describes the proposed work plan, how the work plan is unique and innovative, and how the work plan supports the topic area objectives, target specifications, and metrics; and
- 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 the technical review criteria shown below. All sub-criteria are of equal weight.

Criteria factors vary depending on the topic area to which you have submitted and should be considered when completing the full application.

Topics 1, 2, and 3

Criterion 1: Technical Merit, Innovation, and Impact (45%)
This criterion involves consideration of the following factors:

<u>Technical Merit and Innovation</u>

- Extent to which the proposed technology, process, or project is innovative or replicable;

- Degree to which the current state of the technology and the proposed advancement to demonstration and commercialization 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 to demonstration and commercialization;
- 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 of the project;
- Degree to which key manufacturing and supply chain challenges are considered, as applicable, for viable scale-up in this and future demonstrations;
- Degree to which siting and environmental constraints are considered for deployment;
- Extent to which project has the potential to reduce emissions and provide clean energy acceleration benefits for a community or region; and
- Sufficiency of existing infrastructure to support addition of proposed demonstration.

Impact of Technology Advancement

- Ability of the project to advance industry adoption;
- Extent to which the project supports the topic area objectives and target specifications and metrics;
- Potential impact of the project on advancing the state of the art;
- Extent to which demonstration/deployment is replicable and may lead to future demonstrations; and
- Extent to which the project facilitates stakeholder relationships across new or existing stakeholders to gain technical buy-in and increase potential for future deployments.

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 of contingency funding based on quality of cost estimate and identified risks;
- 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, including labor and community opposition or disputes, and "timely" and appropriate strategies for mitigation and resolution; and
- Soundness of a plan to expeditiously address environmental, siting, and other regulatory requirements for the project, including evaluation of resilience to climate change.

Criterion 2: Project Research and Market Transformation Plan (25%)
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; 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.

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

- 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 mid-point deliverables defined in the application, such that meaningful interim progress will be made.

Market Transformation Plan

- Identification of target market, competitors, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including mitigation plan; and
- Comprehensiveness of market transformation plan including but not limited to product development and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, infrastructure requirements, and product distribution.

Industry Adoption Plan

- Identification of the interest and extent of industry adoption of the technology/process.

Criterion 3: Team and Resources (15%)
This criterion involves consideration of the following factors:

- 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;
- Diversity of expertise and perspectives of the team and the inclusion of industry partners that will amplify impact;
- Sufficiency of the facilities to support the work;
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further demonstration, development, and commercial deployment of the proposed technologies;
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- Reasonableness of the budget and spend plan for the proposed project and objectives.

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

Diversity, Equity, Inclusion, and Accessibility

- 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 commitment and ability to track progress toward meeting each of the DEIA goals; and
- Extent of engagement of organizations that represent DACs as a core element of their mission, including Minority Serving Institutions (MSIs), Minority Business Entities, and nonprofit 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 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 4

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

Merit and Innovation
- Extent to which the proposed activity is innovative;
- Degree to which the current state of challenges and the proposed solutions are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the applicant will substantially address challenges to infrastructure, siting, and permitting; and
- Sufficiency of detail in the application to assess whether the proposed work is novel, meritorious, and revolutionary, including relevant data, calculations, and discussion of prior work in the literature with analyses that support the viability of the proposed work.

Impact of Advancement
- How the project supports the topic area objectives and target specifications and metrics; and
- The potential impact of the project on advancing the state-of-the-art.

Criterion 2: Project Research Plan (25%)
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; 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.

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 experimental baseline, the strength of the quantifiable 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 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 sufficiency of the facilities to support the work;
- The degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further improvements to the permitting process;
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
  The reasonableness of the budget and spend plan for the proposed project and objectives.

Criterion 4: Community Benefits Plan (10%)
This criterion involves consideration of the following factors:

- The quality and way the measures incorporate diversity, equity, and inclusion goals in the project; and
- Extent to which the project benefits underserved communities.

Topic 5

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 work plan is innovative;
- Degree to which the proposed work plan is clearly described;
- Extent to which the application specifically and convincingly demonstrates how the applicant will address the topic area requirements; and
- Extent to which the proposed work plan supports the topic area objectives and target specifications and metrics.

Criterion 2: Project Research Plan (30%)
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; 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.

Identification of 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 metrics and milestones; and
- The strength of the metrics, milestones, and mid-point deliverable(s) defined in the application, such that meaningful interim progress will be made.

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 sufficiency of the facilities 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; and
- The reasonableness of the budget and spend plan for the proposed project and objectives.

iii. Criteria for Replies to Reviewer Comments

EERE has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are attached to the original applications and evaluated as an extension of the Full Application.

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 EERE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to accelerate commercialization and overcome key market barriers;
- 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, or group of projects, represent a desired geographic distribution (considering past awards and current applications);
- The degree to which the proposed project incorporates applicant or team members from Minority Serving Institutions (e.g., Historically Black Colleges

and Universities (HBCUs)/Other Minority Institutions (OMIs)); and partnerships with Minority Business Enterprises, minority-owned businesses, woman-owned businesses, veteran-owned businesses, or Indian Tribes; and

- The degree to which the proposed project will employ procurement of U.S. iron, steel, manufactured products, and construction materials.
- The degree to which the proposed project contributes to the diversity of organizations and organization types and sizes selected from the subject FOA when compared to the existing DOE project portfolio.
- The degree to which the proposed project has broad public support from the communities most directly impacted by the project.
- The degree to which the proposed project avoids duplication/overlap with other publicly or privately funded work.
- The degree to which the proposed project supports complementary efforts or projects, which, when taken together, will best achieve the research goals and objectives.
- The degree to which the proposed project enables new and expanding market segments.
- The degree to which the project's solution or strategy will maximize deployment or replication.
- The degree to which the project promotes increased coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer.

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 and risk reviews, in determining which applications to select.

ii. Pre-Selection Interviews

As part of the evaluation and selection process, EERE 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. Pre-Selection Clarification of the FOA). The invited applicant(s) will meet with EERE representatives to provide clarification on the contents of the Full Applications and to provide EERE an opportunity to ask questions regarding the

proposed project. The information provided by applicants to EERE through pre-selection interviews contributes to EERE's selection decisions.

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

EERE 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.

EERE may obtain additional information through pre-selection interviews that will be used to make a final selection determination. EERE may select applications for funding and make awards without pre-selection interviews.

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

iii. Pre-Selection Clarification

EERE 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 EERE's written clarification questions or video or conference calls with EERE representatives.

The information provided by applicants to EERE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and EERE's selection decisions. If EERE 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.

EERE 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 Responsibility and Qualifications

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 responsibility and qualification information about the applicant that is in the entity information domain in SAM.gov (see 41 U.S.C. 2313).

The applicant, at its option, may review information in the entity information domain in SAM.gov and comment on any information about itself that a federal awarding agency previously entered and is currently in the entity information domain in SAM.gov.

DOE will consider any written comments by the applicant, in addition to the other information in the entity information domain in SAM.gov, 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, risk reviews, 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

EERE will notify applicants of its determination to encourage or discourage the submission of a Full Application. EERE will post these notifications to EERE

eXCHANGE. EERE 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, EERE 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.

A notification encouraging the submission of a Full Application does not authorize the applicant to commence performance of the project.

iii. Full Application Notifications

EERE 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, EERE 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. Applicants Selected for Award Negotiations

Successful applicants will receive written notification that they have been selected for award negotiations. 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 EERE to issue an award nor is it a guarantee of federal government funding. Applicants do not receive an award unless and 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 EERE 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, EERE will cancel the award negotiations and rescind the Selection. EERE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.J.ii. Pre-Award Costs 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 EERE designated the application to be an alternate. As an alternate, EERE 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. EERE may ultimately determine to select or not select the Full Application for award negotiations.

vi. Unsuccessful Applicants

EERE 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 applicants must take before applying to this FOA. Some of these may take several weeks, so it is vital applicants build in enough time to complete them. Failure to complete these actions could interfere with application or negotiation deadlines or the ability to receive an award if selected. These requirements are as follows:

1. **EERE Funding Opportunity Exchange (eXCHANGE)**
   Register and create an account on EERE eXCHANGE at https://eere-eXCHANGE.energy.gov. This account will allow the user to apply to any open EERE FOAs that are currently in EERE eXCHANGE.

   To access EERE eXCHANGE, potential applicants must have a Login.gov account. As part of the eXCHANGE registration process, new users will be directed to create an account in Login.gov. Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the eXCHANGE Multi-Factor Authentication (MFA) Quick Guide in the Manuals section of eXCHANGE.

   Each organization or business unit, whether acting as a team or a single entity, should use only one account as the contact point for each submission. Applicants should also designate backup points of contact. **This step is**

required to apply to this FOA. The 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. Please note that Letters of Intent, Concept Papers, and Full Applications will not be accepted through Grants.gov.

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 a foreign national's participation in the award. Likewise, DOE may elect to deny a foreign national's access to a DOE site, 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)

EERE'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.

National Historic Preservation Act (NHPA)

All recipients selected for an award must comply with the requirements of Section 106 of the National Historic Preservation Act (NHPA) prior to using Federal funds. Section 106 applies to historic properties that are listed in or

eligible for listing in the National Register of Historic Places. DOE and recipients selected for an award must consider the effects of project activities on historic properties, pursuant to Section 106 of the NHPA. DOE will perform a NHPA review under the umbrella of its NEPA review.

vii. Flood Resilience

Applications should indicate whether the proposed project location(s) is within a floodplain, how the floodplain was defined, and how flooding will factor into the project's design. The base floodplain long used for planning has been the 100-year floodplain, which has a 1% chance of flooding in any given year. As directed by Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input (2015), federal agencies, including DOE, must continue to avoid development in a floodplain to the extent possible. When doing so is not possible, federal agencies are directed to "expand management from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk and ensure that projects funded with taxpayer dollars last as long as intended." The higher flood elevation is based on one of three approaches: climate-informed science (preferred), freeboard value, or 0.2% annual flood change (500-year floodplain). EO 13690 and related information is available at: https://www.energy.gov/nepa/articles/eo-13690-establishing-federal-flood-risk-management-standard-and-process-further.

viii. 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 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, a corporation is any for-profit or nonprofit 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].

3. Nondisclosure and Confidentiality Agreements Representations
In submitting an application 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.

ix. Statement of Federal Stewardship

EERE will exercise normal federal stewardship in overseeing the project activities performed under EERE 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.

x. Statement of Substantial Involvement

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

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

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

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

xi. Intellectual Property Management Plan (if applicable)

As a quarter 1 milestone if selected for award, applicants must submit an executed Intellectual Property Management Plan (IPMP) between the members of the consortium or team (if applicable).

The award will set forth the treatment of and obligations related to intellectual property rights between EERE 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 EERE upon request.

The following is a list of examples of items 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 consortium or team; and
- The handling of disputes related to intellectual property between the members.

xii. Subject Invention Utilization Reporting

To ensure that prime recipients, subrecipients, and contractors holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE 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 EERE 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 EERE may specify.

xiii. 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.

xiv. Reporting

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

- Quarterly Financial and Technical Reports;
- Final Technical Report;
- Yearly participation at the DOE Hydrogen Program Merit Review and Peer Evaluation (AMR) meeting, typically held in Washington, D.C.
- DOE may request that material samples, components, and/or prototype systems resulting from the R&D effort be sent for independent, standardized testing at a facility specified by DOE, as appropriate;
- Work with independent system and/or cost analysis projects within DOE portfolio for independent performance and model validation as appropriate; and
- **Project Safety Plan**: Safe practices in the production, storage, distribution, and use of hydrogen are essential for the widespread acceptance of hydrogen and fuel cell technologies. The recipient must comply with the following requirements:
    - The recipient is required to coordinate with the Hydrogen Safety Panel (HSP), a resource of the DOE Hydrogen and Fuel Cells Program, throughout the project life cycle. Examples of opportunities for HSP involvement include participation in post-award project kickoff meetings, project design and document reviews, risk assessments, and pre-startup reviews prior to beginning field demonstrations. To minimize project impacts, these engagements should be coordinated with regularly scheduled project activities rather than be unique efforts and should be based on discussions with HSP.
    - Guidance for the creation of the Safety Plan can be found at https://h2tools.org/sites/default/files/Safety_Planning_for_Hydrogen_and_Fuel_Cell_Projects.pdf. The Safety Plan should cover the full scope of the project, including work by the prime as well as any subrecipients, and should be complete before the work is started. The Safety Plan is due to DOE within 90 days after the award is signed unless alternative timing is approved due to project constraints. The HSP will review the Safety Plan and provide feedback to the Recipient (through DOE) within approximately 30 days of receipt. The Recipient will then have 30 days to respond to the HSP's feedback (e.g., either

by incorporating comments into the Plan or by providing rationale for not incorporating comments) and resubmit a revised Safety Plan to DOE.

- DOE may request HSP involvement in site visits or via teleconferences. If a safety-focused site visit/teleconference is requested, the HSP will provide a written site visit report to the recipient for review and comment and may conduct a follow-up interview with the recipient and their project team. All such HSP reports are also provided to DOE.

For all of the items noted above in this section, please ensure that estimated costs associated with the requirements are included within the proposed budget.

xv. 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 beginning the execution of future phases. At the Go/No-Go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, 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) EERE's Go/No-Go decision; (7) the recipient's submission of a continuation application;[40] and (8) written approval of the continuation application by the Contracting Officer.

[40] 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, EERE may take appropriate action, including but not limited to, redirecting, suspending, or terminating the award.

xvi. 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 U.S. 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.

xvii. 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 million 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 is required to provide

an amendment to the UCC financing statement(s) when pieces of purchased equipment are used to build larger, final equipment under the Statement of Project Objectives (SOPO). 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.

xviii. Real Property and Equipment

Real property and equipment purchased with project funds (federal share and recipient cost share) are subject to the requirements at 2 CFR 200.310, 200.311, 200.313, and 200.316 (non-federal entities, except for-profit entities) and 2 CFR 910.360 (for-profit entities).

For projects selected for awards under this FOA, the recipients may (1) take disposition action on the real property and equipment; or (2) continue to use the real property and equipment after the conclusion of the award period of performance with Contracting Officer approval. The recipient's written request for Continued Use must identify the property and include: a summary of how the property will be used (must align with the authorized project purposes); a proposed use period, (e.g., perpetuity, until fully depreciated, or a calendar date when the recipient expects to submit disposition instructions); acknowledgement that the recipient shall not sell or encumber the property or permit any encumbrance without prior written DOE approval; current fair market value of the property; and an estimated useful life or depreciation schedule for equipment.

When the property is no longer needed for authorized project purposes, the recipient must request disposition instructions from DOE. For-profit entity disposition requirements are set forth in 2 CFR 910.360. Property disposition requirements for other non-federal entities are set forth in 2 CFR 200.310 – 200.316.

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

States, local governments, and other public entities may not condition subawards in a manner that would discriminate against or otherwise disadvantage subrecipients based on their religious character.

xx. 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 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.

xxi. 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. Current and Pending Support.

xxii. 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 and any subrecipient and contractor 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 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.

xxiii. Interim Conflict of Interest Policy for Financial Assistance

The DOE interim Conflict of Interest Policy for Financial Assistance (COI Policy)[41] 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 its 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

[41] 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.

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.

xxiv. Data Management Plan (if applicable)

Each applicant whose Full Application is selected for award negotiations may be required to submit a Data Management Plan (DMP) during the award negotiations phase. A DMP explains how, when appropriate, data generated in the course of the work performed under an EERE award will be shared and preserved 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.

xxv. 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.gov. 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.

xxvi. 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).

VII. Questions/Agency Contacts

Upon the issuance of a FOA, EERE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the FOA except through the established question and answer process described below. Questions regarding this FOA must be submitted to H2FCFOA@ee.doe.gov no later than three (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 the FOA Number to view the questions and answers specific to this FOA**. EERE will attempt to respond to a question within three (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 EERE eXCHANGE and the Grants.gov system. However, you will only receive an email when an 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

EERE 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 trade secrets or business-sensitive, 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 trade secrets or business-sensitive, proprietary, or otherwise confidential information, it is furnished to the federal 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, EERE 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 federal government's right to use the information if it is obtained from another source.

If an applicant chooses to submit trade secrets or business-sensitive, 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 trade secrets or business-sensitive, 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 federal 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 containing trade secrets or business-sensitive, proprietary, or otherwise confidential information:

> **Notice of Restriction on Disclosure and Use of Data:**
> Pages [list applicable pages] of this document may contain trade secrets or business-sensitive, 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 agreement between the submitter and the government. The government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

In addition, (1) the header and footer of every page that contains trade secrets or business-sensitive, proprietary, or otherwise confidential information must be marked as follows: "Contains Trade Secrets or Business-Sensitive, 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 EERE 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

EERE 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

EERE expects to retain copies of all Full Applications and other submissions. No submissions will be returned. By applying to EERE for funding, applicants consent to EERE'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. 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: Applicants not covered by a Class Patent Waiver or the Bayh-Dole Act 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 EERE within the timeframes set forth in the award's intellectual property 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.xxii. 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 further DECs on the website above 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, subrecipients, and contractors retain title to subject inventions, the U.S. government retains certain rights.

i. Government Use License

The U.S. 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 government contractors.

ii. March-In Rights

The U.S. 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 U.S. 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.

Government Rights in Technical Data Produced Under Awards: The U.S. 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 EERE awards under this FOA may be protected from public disclosure for up to five years after the data is generated ("Protected Data"). For awards permitting Protected Data, the protected data must be marked as set forth in the award's 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.

M. Copyright

The prime recipient and subrecipients may assert copyright in copyrightable works, such as software, first produced under the award without EERE 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.

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 use *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-17-12 dated January 3, 2017)

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, 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. EERE 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 terms in the titles specific to regulations applicable to cost sharing. EERE almost always uses "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 two 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 an EERE grant or cooperative agreement, it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, 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 above regulations, other factors may also come into play such as timing of donations and length of the project period. For example, the value of 10 years of donated maintenance on a project that has a project period of five years would not be fully allowable 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, EERE 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, EERE generally does not allow pre-award costs prior to the signing of the Selection Statement by the EERE 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 cost of the item or service is reimbursed, 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, and 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. Consult your DOE contact if you have questions 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 – SAMPLE COST SHARE CALCULATION FOR BLENDED COST SHARE PERCENTAGE

The following example shows the math for calculating required cost share for a project with $2 million in federal funds with four tasks requiring different non-federal cost share percentages:

Task	Proposed Federal Share	Federal Share %	Recipient Share %
Task 1 (R&D)	$1,000,000	80%	20%
Task 2 (R&D)	$500,000	80%	20%
Task 3 (Demonstration)	$400,000	50%	50%
Task 4 (Outreach)	$100,000	100%	0%

Federal share ($) divided by federal share (%) = Task Cost

Each task must be calculated individually as follows:

Task 1
$1,000,000 divided by 80% = $1,250,000 (Task 1 Cost)
Task 1 Cost minus federal share = non-federal share
$1,250,000 - $1,000,000 = $250,000 (non-federal share)

Task 2
$500,000 divided 80% = $625,000 (Task 2 Cost)
Task 2 Cost minus federal share = non-federal share
$625,000 - $500,000 = $125,000 (non-federal share)

Task 3
$400,000 / 50% = $800,000 (Task 3 Cost)
Task 3 Cost minus federal share = non-federal share
$800,000 - $400,000 = $400,000 (non-federal share)

Task 4
Federal share = $100,000
Non-federal cost share is not mandated for outreach = $0 (non-federal share)

The calculation may then be completed as follows:

Tasks	$ Federal Share	% Federal Share	$ Non-Federal Share	% Non-Federal Share	Total Project Cost
Task 1	$1,000,000	80%	$250,000	20%	$1,250,000
Task 2	$500,000	80%	$125,000	20%	$625,000
Task 3	$400,000	50%	$400,000	50%	$800,000
Task 4	$100,000	100%	$0	0%	$100,000
Totals	$2,000,000		$775,000		$2,775,000

Blended Cost Share %
Non-federal share ($775,000) divided by Total Project Cost ($2,775,000) = 27.9% (non-federal)
Federal share ($2,000,000) divided by Total Project Cost ($2,775,000) = 72.1% (federal)

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

1. 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 economic security.[42] 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 United States Competitiveness Provision (see Section VI.B.xxii. U.S. Manufacturing Commitments); 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

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

ownership breakdown of the foreign entity, and the percentage of 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 manufacturing of products and/or services in the United States;
        a. A description of how the foreign entity's participation is essential to the project;
        b. A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP; and
        c. 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.

DOE's decision concerning a waiver request is not appealable.

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

As set forth in Section IV.J.iii. Performance of Work in the United States (Foreign Work Waiver), all work funded under this FOA must be performed in the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of DOE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request for a foreign work waiver must include the following:

1. The rationale for performing the work outside the United States ("foreign work");
2. A description of the work proposed to be performed outside the United States;
3. An explanation as to how the foreign work is essential to the project;
4. A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the U.S. economy;
5. The associated benefits to be realized and the contribution to the project from the foreign work;
6. How the foreign work 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;
7. How the foreign work will promote manufacturing of products and/or services in the United States;
8. A description of the likelihood of IP being created from the foreign work and the treatment of any such IP;
9. The total estimated cost (DOE and recipient cost share) of the proposed foreign work;
10. The countries in which the foreign work is proposed to be performed; and
11. The name of the entity that would perform the foreign work.

DOE may require additional information before considering the waiver request.

DOE's decision concerning a waiver request is not appealable.

APPENDIX D – 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[43] —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

[43] BIL, § 70917(c)(1).

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[44] 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.

[44] Excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives.

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 non-profit 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:

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 domestically manufactured products 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%.

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; and
- 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 DOE Buy America Requirement Waiver Requests.

DOE's decision concerning a waiver request is not appealable.

APPENDIX E – OPEN-SOURCE SOFTWARE

Open-Source Software Distribution Plan.

Applicants that are applying to one or more Topic Areas for which open-source software distribution is required 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.

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APPENDIX F – DEFINITION OF TECHNOLOGY READINESS LEVELS

TRL 1:	Basic principles observed and reported
TRL 2:	Technology concept and/or application formulated
TRL 3:	Analytical and experimental critical function and/or characteristic proof of concept
TRL 4:	Component and/or breadboard validation in a laboratory environment
TRL 5:	Component and/or breadboard validation in a relevant environment
TRL 6:	System/subsystem model or prototype demonstration in a relevant environment
TRL 7:	System prototype demonstration in an operational environment
TRL 8:	Actual system completed and qualified through test and demonstrated
TRL 9:	Actual system proven through successful mission operations

APPENDIX G – LIST OF ACRONYMS

AHJ	Authorities Having Jurisdiction
ARRA	American Recovery and Reinvestment Act
CBP	Community Benefits Plan
CEJST	Climate and Economic Justice Screening Tool
COI	Conflict of Interest
CRADA	Cooperative Research and Development Agreement
DAC	Disadvantaged Community
DEC	Determination of Exceptional Circumstances
DEIA	Diversity, Equity, and Inclusion, and Accessibility
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
DOT	Department of Transportation
EERE	Energy Efficiency and Renewable Energy
EJ	Environmental Justice
FAR	Federal Acquisition Regulation
FCOI	Financial Conflicts of Interest
FFATA	Federal Funding and Transparency Act of 2006
FFRDC	Federally Funded Research and Development Center
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
GAAP	Generally Accepted Accounting Principles
GH_2	Gaseous Hydrogen
H2Hubs	DOE Regional Clean Hydrogen Hubs
HBCU	Historically Black College and University
HFTO	Hydrogen and Fuel Cell Technologies Office
IPMP	Intellectual Property Management Plan
IRB	Institutional Review Board
LDV	Light-Duty Vehicle
LH_2	Liquid Hydrogen
M&O	Management and Operating
MARAD	U.S. DOT Maritime Administration
MBE	Minority Business Enterprise
MD/HD	Medium- and Heavy-Duty
MFA	Multi-Factor Authentication
MPIN	Marketing Partner ID Number
MSI	Minority-Serving institution
MYPP	Multi-Year Program Plan
NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NGO	Non-Government Organization

NNSA	National Nuclear Security Agency
NSF	National Science Foundation
OIG	Office of Inspector General
OMB	Office of Management and Budget
OSTI	Office of Scientific and Technical Information
OTA	Other Transactions Authority
PII	Personal Identifiable Information
R&D	Research and Development
R&D	Research and Development
RD&D	Research, Development and Demonstration
RDD&D	Research, Development, Demonstration and Deployment
RFI	Request for Information
RFP	Request for Proposal
SAM	System for Award Management
SciENcv	Science Experts Network Curriculum Vita
sLH_2	Subcooled LH_2
SMART	Specific, Measurable, Attainable, Realistic, and Timely
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STEM	Science, Technology, Engineering, and Mathematics
TAA	Technical Assistance Agreement
TCU	Tribal College and University
TEA	Technoeconomic Analysis
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
WBS	Work Breakdown Structure
WP	Work Proposal

APPENDIX H – RDD&D COMMUNITY BENEFITS PLAN GUIDANCE

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[45] 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),[46] it is important to consider the impacts of the successful commercial deployment of any innovations resulting from this FOA on the current and future workforce.

The goal of the RDD&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 American people and lead to broadly shared prosperity, including for workers and disadvantaged communities.[47] The three sections of the RDD&D Community Benefits Plans are considered together because there may be significant overlap among 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 RDD&D Community Benefits Plan. Applicants are not required to implement any of these specific examples and should propose activities that best fit 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 (DACs). Tapping all the available talent requires intentional approaches and yields broad benefits.

Equity extends beyond diversity to equitable treatment. Equitable access to

[45] DOE defines 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 definition, the remainder of this document refers to "energy equity" to encompass energy justice and DOE's efforts related to Justice40. https://www.energy.gov/diversity/articles/how-energy-justice-presidential-initiatives-and- executive-orders-shape-equity

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

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

opportunity for members of the project team is paramount. This includes ensuring 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:[48]

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 also 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 to promote DEIA, justice, and workforce participation. Minority Serving Institutions, Minority Business Enterprises, minority-owned businesses, disability-owned businesses, 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 how

[48] 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

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. For instance, 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 do not hinder 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 MSIs, 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 DACs 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 DACs. 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 MSIs;

- 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 DACs;
- Providing efforts toward improving a workplace culture of inclusion;
- Developing technology and technology integration innovations to meet the needs of DACs;
- Creating partnerships with local communities, especially under-resourced and DACs;
- 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 DACs' 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 cite 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);[49] 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;
- Describing how the proposed research strategy and methodology was informed by input from a wide variety of stakeholders;
- Creating 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 RDD&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 its 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 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

[49] 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

that could result in changes to regional or national labor markets.

For additional support with developing the Workforce section of a RDD&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 BIL-funded demonstration and deployment projects, may be useful for R&D projects.

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 United States;
- 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 workforce training to address needs for successful innovation;
- Voluntary recognition of a union and informing employees of their rights, regardless of its 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 RDD&D Community Benefits Plan include one Specific, Measurable, Achievable, Realistic and Timely (SMART) milestone for each budget period. An exemplary 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?