

**Department of Energy (DOE)**  
**Office of Energy Efficiency and Renewable Energy (EERE)**

**Bipartisan Infrastructure Law Enhanced Geothermal Systems  
(EGS) Pilot Demonstrations**

**Funding Opportunity Announcement (FOA) Number: DE-FOA-0002826**

**FOA Type: Modification No. 0002**

**CFDA Number: 81.087**

FOA Issue Date:	02/08/2023
Informational Webinar:	02/09/2023
Submission Deadline for First Round Letters of Intent:	03/08/2023 5:00pm ET
Submission Deadline for First Round Full Applications:	06/16/2023 5:00pm ET
Expected Date for First Round EERE Selection Notifications:	10/15/2023
Expected Timeframe for First Round Award Negotiations:	11/2023

- Applicants must submit a Letter of Intent by 5:00pm ET on the due date listed above to be eligible to submit a Full Application.
- To apply to this FOA, applicants must register with and submit application materials through EERE Exchange at <https://eere-Exchange.energy.gov>, EERE's online application portal.
- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the selection.

## Modifications

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

Mod. No.	Date	Description of Modification
0001	02/09/2023	Full Application Deadline changed to 06/16/2023
0002	04/27/2023	Updating the Expected Timeframe for First Round Award Negotiations to 11/2023 and Correcting the SOPO page limit to 12 pages

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## I. Funding Opportunity Description

### A. Background and Context

Awards made under this Funding Opportunity Announcement (FOA) will be funded, in whole or in part, with funds appropriated by the Infrastructure Investment and Jobs Act<sup>1</sup>, also more commonly known as the Bipartisan Infrastructure Law (BIL).

The BIL is a once-in-a-generation investment in infrastructure, which will grow a more sustainable, resilient, and equitable economy through enhancing U.S. competitiveness, driving the creation of good-paying union jobs, and ensuring stronger access to economic, environmental, and other benefits for disadvantaged communities. The BIL appropriates more than \$62 billion to the Department of Energy (DOE)<sup>2</sup> to invest in American manufacturing and workers; expand access to energy efficiency; deliver reliable, clean and affordable power to more Americans; and deploy the technologies of tomorrow through clean energy demonstrations.

As part of and in addition to upgrading and modernizing infrastructure, DOE's BIL investments will address the climate crisis and support efforts that will build a clean and equitable energy economy that achieves zero carbon electricity by 2035, and puts the United States on a path to achieve net-zero emissions economy-wide by no later than 2050<sup>3</sup> to benefit all Americans.

The BIL section 41007 (a) authorizes the DOE Geothermal Technologies Office (GTO) to carry out activities under section 615(d) (Enhanced Geothermal Systems Demonstrations) of the Energy Independence and Security Act of 2007, as amended by the Energy Act of 2020 (42 U.S.C. 17194(d) (EISA 2007) including \$84,000,000 for the period of fiscal years 2022 through 2025. EISA 2007 authorizes GTO to support Enhanced Geothermal Systems (EGS) pilot projects that collectively demonstrate EGS in different geologic settings, using a variety of development techniques and well orientations, at sites where subsurface characterization or geothermal energy integration analysis has been conducted. These pilot demonstration projects will enable investments that maintain progress towards GTO's aggressive *GeoVision*<sup>4</sup> and Enhanced Geothermal Systems Energy Earthshot goals, and will support the Biden

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

<sup>2</sup> U.S. Department of Energy. November 2021. "DOE Fact Sheet: The Bipartisan Infrastructure Deal Will Deliver For American Workers, Families and Usher in the Clean Energy Future." <https://www.energy.gov/articles/doe-fact-sheet-bipartisan-infrastructure-deal-will-deliver-american-workers-families-and-0>

<sup>3</sup> Executive Order (EO) 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.

<sup>4</sup> The GeoVision Roadmap outlines a compilation of technical, economic, and institutional actions that the entire geothermal community including DOE, other government agencies, industry, and academia must address in order for geothermal technologies to play a larger role in the Nation's energy mix.

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Administration's goal to achieve a carbon-free electric grid by 2035 and a net zero emissions economy by 2050.<sup>5</sup>

**i. Program Purpose**

This FOA supports the administration goals laid out above. Geothermal energy is a renewable and diverse solution for the United States—providing reliable and flexible, emissions-free electricity generation and delivering unique technology solutions to America's heating and cooling demands; directly supporting the Administration's goals of carbon pollution-free electricity by 2035 and net zero greenhouse gas (GHG) emissions by 2050. Geothermal resources can be found nationwide and represent vast domestic energy potential; however, only a fraction of this potential has been realized due to technical and non-technical barriers that constrain industry growth.

The Department of Energy's (DOE's) Geothermal Technologies Office's (GTO) 2022 Enhanced Geothermal Shot™ analysis, building on the 2019 GeoVision report, concludes that with aggressive technology improvements, in areas relevant to enhanced geothermal systems (EGS), geothermal power generation could provide 90 gigawatts-electric (GWe) firm, flexible power to the U.S. grid by 2050.

Enhanced Geothermal Systems (EGS) are engineered geothermal reservoirs, created where there is hot rock (175-300+°C), but little to no natural permeability and/or fluid saturation. During EGS development, subsurface permeability is enhanced via safe, well-engineered reservoir stimulation processes that re-open pre-existing fractures, create new ones, or a combination of both. These open conduits increase permeability and allow fluid to circulate throughout the hot rock. The fluid transports the otherwise stranded heat to the surface where clean, renewable electricity can be generated with current power generation technologies.

Relative to other geothermal resources, EGS have the potential to provide the most growth in the electric sector, and in the GeoVision scenarios, support noteworthy growth within the non-electric sector for district heating and other direct-use applications. This potential expands if superhot EGS resources (>375°C)<sup>6</sup> are accounted for. Without significant and sustained investment in EGS technology development and demonstrations to refine our ability to access and develop these resources, however, the 90 GWe target will not be achieved.

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<sup>5</sup> FACT SHEET: President Biden sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

<sup>6</sup> Bonneville, A., Asanuma, H., Cladouhos, T., Friðleifsson, G., Horne, R., Jaupart, C., Noren, A., Petty, S., Schultz, A., and Sorlie, C. (2021) "The Newberry Super-Hot EGS Project." Proceedings, World Geothermal Congress 2020+1, Reykjavik, Iceland, April – October 2021.

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SEC. 41007 of the Bipartisan Infrastructure Law will enable investments that can maintain progress towards GTO's aggressive Energy Earthshot and GeoVision goals. The projects selected under this FOA will build on the lessons of previous GTO EGS demonstration initiatives, enabling a move beyond the near-field EGS environment with new drilling and development in varied geological environments to accelerate EGS commercialization pathways throughout the U.S.

The Topic Areas addressed under this FOA are:

**Topic Area 1: EGS Proximal Demonstrations**

EGS demonstrations utilizing existing infrastructure proximal to existing geothermal / hydrothermal development with immediate potential for electrical power production.

**Topic Area 2: EGS Green Field Demonstrations**

Sites with no existing geothermal development and potential for shallow sedimentary, igneous and/or mixed metamorphic rock EGS with near-term electrical power production potential.

**Topic Area 3: Super-hot / Supercritical EGS Demonstrations**

Super-hot/ supercritical EGS demonstrations located at well-characterized sites with existing well(s) in place and with near-term electrical power production potential.

**Topic Area 4: Eastern-US EGS Demonstrations**

EGS stimulation demonstration located at a well-characterized Eastern U.S. site, with existing well(s) in place and near-term electrical power and heat production potential.

As part of the whole-of-government approach to advance equity and encourage worker organizing and collective bargaining<sup>7,8,9</sup> this FOA and any related activities will seek to encourage meaningful engagement and participation of labor unions and underserved communities and underrepresented groups, including consultation with Tribal Nations<sup>10</sup>. Consistent with Executive Order 14052, this FOA is designed to support the goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities<sup>11</sup> in accordance with the Justice40 Initiative, and drive the creation of good-paying

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<sup>7</sup> EO 13985, "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government" January 20, 2021.

<sup>8</sup> [EO 14025](#), "Worker Organizing and Empowerment," April 26, 2021.

<sup>9</sup> EO 14052, "Implementation of the Infrastructure Investment and Jobs Act," November 18, 2021.

<sup>10</sup> EO 13175, November 6, 2000 "Consultation and Coordination With Indian Tribal Governments", charges all executive departments and agencies with engaging in regular, meaningful, and robust consultation with Tribal officials in the development of Federal policies that have Tribal implications.

<sup>11</sup> EO 14008, "Executive Order on Tackling the Climate Crisis at Home and Abroad" January 27, 2021.

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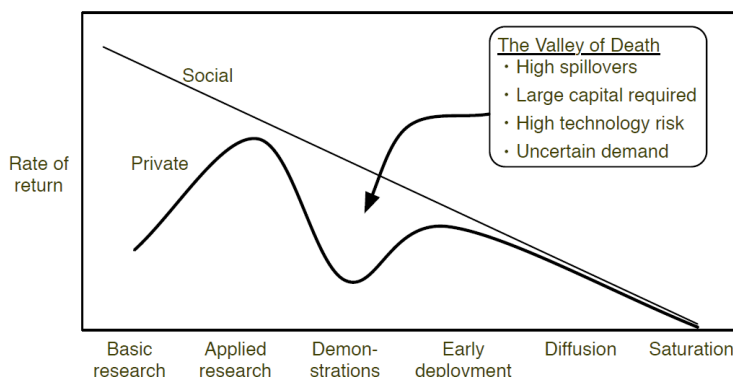
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union jobs through a focus on high labor standards and the free and fair chance for workers to join a union.

## ii. Technology Space and Strategic Goals

SEC. 41007 (a) of the Infrastructure Investment and Jobs Act authorized GTO to carry out activities under section 615(d) (Enhanced Geothermal Systems Demonstrations) of the Energy Independence and Security Act of 2007 (42 U.S.C. 17194(d)) including \$84,000,000 for the period of fiscal years 2022 through 2025. This legislation authorizes GTO to support enhanced geothermal systems pilot projects that collectively demonstrate EGS in different geologic settings, using a variety of development techniques and well orientations, at sites where subsurface characterization or geothermal energy integration analysis has been conducted.

The pilot demonstrations enabled via this FOA will help fill an important gap that exists in global technology markets and innovation systems. Overcoming the frequently cited ‘valley of death,’ where countless promising early-stage technology concepts



**Figure 1:** Innovation Stages and the Valley of Death (Nemet, Kraus and Zipperer, 2016)

fail (Figure 1), remains a challenge as a result of the high-risk nature of initial scale-up in conjunction with uncertain markets. This leads to underinvestment<sup>12</sup> because the financing required for commercial deployment is not available from low-cost institutional capital sources without first de-risking technology at scale<sup>13</sup>.

Adding additional complication, demonstration projects require a variety of technologies working in conjunction, many of which are not considered

<sup>12</sup> Nemet, Kraus and Zipperer, *The Valley of Death, the Technology Pork Barrel, and Public Support for Large Demonstration Projects*. German Institute for Economic Research. 2016.

<sup>13</sup> <https://www.forbes.com/sites/brentanalexander/2021/11/06/the-new-infrastructure-bill-looks-to-solve-a-clean-energy-valley-of-death/?sh=40c171d42b91>

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commercial<sup>14 15 16 17</sup>. Demonstrations also require significant funding for scale-up and are dependent upon external factors including supply chains, employment of engineering standards, successful local and federal permitting, environmental reviews and impact assessments, and stakeholder engagement. The combination of these factors often creates significant risk for project failure. In addition, the reality of innovation is that although the process is superficially linear--progressing from early-stage lab work to commercial-scale market deployment--each step within the innovation process involves feedback loops<sup>18</sup> which require time and iteration to successfully advance through.

The learnings and objectives of pilot demonstrations can be summarized as follows:

- as exemplars, proving reliability and performance ultimately de-risking the technologies
- as experiments from which to learn, because upscaling typically identifies new problems that are not apparent at smaller scales<sup>19</sup> and allows the community to settle on a 'dominant' design<sup>20</sup>
- as opportunities for collaboration, such that best practices can be established, and processes can be standardized and improved

Researchers focused on progressive learning across renewable and sustainable energy demonstration projects<sup>21 22</sup> identify the importance of **technical learning** to first iterate on improvements to technologies involved in full-scale demonstrations and subsequent **organizational and market learnings** where applying technical learning curve benefits leads to scale-up, operational processes, and the development of market niches as well as improved effectiveness and efficiency (Figure 2).

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<sup>14</sup> Gordon Kingsley, Barri Bozeman, and Karen Coker. Technology transfer and absorption: an r&d value-mapping approach to evaluation. *Research Policy*, 25(6):967-995, 1996.

<sup>15</sup> David C. Mowery. The changing structure of the us national innovation system: implications for international conflict and cooperation in r&d policy. *Research Policy*, 27(6):639-654, 1998.

<sup>16</sup> P. Spath and H. Rohracher. 'energy regions': The transformative power of regional discourses on socio-technical futures. *Research Policy*, 39(4):449-458, 2010. ISSN 0048-7333.

<sup>17</sup> Chris Hendry and Paul Harborne. Changing the view of wind power development: More than bricolage". *Research Policy*, 40(5):778-789, 2011.

<sup>18</sup> Kerssens-van Drongelen, I., Bilderbeek, J., 1999. R&D performance measurement: more than choosing a set of metrics. *R&D Management*. 29, 35-46.

<sup>19</sup> Devendra Sahal. Technological guideposts and innovation avenues. *Research Policy*, 14(2):61-82, 1985.

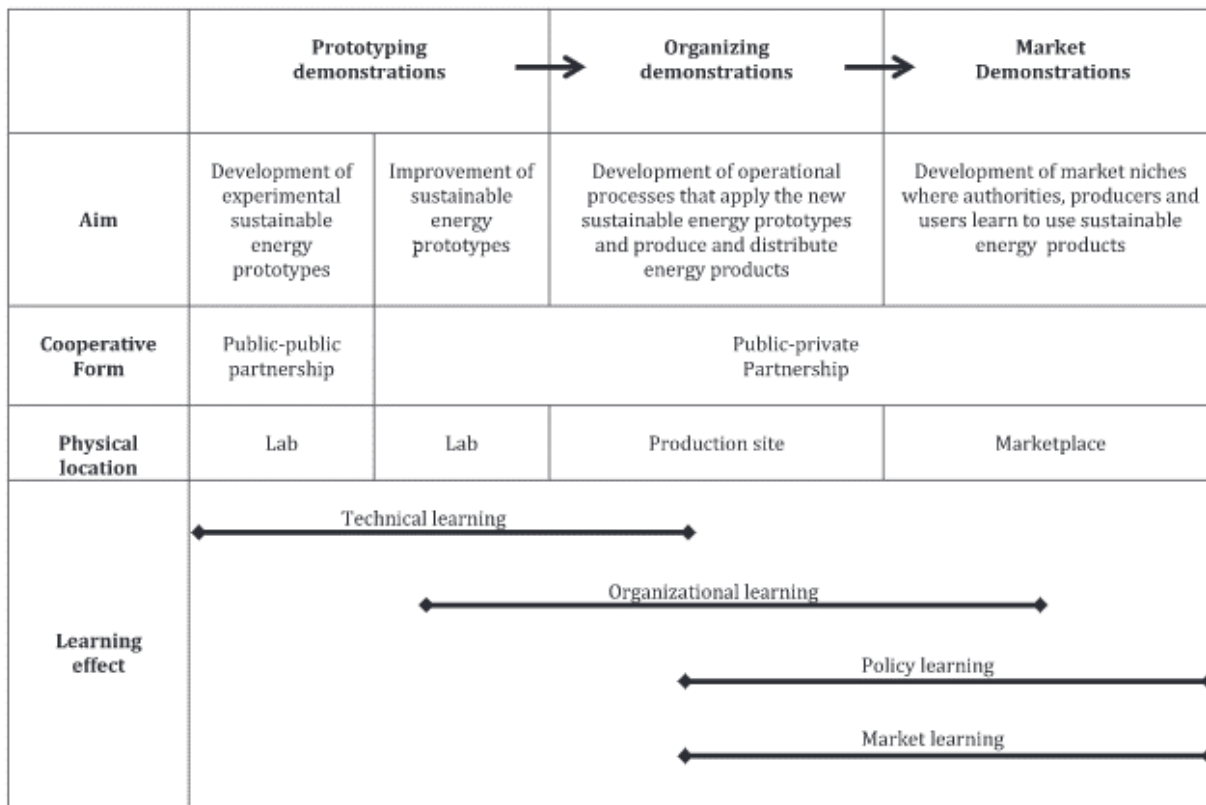
<sup>20</sup> Brown J, Hendry C. Public demonstration projects and field trials: accelerating commercialization of sustainable technology in solar photovoltaics. *Energy Pol* 2009;37(7):2560-73.

<sup>21</sup> Bart A.G. Bossink. Learning strategies in sustainable energy demonstration projects: What organizations learn from sustainable energy demonstrations. *Renewable and Sustainable Energy Reviews*, 131: 110025, 2020. ISSN 1364-0321

<sup>22</sup> Bart A.G. Bossink. Demonstrating sustainable energy: A review-based model of sustainable energy demonstration projects, *Renewable and Sustainable Energy Reviews*. 77: 1349-1362, 2017. ISSN 1364-0321.

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**Figure 2:** Model of renewable and sustainable energy demonstration project learning (Bossink, 2017)

With respect to the specific intent of this FOA, Technical Learning may include:

- Identification and descriptions of actions by which the proposed subsurface technologies or methodologies will be advanced (e.g., best technical practices, operational lessons learned, subsequent technological refinements, etc.).

Similarly, Organizational Learning specific to this FOA may include, but is not limited to:

- A plan for hypothesis testing or learning-by-doing, developing, and refining in-the-field operational strategies that improve the efficiency and repeatability of EGS deployment.
- Identification and description of all relevant stakeholders.

Market Learning specific to this FOA may include, but is not limited to:

- Estimates of power production capacity from the proposed field demonstration.

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- Consideration and analysis of the size of the potential market opportunity (i.e., Local and regional electricity demands and local and regional heating demands).
- Overview of commercial, environmental, and community/societal benefits. Critical questions to address can include:
  - Who benefits from the project and how/why?
  - What are the non-monetary benefits of the project? For whom?
  - How can we facilitate the use of geothermal energy by these potential beneficiaries and engender a positive view of geothermal?
- Characterization of existing grid and transmission infrastructure and identification of potential grid/transmission connection points.
- Current Market Intelligence identifying recent analogous Power Purchase Agreements (PPAs), land acquisition costs, analogous permitting timelines.
- Project-Level Economic Analyses (e.g., Levelized Cost of Electricity (LCOE)), cash flow analysis, net present value, return on investment).
- Operating expenses required to maintain reliable and sustainable power production.
- Go-To-Market Strategies Understanding of the size of the potential market opportunity (i.e., Local and regional electricity demands and local and regional heating demands).
- Estimated economic impacts of quantifiable risks, where applicable.

Government supported pilot demonstrations focused on technical and organizational learning, which are the objective of this FOA, provide a unique opportunity to address the pilot demonstration objectives outlined above with low risk. Given the opportunity to learn-by-doing during these supported demonstrations and ultimately standardize technical strategies, projects are then ideally positioned to advance to the next critical pre-commercialization step, creating and learning about their market, which enables commercial deployment at scale supported by private financing.

The most fundamental advancement required to enable EGS commercialization at scale is permeability enhancement that optimizes heat transfer to generate sustainable power. A multitude of technologies exist and are under development that address challenges to accessing, creating, and sustaining EGS reservoirs. However, processes to develop orderly and strategic permeability enhancement methods--controlling fracture location, shape, and size, for example--cannot be perfected in a lab, but instead require subsurface access, and testing in real world temperature, stress, and pressure conditions in various lithologies. Few of these prototyped technologies or methods have enjoyed opportunities to test in situ from a systems perspective, in different combinations, and under a variety of geologic settings and conditions. The lack of opportunities for field-based, iterative, EGS testing exists because of the high costs of subsurface operations,

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including drilling and stimulating wells. As a result, a menu of mid Technology Readiness Level (TRL) reservoir creation and characterization technologies stand ready along with decades of computational modeling expertise waiting for hypothesis testing in the field to prove their reliability.

Learning-by-doing will enable technology suites to be upscaled, and the collaborative development of accepted design approaches in different environments that can be adopted for broader EGS development.

As outlined above, the invaluable opportunity to learn-by-doing and innovate EGS systems at pilot scale can lead to equally transformative changes in deployment and acceptance of EGS nationwide.

Detailed technical descriptions of this FOA's Topic Areas are provided in the sections that follow.

### **iii. Community Benefits Plan**

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

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

### **iv. Teaming Partner List**

DOE is compiling a "Teaming Partner List" to facilitate the formation of new project teams for this FOA. The Teaming Partner List allows organizations who may wish to participate on an application to express their interest to other applicants and to explore potential partnerships. Participation by partners underrepresented in the industry and diverse suppliers, and by labor unions, is highly encouraged.



Updates to the Teaming Partner List will be available in the EERE Exchange website <https://eere-exchange.energy.gov/>. The Teaming Partner List will be regularly updated to reflect new teaming partners who provide their organization's information.

**SUBMISSION INSTRUCTIONS:** Any organization that would like to be included on this list should submit the following information: Organization Name, Contact Name, Contact Address, Contact Email, Contact Phone, Organization Type, Area of Technical Expertise, Brief Description of Capabilities, and Area of Interest. Interested parties should email the information to [BIL\\_EGSPilotDemos@ee.doe.gov](mailto:BIL_EGSPilotDemos@ee.doe.gov) with the subject line "Teaming Partner Information."

**DISCLAIMER:** By submitting a request to be included on the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. By facilitating the Teaming Partner List, DOE is not endorsing, sponsoring, or otherwise evaluating the qualifications of the individuals and organizations that are self-identifying themselves for placement on this Teaming Partner List. DOE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information.

## **B. Topic Areas**

GTO's EGS Program actively pursues research, development, and demonstration projects to facilitate technology validation and demonstration, reduce cost, and improve performance of EGS. Specifically, the economic viability of EGS depends on developing and improving enabling technologies and a detailed understanding of rock mass behavior and permeability enhancement.

The pilot demonstration activities to be funded through this FOA will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035 and "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 by driving innovation at field scale. The Department of Energy is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of disadvantaged communities.

The objective of this funding opportunity announcement is to identify and develop EGS pilot demonstration projects in a variety of geologic formations and subsurface conditions that will act:

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- as exemplars, proving reliability and performance ultimately de-risking the suites of technologies required to develop and sustain EGS reservoirs;
- as experiments from which to learn (Learn-by-doing), to use the upscaled opportunity to identify new problems that are not apparent at smaller, lab-based scales;
- as an opportunity to hypothesis test and validate a design approach for the geological conditions where projects are located and extended to broader EGS development;
- as opportunities for collaboration, such that best practices can be established, and general operational processes can be standardized and improved;
- (In Topic Area 2, 3, 4) as opportunities to begin to connect with consumers and off-takers, to understand their needs and define the market, and take that into account in design (including specific DOE interest in EGS for load following generation, where relevant).

<u>Topic Areas</u>	<u>Title</u>
<b>BIL section 41007</b> Enhanced Geothermal Systems Pilot Demonstrations)	
<b>Topic Area 1:</b> EGS Proximal Pilot Demonstrations	EGS demonstrations utilizing existing infrastructure proximal to existing geothermal / hydrothermal development with immediate potential for electrical power production.
<b>Topic Area 2:</b> EGS Green Field Pilot Demonstrations	Well-characterized sites with no existing geothermal development and potential for sedimentary, igneous and/or mixed metamorphic rock EGS with near-term electrical power production potential.
<b>Topic Area 3:</b> Super-hot / Supercritical EGS Pilot Demonstrations	Super-hot/ Supercritical EGS demonstrations located at well-characterized sites with near-term electrical power production potential.
<b>Topic Area 4:</b> Eastern-US EGS Pilot Demonstration <sup>23</sup>	EGS demonstration located at a well-characterized Eastern U.S. site with near-term electrical and thermal power production potential.

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

This FOA may remain open for up to 48 months, with review cycles occurring approximately every eight months, while funding lasts. The “rolling” nature of this announcement is meant to accommodate our community of applicants, who may need time to find the appropriate mix of experience to develop effective teams and to

<sup>23</sup> EASTERN DEMONSTRATION per Congressional language is defined as “an area east of the Mississippi River that is suitable for enhanced geothermal demonstration for power, heat, or a combination of power and heat. “



identify high potential sites, perform critical due diligence on those sites, and accommodate operational restrictions on sites before applying. In addition, DOE recognizes a perennial challenge for our small industry with respect to the availability of personnel to commit to the DOE FOA application and project management process. Although it is anticipated that additional annual appropriations will be made available for this FOA in subsequent years and that funding will remain available for additional launches of this FOA, it cannot be guaranteed. It is possible that all funding for Topic Areas 1-3 may be expended after the 1<sup>st</sup> application/review cycle in which case all subsequent cycles for these Topic Areas will not occur and only Topic 4 applications would be accepted in the 2<sup>nd</sup> cycle.

The planned review periods are outlined below. Please note that appropriated funding may be expended after the 2<sup>nd</sup> Cohort selections are made. If this is the case, DOE will notify the community via EERE eXCHANGE that subsequent submission periods will be withdrawn.

Cohort	Applicant Dates	Date	Notes
	FOA Release	January 2023	
1	1 <sup>st</sup> Round Letters of Intent	February 2023	Only applications for Topic Areas 1,2, and 3 accepted
	1 <sup>st</sup> Round Full Applications Due	June 2023	
2	2 <sup>nd</sup> Round Letters of Intent	November 2023	All Topic Areas accepted
	2 <sup>nd</sup> Round of Full Applications Due	March 2024	
3	3 <sup>rd</sup> Round Letters of Intent	July 2024	All Topic Areas accepted
	3 <sup>rd</sup> Round of Full Applications Due	November 2024	
4	4 <sup>th</sup> Round Letters of Intent	March 2025	All Topic Areas accepted
	4 <sup>th</sup> Round of Full Applications Due	July 2025	

### Strategic Goals:

The technology developments targeted in this FOA are intended to increase geothermal power production in the U.S. in the near-term from areas surrounding existing geothermal fields (Topic Area 1) while facilitating new opportunities for widespread power (or power with cascaded heat production) in the future from regions where heat is present, yet no geothermal energy production exists (i.e., Topic Areas 2, 3, 4).

Strategic goals for this FOA, highlighted below in Table 1, are derived from the Enhanced Geothermal Systems Energy Earthshot, the GeoVision Roadmap and GTO MYPP.

**Table 1: BIL EGS Demonstrations FOA Goals and Applicable GTO Goals**

FOA Metrics:

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- Topic Areas 1, 2 and 3 must demonstrate the modeled or actual capability of producing >5 MWe of additional capacity (per site/well) using advanced stimulation techniques in new/existing geothermal wells.
- For Topic Area 4 demonstrate the capability of producing >1 MWe and 3 MWth through cascading of the heat resource. Demonstration of the advancement of a critical reservoir creation technology or method to a higher TRL.

<b>Enhanced Geothermal Shot™</b>	\$45/MWh by 2035 Aggressive pursuit of resource characterization, well construction, reservoir sustainability, and materials R&D accompanied by a “learn-by-doing” approach to EGS field demonstration testing.
<b><u>GeoVision Roadmap</u></b>	<b>SUB-ACTION 1.4.1:</b> Develop existing and innovative stimulation methods for improved geothermal resource recovery <b>SUB-ACTION 1.4.2:</b> Improve zonal-isolation techniques. <b>SUB-ACTION 1.4.3:</b> Develop advanced real-time fracture modeling and mapping. <b>SUB-ACTION 1.4.4:</b> Quantify the relationship among in-situ state of stress, induced seismicity, and permeability
<b>GTO MYPP 2022</b>	<b>Subsurface Enhancement and Sustainability Goal 1:</b> Collect, archive, and distribute high-fidelity multiphysics data associated with stimulations of in-field, near-field, and greenfield EGS reservoirs in crystalline rock at depth <b>Subsurface Enhancement and Sustainability Goal 2:</b> Increase the net production potential in an existing geothermal plant using advanced, targeted stimulation technologies in existing but sub-commercial wells <b>Subsurface Enhancement and Sustainability Goal 4:</b> Refine and optimize stimulation procedures using zonal isolation for reservoir enhancement in crystalline basement rock

**Pilot Demonstration Requirements: (RELEVANT TOPIC AREAS are NOTED):**

Awards made under this funding opportunity announcement will be cooperative agreements that may include drilling, well stimulation, data collection, modeling, and analysis. Power production is allowable, if feasible.

- **Compliance with the “Protocol for Induced Seismicity Associated with Enhanced Geothermal Systems,” (REQUIRED FOR ALL TOPIC AREAS):**

<http://wellbore.lbl.gov/downloads/EGS-IS-Protocol-Final-Draft-20120124.PDF>

This document is intended to serve as a general guide that identifies steps a geothermal developer can take to address induced seismicity issues. The proposed protocol includes simple planning steps that would apply to most developments, as well as more elaborate procedures that would apply under particular circumstances to a small number of geothermal developments. Therefore, this protocol is not intended to be a

universal prescriptive approach to seismicity management. The guiding principles shall be incorporated into the management of all EGS Pilot Demonstration awards.

- **Drilling, Recompletion, and Workover Costs (REQUIRED FOR ALL TOPIC AREAS)**

While permeability enhancement is a requirement and is the focus of these pilot demonstrations, it is recognized that some funds may be needed by project applicants for well construction, recompletion, or workover activities to enable effective reservoir stimulation.

Recipients of funding from this FOA will be allowed to expend 50% of the awarded funds toward well drilling and/or refurbishment in support of the demonstrations. The funds allocated for drilling, recompletion, and workover are limited to activities that involve the drilling of a new well(s) or operations in an existing well(s) through the installation and cementing of the final casing string or liner or any equipment or tools deployed as part of the final casing string or liner (e.g. external casing packers, sliding sleeves, and the like). Well costs in excess of those covered by this FOA will be the responsibility of the applicant and can be applied to the requisite cost share.

Additionally well-related costs incurred prior to an award are the responsibility of the applicant as are any other well costs not directly associated with the project.

Details of any planned well construction or workover activities and associated costs must be submitted in the application. Recipients under this FOA will be required to provide updated/final well construction or workover plans for review and approval by DOE prior to initiation of such activities during Phase 1.

- **Communications (REQUIRED IN ALL TOPIC AREAS)**

Recipients must reserve a portion of their budget to conduct and promote communications and outreach activities with stakeholders, including labor unions and the general public to listen to concerns, provide details on their project plans, and share their successes. Engagement with local stakeholders must begin at the outset of any selected projects and must be maintained on a recurring basis throughout the duration of the project.

DOE requires that each team recruit and maintain (full or part time, depending on need) an “information officer” whose role will center around engagement with the local community to ensure there is a direct conduit for information on the projects.

- **Workforce (REQUIRED IN ALL TOPIC AREAS)**

- **Data Collection:** The Geothermal workforce is everchanging, with skilled workers from oil and gas or other industries frequently transitioning into geothermal depending on market conditions and project availability. DOE would like to take

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the opportunity to collect critical data on the Knowledge, Skills, and Abilities(KSAs) required of the workforce for successful execution of these Pilot Demonstration Projects. Recipients will be asked to submit a record of occupations of workers that are participating in the project on a quarterly basis which will be used to inform a specific end of project task that will identify KSAs and core competencies of workers necessary to complete EGS demonstration projects.

- **Workforce Opportunities:** Pilot demonstration leads will be asked to host one “graduate” of future GTO/GEODE developed workforce programs (if applicable, pending appropriations for these other programs, and at no cost to the pilot demonstration) to create a pipeline for newly trained geothermal professionals from geoscientists and engineers, land management professionals, to drillers, rig hands, service providers, etc., to enter the geothermal market.

- **Teaming (REQUIRED IN ALL TOPIC AREAS)**

This FOA seeks to solicit multi-disciplinary teams that have the demonstrated technical and financial viability to plan, develop, and operate large-scale field-based EGS and Superhot EGS projects with minimum variance from the originally planned project schedule, scope, and budget.

Principal Investigators must reserve a developmental position on their team for aspiring PIs (junior faculty from Academia, early career National Laboratory research staff, junior industry researchers etc.) to gain invaluable mentorship experience during the execution of a large-scale demonstration project. This position can take any form deemed appropriate by the PI(s), but must provide access to project leadership and project management decision-making. Projects undertaking construction activity are encouraged to team with the appropriate building and construction trades unions and provide letters of commitment.

Teams are required to include industry participation and should focus on diversity of personnel, institutions, expertise and sector knowledge. Teams must include geothermal expertise but can include a diversity of experience from other subsurface relevant sectors as well.

The Teaming list can be utilized (<https://eere-exchange.energy.gov/>) to assist in creating effective, multi-disciplinary teams.

- **Reservoir Stimulation (REQUIRED IN ALL TOPIC AREAS)**

Pilot demonstration projects funded under this FOA will be expected to identify and deploy innovative and in some cases, pre-commercial, technologies to enable in situ reservoir monitoring and assessment, reservoir stimulation, monitoring flow testing, and, potentially, power and heat production.

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Due to the criticality of permeability enhancement in EGS, all projects except Topic Area 3 must successfully demonstrate and execute multi-zone stimulation methods and techniques. For Topic Area 3, the demonstration and execution of multi-zone stimulation methods and techniques is desired but not required, but stimulation of at least one zone is required (e.g. fluid injection through casing to stimulate an open-hole section below the final casing string would be acceptable). In addition, these projects must identify a pathway to successfully sustain sufficient fluid flow and heat extraction rates commensurate with that required for commercial development, which directly supports the Biden Administration's goals for a clean energy future.

**As such, field-based pilot scale demonstrations funded through this FOA in Topic Areas 1,2 & 4 will be required to utilize advanced reservoir stimulation and isolation technologies, which are identified in the Strategic Development of EGS<sup>24</sup> and FORGE Roadmaps<sup>25</sup>, as central to the success of EGS. Pilot scale demonstrations in Topic Area 3 will be required to execute a reservoir stimulation but are not required to deploy advanced technologies that enable stimulation and isolation across multiple zones (e.g., open-hole stimulation below the last casing shoe would be acceptable).**

Publicly released information regarding previous DOE field projects and technical baseline for well stimulation methods utilized in the past can be found at <https://www.osti.gov/> (i.e., final technical reports, conference proceedings, journal articles, and the like), and <https://www.energy.gov/eere/geothermal> (GTO EGS information and GTO Peer Review reports). These demonstration projects dramatically advanced EGS research, but repeated testing to demonstrate the reproducibility of field-scale EGS stimulation methods has not been possible and therefore technical questions remain, surrounding:

- Sufficient technical understanding of factors that contribute to success or failure of well stimulation methods in a variety of geothermal reservoirs and rock types
- Sufficient testing of various well stimulation techniques that utilize various combinations of technologies and methods such as fluid injection, thermal rock-fluid interaction, chemical stimulation, zonal isolation, addition of proppants, and/or other techniques
- Adoption of successful EGS well stimulation techniques by the geothermal industry at a commercial scale

Several new technologies or those adopted from the oil and gas sector have shown promise for improving stimulation success and sustainability in EGS wells. In addition, a shift in the rationale surrounding EGS stimulation strategy – progressing from open-hole stimulation to isolated stimulation zones - has occurred in the last decade and has

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<sup>24</sup> Ziagos, J., Phillips, B.R., Boyd, L., et al. "A Technology Roadmap for Strategic Development of Enhanced Geothermal Systems." *Proceedings of Thirty-Eighth Workshop on Geothermal Reservoir Engineering* (2013).

<sup>25</sup> McKittrick, Alexis, Leslie Abrahams, Christopher Clavin, Robert Rozansky, and Daniel Bernstein. *Frontier Observatory for Research in Geothermal Energy: A Roadmap*. IDA Science and Technology Policy Institute, 2019

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shown clear advantages in modeling<sup>26</sup> and field tests (e.g., Cladouhos et al, 2009)<sup>27</sup>. GTO seeks to leverage these advances to generate power in the near-term, from non- or under-performing wells on the margins of hydrothermal fields (Topic Area 1), where infrastructure costs are low and Megawatts (MW) can be added now as well as in new environments where lower EGS costs can be achieved with the implementation of multiple stimulation zones (i.e., Topic Areas 2 and 4).

- **Consideration and documentation of Technical, Organizational, and Market Learning (REQUIRED IN ALL TOPIC AREAS)**

Applicants and awardees will be required to consider and document opportunities for technical and organizational learning in their application materials and to describe learnings in Phase Reports throughout the project duration.

Technical Learning could include the identification and descriptions of actions by which the proposed subsurface technologies or methodologies will be advanced (e.g., best technical practices, operational lessons learned, subsequent technological refinements, etc.) or other areas of relevance.

Similarly, Organizational Learning specific to this FOA could include a clear methodology for hypothesis testing or learning-by-doing, identification of relevant stakeholders, developing in-the-field operational strategies that improve the efficiency and repeatability of EGS deployment or other topics that advance organizational learnings. With respect to Market Learning, economic and social benefits, market potential, infrastructure (e.g., existing transmission), and go-to-market strategies should be articulated and project-level economic analyses, where relevant, presented quantitatively.

## **TOPIC AREA DETAILS:**

### **Topic Area 1: EGS Proximal Demonstrations**

**EGS demonstrations utilizing existing infrastructure proximal to existing geothermal / hydrothermal development with immediate potential for electrical power production.**

**Objective:** Through this Topic Area, innovative stimulation techniques and technologies must be validated in the field, culminating in new, clean, baseload geothermal power production. A

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<sup>26</sup> Kennedy, B.M, D. Blankenship, T. Doe, A. Riahi, P. Fu, B. Damjanac, E. Sonnenthal, A. Finnila, 2021, Performance Evaluation of Engineered Geothermal Systems Using Discrete Fracture Network Simulations, Lawrence Berkeley National Laboratory, <https://escholarship.org/uc/item/4168d73x>

<sup>27</sup> Cladouhos, T., Petty, S., Larson, B., Ivonetti, J., Livesay, B., Baria, R. 2009, Toward More Efficient Heat Mining: A Planned Enhanced Geothermal System Demonstration Project, GRC Transactions, Vol. 33.

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continuation of the 2020 GTO Amplify effort, this Topic Area will demonstrate that the use of EGS stimulation methods can transform low permeability or underproductive wells in or near existing hydrothermal fields into productive, economically beneficial assets for geothermal developers. **These demonstrations will focus on technical and organizational learning.** Applicants should closely consider the Objectives outlined in Section I.A. in defining their proposed project approach and opportunities to learn-by-doing.

The awards funded under this FOA Topic Area will stimulate wells with sub-commercial production / injection capacity in a near-field or in-field environment with the goal of sustainably increasing the output of the existing reservoirs by at least 5MW per site/well.

**Technical Requirements:** Awardees will develop a plan to enhance the productivity of the system, then stimulate one or more wells and monitor the improvement in productivity or injectivity of the system (power production). These projects will advance the state-of-the-art in EGS development and build on successes of previous DOE EGS demonstration projects via the use of targeted stimulation techniques such as zonal isolation, fracture initiation technologies for improving productivity of wells and/or increasing inter-well connectivity. The use of readily field-deployable well stimulation techniques that target specific sections of wells (via zonal isolation) is required. The use of available or tested prototype technologies from geothermal, oil and gas, or other relevant industries are allowable but the Technology Readiness Level (TRL) of proposed stimulation/isolation technologies must be at least a six (6). It is the intent of this pilot demonstration that technologies only be deployed that have been tested in relevant environments and applicants must provide rigorous and thorough documentation of such in their applications. Please see Appendix E for TRL definitions.

Awards made under this announcement will be in the form of cooperative agreements that will include well stimulation, data collection, power production, modeling, and analysis during three distinct Phases.

**Drilling and Site Requirements:**

It is preferred that at least one target well exists at any proposed sites prior to an award being made by DOE under this announcement, but it is not a requirement. For applications where a target well does not exist or where additional wells are proposed, only that portion of the award discussed above in the drilling requirements section, can be applied to well construction activities. For sites with existing wells, DOE seeks wells that are in good condition and capable of being put into operations relatively quickly and with minimal workover, subject to the funding restrictions noted previously. Applicants who propose sites without existing target wells are encouraged to apply only if sufficient site-specific geologic characterization and analysis has taken place as specified in 42 U.S.C. 17194(d) (the level of data available will be reviewed as part of the Merit Review Process) and if a well location has already been selected. Additionally, if a new well is proposed, the applicant must describe in sufficient detail that the new well is not targeting a prime hydrothermal resource and the drilling activities must incorporate technology advancements aimed at reducing well construction time and costs

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compared to other wells drilled in the field. Specific requirements for new drilling are included in the Project Phase Descriptions. A new well may be drilled as part of this Topic Area, however, **operators should note that drilling costs must be repaid to DOE if a commercial hydrothermal resource is identified and accessed during drilling.** For this FOA, a commercial hydrothermal resource is defined as a well that has a capacity of generating 3 MWe or greater without any reservoir stimulation or enhancement, as confirmed by appropriate well testing.

Please note that extensive site characterization work will NOT be funded under this FOA although it is allowable as recipient cost-share.

Under this Topic Area, projects with existing permits or a clearly outlined and pre-positioned pathway to securing permitting will be given preference during the Merit Review Process. The Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for geothermal resource extraction at the proposed site at the time of application, or must provide clear documentation that surface and subsurface rights for geothermal resource extraction can be obtained within the timeframe of Phase 1 of the project. Letters of support from partners or subcontractors do not take the place of legal documentation of surface and subsurface rights.<sup>28</sup> It is a requirement that the site be within or proximal to a producing hydrothermal field and that an operational and accessible power plant exist near the location of the proposed well(s).

Costs to develop pipelines to reach said operational power plant must be outlined in the application materials and must be paid for by the project team. A higher priority will be given to proposals that identify wells that, if successfully stimulated, will require lower costs for access to power facilities or provide higher cost share for the development of required infrastructure to produce power, if applicable (pipelines, pipeline connections, etc.).

It is the expectation that the Project Level Economic Analysis as well as other aspects of Technical, Organizational and Market Learning will be further developed and updated by awardees under this FOA throughout the phases of the projects.

Applicants **must include a preliminary but thorough analysis of electrical power potential, prior to, and following the planned permeability enhancement activities** as part of their Application's Technical Volume.

## **Topic Area 2: EGS Green Field Demonstrations**

**Sites with no existing or proximal geothermal development and potential for sedimentary, igneous and/or mixed metamorphic rock EGS with near-term electrical power production potential.**

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<sup>28</sup> For projects on federal land, legal documentation may include a BLM lease, BLM site license, BLM exploration permit, BLM drilling permit, and a BLM utilization permit. For projects on private/state land, legal documentation may include: a deed or lease for the geothermal rights (as defined in that state), a similar document showing surface rights, and drilling & operating permits.

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**Objective:** EGS Green Field Demonstrations will target low permeability, geothermal anomalies with the *potential* for power production, where no current geothermal development exists.

**These demonstrations will focus on technical, organizational, and market learning.** They will be required to utilize innovative stimulation techniques and technologies to continue to hone our understanding of what is required, especially with respect to zonal isolation and stimulation, to scale up EGS and ensure its viability throughout the U.S. Applicants should closely consider the Objectives outlined on page 7 of the Background section in defining their proposed project approach and opportunities to learn-by-doing.

**Technical Requirements:** This Topic Area will facilitate development in well-characterized sedimentary, igneous and/or mixed metamorphic reservoirs without regard to geographic location within the United States. Further, this Topic Area will provide an opportunity to refine our understanding of the extent of EGS resources available for new, clean, baseload geothermal power production.

Applicants can consider a variety of development techniques to effectively access and create a productive EGS reservoir in designing their projects, including: unique completions, well orientations relative to in situ stress, stimulation and zonal isolation technology or methods. The use of available or tested prototype technologies from geothermal, oil and gas, or other relevant industries are allowable but the Technology Readiness Level (TRL) of proposed stimulation/isolation technologies must be at least a six (6). It is the intent of this pilot demonstration that proposed technologies have been tested in relevant environments and applicants must demonstrate as such in their applications. Please see Appendix E for TRL definitions.

Proposed sites/reservoirs should, per 42 U.S.C. 17194(d)), include sites where “subsurface characterization or geothermal energy integration analysis has been conducted” and in “locations that are potentially commercially viable for enhanced geothermal systems development, while also considering environmental impacts to the maximum extent practicable.” Rigorous and thorough technical documentation of such characterization and integration analyses must be provided by the Applicant in the submitted Technical Volume of the application. Extensive site characterization work will not be funded under this FOA although it is allowable as recipient cost-share.

Awards made under this announcement will be cooperative agreements that will include drilling, well stimulation, data collection, power production (if feasible), modeling, and analysis.

#### **Drilling and Site Requirements:**

The value of information obtained from wellbores drilled in new or frontier areas is inherently high, and provides a primary basis for confirmation of the potential for any new EGS resource. As such, at least one well which has been drilled to and has encountered the target reservoir at proposed site(s) would be preferred prior to an award being made by DOE under this

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announcement, although this is not a requirement. For applications where a target well or wells do not exist or where additional wells are proposed, only that portion of the award discussed above can be applied to well construction activities. For sites with existing wells, DOE seeks wells that are in good condition and capable of being put into operations relatively quickly and with minimal workover, subject to the funding restrictions noted previously. Applicants who have proposed sites without existing target wells are encouraged to only apply if sufficient site-specific geologic characterization and analysis has taken place as specified in 42 U.S.C. 17194(d) (the level of data available will be reviewed as part of the Merit Review Process) and if well location(s) has already been selected. Additionally, if a new well or wells are proposed, the applicant must describe in sufficient detail that the new well(s) is not targeting a prime hydrothermal resource and the drilling activities must incorporate technology advancements aimed at reducing well construction time compared to nearby offset wells or wells of a similar nature. Specific requirements for new drilling are included in the Project Phase Descriptions.

If a new well(s) is proposed, **operators should note that drilling costs must be repaid to DOE if a commercial hydrothermal resource is identified and accessed during drilling.** For this FOA, a commercial hydrothermal resource is defined as a well that has a capacity of generating 3 MWe or greater without any reservoir stimulation or enhancement, as confirmed by appropriate well testing.

Under this Topic Area, projects with existing permits or a clearly outlined and pre-positioned pathway to securing permitting will be given preference during the Merit Review Process. The Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for geothermal resource extraction at the proposed site at the time of application, or must provide clear documentation that surface and subsurface rights for geothermal resource extraction can be obtained within the timeframe of Phase 1 of the project. Letters of support from partners or subcontractors do not take the place of legal documentation of surface and subsurface rights.<sup>29</sup>

Although power production is not a requirement, it is an encouraged outcome, albeit beyond the scope/funding available through this FOA. Applicants **must include a preliminary but thorough analysis of electrical power potential, prior to, and following the planned permeability enhancement activities** as part of their Application's Technical Volume.

### **Topic Area 3: Super-hot/Supercritical EGS Demonstration**

**Super-hot/ Supercritical EGS demonstrations located at well-characterized sites with near-term electrical power production potential.**

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<sup>29</sup> For projects on federal land, legal documentation may include a BLM lease, BLM site license, BLM exploration permit, BLM drilling permit, and a BLM utilization permit. For projects on private/state land, legal documentation may include: a deed or lease for the geothermal rights (as defined in that state), a similar document showing surface rights, and drilling & operating permits.

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**Objective:** This Topic Area targets low permeability, super-hot / supercritical EGS resources (>375°C) with the *potential* for power production. **These demonstrations will focus on technical, organizational, and market learning.** Super-hot / Supercritical Demonstrations will be required to improve our understanding of the mechanisms controlling fracture generation and sustainability in superhot environments and elucidate the relationships between reservoir permeability, fluid chemistry, temperature, and pressure. **Applicants should closely consider the Objectives outlined on page 7 of the Background section in defining their proposed project approach and opportunities to learn-by-doing.**

**Technical Requirements:** This Topic Area will facilitate EGS development in well characterized, super-hot/supercritical reservoirs, regardless of subsurface geologic setting by providing an opportunity to refine our understanding of the unique and high potential super-hot/supercritical EGS resources available for new, clean, baseload geothermal power production.

Applicants can consider a variety of development techniques to effectively access and create a productive reservoir in super-hot/supercritical environments, including: unique well designs, completions, wellbore orientations, reservoir stimulations, and zonal isolation technology or methods, however, this Topic Area DOES NOT REQUIRE multizone stimulation (e.g., open-hole stimulations below the last cemented casing string are acceptable). Instead, the focus is on earlier stage understanding of the subsurface environment and how stimulation will alter that environment.

If multizone stimulation is proposed, the use of available or tested prototype technologies from geothermal, oil and gas, mining, or other relevant industries are allowable but the TRL of proposed stimulation/isolation technologies must be at least a six (6). It is the intent of this pilot demonstration that proposed technologies have been tested in relevant environments and applicants must demonstrate as such in their applications. Please see Appendix E for TRL definitions.

Proposed sites/reservoirs should, per 42 U.S.C. 17194(d)), include sites where “subsurface characterization or geothermal energy integration analysis has been conducted” and in “locations that are potentially commercially viable for enhanced geothermal systems development, while also considering environmental impacts to the maximum extent practicable.” Extensive characterization work to assess the quality and potential of the geothermal resource will not be funded under this FOA although it is allowable as recipient cost-share. Extensive subsurface data collection, analysis, and sharing is, however, a requirement. The collection of this data can be supported with DOE funding, such that the data is made publicly available through the Geothermal Data Repository so as to further the accrual of knowledge surrounding these unique systems.

Under this Topic Area, projects with existing permits or a clearly outlined and pre-positioned pathway to securing permitting will be given preference during the Merit Review Process. The

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Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for geothermal resource extraction at the proposed site at the time of application, or must provide clear documentation that surface and subsurface rights for geothermal resource extraction can be obtained within the timeframe of Phase 1 of the project. Letters of support from partners or subcontractors do not take the place of legal documentation of surface and subsurface rights.<sup>30</sup>

### **Unique Research Requirements for Topic Area 3:**

Recipients that propose super-hot/supercritical operations will need to provide or collect targeted data sets with complimentary analysis to address technical unknowns associated with operations (all of which must be uploaded to the Geothermal Data Repository), including but not limited to:

- Analysis and modeling to predict the native state of the potential reservoir and the effect of drilling and stimulation perturbations
- Fractures evolution as a result of perturbation (drilling and fluid injection)
- Collection of fluid/gas samples to refine current thermodynamic databases - (e.g., Reed & Palandri, 2021)
- Estimates of stress-strain relationships of the host rock under superhot/supercritical conditions
- Geophysical datasets for detailed subsurface Lithologic, Rock Mechanical, and Structural Geologic characterization

**Please note that DOE will prioritize the collection of critical subsurface data, stimulation, and stimulation analysis in this Topic Area over additional well drilling, as our focus is to better understand how permeability, induced seismicity and geochemistry, evolve during stimulation and post-stimulation testing which ultimately impact the sustainability of super-hot/supercritical systems.**

### **Drilling and Site Requirements:**

**At least one target well(s) must exist** at proposed sites. For applications where an additional well is desired or where deepening of an existing well is required, only that portion of the award discussed in the **Drilling, Recompletion, and Workover Costs** subsection of the “Pilot Demonstration Requirements” section, can be applied to well construction activities. For sites that plan to operate using existing wells, DOE seeks wells that are in good condition and having high mechanical integrity that are capable of being put into operations relatively quickly and

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<sup>30</sup> For projects on federal land, legal documentation may include a BLM lease, BLM site license, BLM exploration permit, BLM drilling permit, and a BLM utilization permit. For projects on private/state land, legal documentation may include: a deed or lease for the geothermal rights (as defined in that state), a similar document showing surface rights, and drilling & operating permits.

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with minimal well interventions or workover, subject to the funding restrictions noted previously. Additionally, if a new well or wells are proposed, the applicant must describe in sufficient detail that the new well is not targeting a prime hydrothermal resource. Drilling Plans for Super-hot / Supercritical systems must include considerations and mitigations for challenging knowns and unknowns (e.g., high temperatures, dramatic pressure gradients, rapid phase transitions, variable reaction rates creating highly corrosive fluids, and the like) both in the context of health and safety perspective and materials and tool/equipment functionality. A risk-register detailing potential operational issues and specific mitigatory actions will be required as part of Stimulation and/or Re-completion/Drilling Plans in Phase 1.

If a new well(s) is proposed, **operators should note that drilling costs must be repaid to DOE if a commercial hydrothermal resource is identified and accessed during drilling.** For this FOA, a commercial hydrothermal resource is defined as a well that has a capacity of generating 3 MW or greater without any reservoir stimulation or enhancement, as confirmed by appropriate well testing.

Under this Topic Area, projects with existing permits or a clearly outlined and pre-positioned pathway to securing permitting will be given preference during the Merit Review Process. The Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for geothermal resource extraction at the proposed site at the time of application, or must provide clear documentation that surface and subsurface rights for geothermal resource extraction can be obtained within the timeframe of Phase 1 of the project. Letters of support from partners or subcontractors do not take the place of legal documentation of surface and subsurface rights.<sup>31</sup>

Although power production is not a requirement, it is an encouraged outcome, albeit beyond the scope/funding available through this FOA. Applicants must include a preliminary but thorough analysis of electrical power potential, prior to, and following the planned permeability enhancement activities as part of their Application's Technical Volume.

#### **Topic Area 4: Eastern-U.S. EGS Stimulation**

**EGS demonstration located at a well-characterized Eastern U.S. site with near-term electrical power potential and heat production.**

**Objectives:** This Topic Area will target low permeability, high temperature geothermal anomalies in the Eastern U.S. with the *potential* for generation of electrical power and heat production (must include potential for near-term power production – projects cannot only supply heat) as a cascaded resource. **These demonstrations will focus on technical,**

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<sup>31</sup> For projects on federal land, legal documentation may include a BLM lease, BLM site license, BLM exploration permit, BLM drilling permit, and a BLM utilization permit. For projects on private/state land, legal documentation may include: a deed or lease for the geothermal rights (as defined in that state), a similar document showing surface rights, and drilling & operating permits.

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**organizational, and market learning.** Eastern U.S. Pilot demos will be required to utilize innovative stimulation or completion techniques and technologies to continue to hone our understanding of what is required, especially with respect to stimulation technology/methodologies, to demonstrate the viability of EGS in the terrains of the Eastern U.S.

**Technical Requirements:** Proposed sites/reservoirs should, per 42 U.S.C. 17194(d)), include sites where “subsurface characterization or geothermal energy integration analysis has been conducted” and in “locations that are potentially commercially viable for enhanced geothermal systems development, while also considering environmental impacts to the maximum extent practicable.”

Although electrical power production is not a requirement, it is both allowable and encouraged. Those projects lacking the infrastructure to produce electrical power will be required to present detailed analysis of potential electrical power of the proposed EGS resource.

Awards made under this announcement will be cooperative agreements that will include well stimulation, data collection, power / heat production (if feasible), modeling, and analysis over four Phases.

#### **Drilling and Site Requirements:**

**It is a requirement that at least one target well exist** at any proposed Eastern U.S. Pilot Demonstration site prior to an award being made by DOE under this announcement. For applications where additional wells are proposed, only that portion of the award discussed above can be applied to well construction activities. For the existing well(s), DOE seeks wells that are in good condition and having high mechanical integrity that are capable of being put into operations relatively quickly and with minimal intervention or workover, subject to the funding restrictions noted previously. Applicants are encouraged to apply to drill additional wells on site only if sufficient site-specific geologic characterization and analysis has taken place to appropriately site the proposed well and to provide site information as specified in 42 U.S.C. 17194(d) (the level of data available will be reviewed as part of the Merit Review Process). Specific requirements for new drilling are included in the Project Phase Descriptions.

Under this Topic Area, projects with existing drilling permits or a clearly outlined and pre-positioned pathway to securing permits will be given preference during the Merit Review Process. The Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for geothermal resource extraction at the proposed site at the time of application or must provide clear documentation that surface and subsurface rights for geothermal resource extraction can be obtained within



the timeframe of Phase 1 of the project. Letters of support from partners or subcontractors do not take the place of legal documentation of surface and subsurface rights.<sup>32</sup>

Although power production is not a requirement, it is an encouraged outcome, albeit beyond the scope/funding available through this FOA. Applicants **must include a preliminary but thorough analysis of electrical power potential, prior to, and following the planned permeability enhancement activities** as part of their Application's Technical Volume.

### **Project Phase Descriptions:**

Proposed projects should be completed in distinct phases with go/no-go decision points after Phase 1, 2, 3, and during Phase 4, as appropriate. Phases are described below with required objectives. It is not necessary to complete these objectives in the order listed; some objectives also may be completed in parallel depending on the proposed site.

All tasks should include SMART (Specific, Measurable, Achievable, Relevant, and Timely) milestones that demonstrate achievement included at the end of each objective.

#### **Phase 1 – Planning + Permitting**

The goal of Phase 1 is to complete mission-critical technical and logistical tasks that demonstrate site viability.

- Assess all available site characterization data and develop a conceptual geologic model if one does not already exist:
  - Compile site data into a conceptual geologic model of the proposed site (if one does not already exist). The model should include graphical representations of key characteristics that reflect site suitability for meeting GTO project goals and objectives. While reservoir modeling is not required during Phase 1, quantitative and/or other probabilistic analyses should be undertaken to bound uncertainties in the distribution and magnitude of key subsurface parameters including the extent of target reservoir rock units, temperature profile, fluid content, permeability and porosity, geologic structure and lithology and rock mechanical properties, petrology, and stress regime especially those which substantiate proposed stimulation methodologies.
  - Archive site data used to support the conceptual geologic model to GTO's Geothermal Data Repository (GDR), which hosts all data collected or developed by GTO-funded awards;
  - **For Topic Area 3 Only:**

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<sup>32</sup> For projects on federal land, legal documentation may include a BLM lease, BLM site license, BLM exploration permit, BLM drilling permit, and a BLM utilization permit. For projects on private/state land, legal documentation may include: a deed or lease for the mineral/water/geothermal rights (as defined in that state), a similar document showing surface rights, and drilling & operating permits.

- Teams working in super-hot/supercritical environments should outline a plan to collect data prior to or during well re-completion or new well construction (if applicable) and stimulation to inform their required analysis on the following non-inclusive list of subjects:
  - Analysis and modeling to predict the native state of the potential reservoir and the effect of drilling and stimulation perturbations
  - Fracture evolution as a result of perturbation (drilling and fluid injection)
  - Collection of fluid/gas samples to refine current thermodynamic and reservoir fluid databases (e.g., Reed & Palandri, 2021)
  - Development of stress/strain constitutive relationships of the host rock in super-hot/supercritical conditions
  - Geophysical data sets for detailed subsurface reservoir Lithologic, Rock Mechanical, and Structural Geologic characterization
- Develop Stimulation Plan:
  - The Stimulation Plan must describe in detail the proposed stimulation method and must reference an existing, comprehensive geologic model that describes the geology of the site, outlines the presence of any mapped or possible faults, current or historical seismicity (if any), as well as subsurface principal stress orientations and magnitudes. If critical data gaps exist, DOE will consider the acquisition of new well characterization data in order to develop a rigorous and thorough stimulation plan, if it is clearly outlined in the application materials and budget documents, but DOE's expectation is that existing datasets will be utilized to develop the Stimulation Plan. All relevant geological, geomechanical, petrophysical, geochemical, geophysical and seismological data may be considered in the development of the Stimulation Plan.
  - The Stimulation Plan must also include the implementation of novel reservoir stimulation technologies and methodologies employing multi-zone stimulation approaches (**Please note that multi-zone stimulation is not required for Topic Area 3**). Stimulation or isolation tools and technologies of interest for deployment at the Pilot Demo site must be described in the Stimulation Plan in detail. If the tools are currently under development, they **must be at a TRL of 6** to be considered for testing at the Pilot Demo site. Evidence of this TRL level must be provided in the stimulation plan.
  - Re-stimulation and stimulation in adjacent existing wells (to be connected during stimulation) will be permitted and consideration of the staging of subsequent re-stimulation or additional well stimulation should be included in the Stimulation Plan and included in all power production capacity modeling and Induced Seismicity Mitigation Plan analysis and mitigations.
- Initiate Permitting Activities:
  - Develop an updated schedule and detailed budget for the completion of the relevant federal, state, and local permitting.

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- The recipient will be required to present updated permitting requirements and schedule to DOE and all applicable federal and state permitting agencies in a Phase 1 Permitting meeting.
- Initiate permitting activities with all relevant federal, state, and local permitting agencies.
  - Environmental reviews, permits, and approvals, must be recorded and/or obtained in accordance with NEPA and other state and local requirements and should include all relevant activities to the proposed project (characterization, monitoring, drilling, technology testing, stimulation, post-stimulation testing) in the context of potential environmental impacts.
  - For projects proposing drilling, all drilling permits and regulatory approvals must be issued by appropriate permitting authorities and relevant regulatory agencies prior to the end of Phase 1.
- Establish Wellbore Readiness:
  - **For Existing Wells:**
    - The requirement for Phase 1 is final planning for the workover or re-completion of the candidate well. This can include re-entering the proposed wellbore to determine if proposed re-completion plans are feasible and adequate and to develop more accurate budgets for re-completion activities to take place in Phase 2. Please note that DOE seeks wells that are in operational condition and/or require minimal intervention to allow stimulation.
    - For wells requiring workover, re-completion, or additional drilling, detailed operational plans and costs must be submitted to DOE during Phase 1.
  - **For New Wells**
    - The requirement for Phase 1 is to build on preliminary drilling plans supplied in the application materials to develop a final drilling plan that fully accounts for the subsurface stress conditions at the site, positions the team to access fractures effectively and in accordance with their stimulation plan, and provides detailed mitigatory actions and considerations for common geothermal drilling challenges including high temperatures, high fluid pressures, corrosive gases, lost circulation, and other such operational hazards (Finger and Blankenship, 2010)<sup>33</sup>. GTO can provide support to teams in accounting for geothermal considerations. Drilling programs will be reviewed by independent drilling experts in collaboration with the DOE Team and must be approved by the DOE Team prior to commencement of drilling operations.

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<sup>33</sup> <https://www1.eere.energy.gov/geothermal/pdfs/drillinghandbook.pdf>

- During Phase 1, Teams will be permitted to release bids for subcontractors related to drilling and on-site operational support and procure long lead time items required for drilling.
- Teams are required to supply DOE with complete and detailed plans and cost estimates for new well development.
- Teams will be required to convene a panel of external experts, which can include the external DOE experts mentioned above, to review and support the development of the well plan. Following plan development, the team will conduct a formal “Drill the Well On Paper” (DWOP) exercise with representatives from DOE present. Upon completion of the DWOP exercise, a final drilling plan will be submitted to DOE for approval. DOE approval is required prior to commencement of drilling operations.
- Begin Induced Seismicity Mitigation Plan (ISMP) Preparations:
  - Initiate preliminary seismic monitoring: Deployment of a telemetered seismic monitoring array comprised surface and/or borehole (preferred) stations capable of recording seismic events with magnitudes as small as magnitude 0.0 and preferably magnitude lower and a minimum of 30 days of recorded seismic data.
  - Recipients will be required to develop an ISMP in line with the current version of the “Best Practices for Addressing Induced Seismicity Associated With Enhanced Geothermal Systems (EGS).”  
([https://wellbore.lbl.gov/downloads/Best\\_Practices\\_EGS\\_Induced\\_Seismicity\\_8-APR-2016.pdf](https://wellbore.lbl.gov/downloads/Best_Practices_EGS_Induced_Seismicity_8-APR-2016.pdf))
- Develop Environmental, Safety and Health Plan:
  - An Environmental, Safety and Health (ES&H) Plan must identify and analyze safety risks for existing and potential hazards or unsafe conditions associated with field activities. The ES&H Plan must identify contact personnel responsible for on-site safety as well as provide for procedures and protocols for hazards communication, emergency evacuation and response, and any ES&H training requirements. ES&H requirements shall flow down to subcontractors.
- Communications Outreach
  - Recipients should conduct communications and outreach activities with stakeholders, including labor unions and the general public to listen to concerns, provide details on their project plans, and share their project successes
  - During Phase 1, it is expected that a full or part time “Information Officer” will be hired to direct all engagement with the local community, ensuring there is a direct conduit between the stakeholders and the project team.
  - The Information Officer should coordinate active engagement with local stakeholders starting in Phase 1, prior to any drilling or stimulation activities.
- Phase 1 Reporting:
  - The minimum technical requirement for Phase 1 is to obtain sufficient information and permission to proceed to Phase 2 to stimulate the proposed wellbore. This information should be documented in a Phase 1 report.

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- Overview of geological conditions via a summary of the existing geological model, including a description of mapped or unmapped / predicted faults. Interpretation and representation of the natural fracture system and basic prediction of the direction(s) of fracture growth.
- A detailed well stimulation plan that includes required tasks with go/no-go decisions, a budget, and a schedule and includes estimated volumes of rock to be stimulated and power/heat potential expected to be generated.
- Detailed plans and costs for projects that require drilling, re-completion, or workover.
- Updated Environmental Information Volume (EIV): All reports, plans, permits, licenses, and other items required by governmental regulatory agencies for the performance of this work, including NEPA determination and documentation.
- **GO/No-Go –All requirements of Phase 1 must be completed with no intractable technical or operational challenges identified or encountered and unmitigated during Phase 1.**

#### **Phase 2 - FOR PROJECTS UTILIZING EXISTING WELLS – Final Site Preparations**

- Initiate Work-over or Re-Completion Activities:
  - Teams that propose the use of existing wells will implement workover or re-completion plans in Phase 2.
  - Teams will be required to implement all ES&H activities outlined in their ES&H and Re-Completion Programs and check in with DOE and relevant DOE contracted support teams throughout the drilling program.
    - Teams working in Super-hot/supercritical environments will be required to develop specific mitigation strategies in their ES&H Plan associated with anticipated environments.
  - During workover or re-completion operations, the collection of new logs, approved by DOE, including borehole imaging logs (if open hole exists) for pre- and post-stimulation comparison are encouraged. DOE may establish standard data collection requirements (funded by DOE) for all funded drilling activities to support drilling research in other parts of the GTO programs.
    - Teams working in Super-hot/supercritical environments should implement well characterization activities before or during re-completion, as outlined in Phase 1 Plans.
  - Following workover or recompletion activities, the well testing must be performed in an appropriate manner agreed upon by DOE to establish the baseline performance of the well and verify that they are not commercially viable and require stimulation to be viable.
- Revise Geologic Model:

- Refine Phase 1 conceptual geologic site model to incorporate new characterization or monitoring data informed by any new non-invasive site characterization as permitted by NEPA status.
- Revise Stimulation Plan:
  - Stimulation Plans should be revised based on data and analysis collected during workover or re-completion operations (if relevant). Teams are permitted to conduct dynamic reservoir modeling based on the refined geologic site model to inform stimulation design.
- Finalize Induced Seismicity Mitigation Plan:
  - Finalize the Induced Seismicity Mitigation Plan, which incorporates Micro Earthquake (MEQ) data and associated analysis into a completed Probabilistic Seismic Hazard Analysis (PSHA), Criteria for Damage and Vibration, and Mitigation Actions for field testing.
- Finalize Required Permitting Activities:
  - In preparation for stimulation and by the end of Phase 2, all NEPA, State, and Local permits required for stimulation operations must be finalized.
- **GO/No-Go - All requirements of Phase 2 must be met, and any intractable technical or operational challenges encountered during drilling or field work must be adequately mitigated.**

## **Phase 2 - FOR PROJECTS DRILLING NEW WELLS – Drilling and Site Preparations**

- Initiate Drilling Activities:
  - Teams approved to drill a new well will be required to implement all ES&H activities outlined in their ES&H and Drilling Programs and check in with DOE and relevant DOE contracted support teams throughout the drilling program.
  - Teams will be required to work with DOE and a Technical Monitoring Team to assist in providing operational support and feedback during drilling. Drilling costs will be monitored in coordination with DOE project management team to ensure projects stay within allowable cost ranges proposed in the original cost estimate.
    - Logging activities, as described in the drilling plan and approved by DOE are encouraged during drilling operations to further refine geologic models and stimulation procedures and improve geothermal drilling efficiency. DOE will fund these activities with the expectation that all data will be submitted to the GDR quarterly.
    - All relevant drilling parameters will be monitored and logged using an electronic data recording (EDR) system, all events of note will be documented as metadata in the submitted EDR files.
    - Detailed drilling reports and cost tracking reports will be provided to DOE via email to the project officer on a daily basis both in PDF format and in the native format of the software used to generate the daily reports.

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- Newly drilled wells under Topic Areas 1, 2, and 4 must be subjected to appropriate testing to establish the baseline performance of the well and verify that they are not commercially viable and require stimulation to be viable.
  - The skill standards and certifications of workers engaged in the drilling and related activities.
- Revise Geologic Model:
  - Refine Phase 1 conceptual geologic site model to incorporate new characterization or monitoring data informed by any new non-invasive site characterization as permitted by NEPA status.
- Revise Stimulation Plan:
  - Post drilling, Stimulation Plans should be revised based on data and analysis collected during drilling operations. Teams are permitted to conduct dynamic reservoir modeling based on the refined geologic site model to inform stimulation design.
- Finalize Induced Seismicity Mitigation Plan:
  - Finalize the Induced Seismicity Mitigation Plan, which incorporates MEQ data and associated analysis into a completed Probabilistic Seismic Hazard Analysis (PSHA), Criteria for Damage and Vibration, and Mitigation Actions for field testing.
- Finalize Required Permitting Activities:
  - In preparation for stimulation and by the end of Phase 2, all Federal, State, and Local permits required for stimulation operations must be finalized.
- **GO/No-Go – All requirements of Phase 2 must be met and any intractable technical or operational challenges encountered during drilling or field work must be adequately mitigated. New well must be capable of producing at an equivalent rate of 3MW or greater, based upon rigorous well testing.**

### **Phase 3 – Stimulation + Testing**

The goal of Phase 3 is to complete well stimulation(s) and establish flow of geothermal fluid between wells (if available), thoroughly analyze stimulation results, and collect and archive stimulation data for public use.

**Please Note:** Recipients are expected to conduct and promote communications, education, and outreach activities with DOE, outside stakeholders, and the public to promote awareness of this initiative throughout Phase 3.

- **Phase 3A: Perform Stimulation Activities**
  - Complete stimulation of the candidate geothermal well via hydraulic stimulation (or other means) and to establish inter-well connectivity based on stimulation plans outlined in Phase 1 and Phase 2.

- All relevant stimulation treatment parameters will be electronically recorded and submitted to the GDR. Metadata of all notable events shall be included in the electronic files.
- **Phase 3B: Testing and Analysis**
  - Following stimulation activities, well testing must be performed in an appropriate manner to establish a direct comparison of current production performance to pre-stimulation well production performance. DOE approval of well testing plan and procedures is required prior to commencement of well testing operations.
- **Phase 3C: Additional Stimulation Activities**
  - If additional stimulation in original target well is anticipated to improve on the results of the initial stimulation efforts, the applicant may propose a repeat of the previous stimulation with appropriate modifications to address learnings from the first effort.
  - Alternative stimulation methods in the original target well or stimulation activities in a well or wells other than the original target well may be proposed to address learnings from the first effort.
- **Reporting and Publications:**
  - At a minimum, the Phase 3 report should include the following data sets which must be uploaded to the Geothermal Data Repository (GDR):
    - Any drilling or recompletion reports;
    - Daily stimulation reports;
    - Stimulation data;
    - Well logs, as needed;
    - Formation response data following stimulation;
    - Pumping and related data to evaluate the stimulation; and
    - Seismic data prior to and after stimulation
- **GO/No-Go – All requirements of Phase 3 must be met, and any intractable technical or operational challenges encountered during stimulation, seismic monitoring, or other field work must be adequately mitigated.**

#### **Phase 4 – EGS Reservoir Sustainability (Desired but not required for Topic Area 3)**

The goal of Phase 4 is to assess and validate long-term fluid flow and heat extraction rates following well stimulation. Phase 4 must include monitoring and characterization of the targeted formation to stimulation to understand and assess the sustainability of the EGS reservoir.

- **Perform Long-Term Flow Testing:**
  - Flow testing will be required for 4-6 months, commencing early in Phase 4.

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- Update Power/Heat Production Estimates:
  - An update to the capacity analysis (potential in MWth or MWe) of the proposed EGS resource should be provided to DOE and supported and refined based on flow test data.
- **GO/No-Go – Initial long-term flow tests are indicative of sufficient power generation potential, such that the well in question is commercially viable and should advance to the power production stage. Any intractable challenges encountered during flow testing must be adequately mitigated. Any intractable operational challenges (e.g., costs) that exist which would limit power production potential have been clearly identified and mitigated**
- **Power Production** (Required for Topic Area 1, Optional for Topic Areas 2, 3, and 4):
  - All operational tasks required to facilitate power production should take place in Phase 4, including connecting or modifying pipelines. Awardees will be expected to cost share power production tasks.
- **Post Stimulation Data Collection** (all Topic Areas):
  - Non-proprietary data collected during all phases of the projects will be made available to the public through the Geothermal Data Repository.
  - Data collection to take place in the months following stimulation can include the following (Only microseismic monitoring is required):
    - Microseismic data and interpretation;
    - Productivity or injectivity data and analysis;
    - Logs run in the well (PTS, sonic, natural gamma, tool-head temperature, etc.);
    - Borehole imaging logs (e.g., televiewer, FMS, other) for both pre- and post-stimulation;
    - Well flow rates and wellhead temperatures;
    - Chemistry of produced fluid and mineral dissolution/precipitation;
    - Formation response/evolution data; and
    - Tracer data, analysis, and results of tracer tests if the well is in communication with other wells in the field or to determine such connection.
- **Reporting and Publications:**
  - Short- and long-term flow test reports, updated power production analysis and/or production data should be included in a final technical report that contains all Phases of the award.
  - For wells drilled under this FOA, a separate retrospective well report including lessons learned.

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- All cost data, digitally recorded data, and daily reports for new wells and as applicable electronically recorded data submitted to the GDR

### **Go/No-Go Decision Points**

There must be go/no-go decision points after Phase 1, after Phase 2, and after Phase 3.

Additional milestones and/or status reviews may be added to the project during negotiations.

At go/no-go decision points, DOE will make one of three decisions for each award based on the technical progress made relative to the Statement of Project Objectives, actual spending during the project period, adherence to the proposed project schedule, and continued financial viability of the project team:

- “Go” Forward – the project is on track, minimal or no modifications are required, work is acceptable, the proposed work plan for the next performance phase is acceptable, funding is available, and the project continues to be appropriate to the mission and goals of GTO.
- “Hold” – the project is still viewed as having a high likelihood of success; however, additional information is required before a “Go” or “No-Go” decision can be made.
- “No-Go” – the project will either be put on hold or DOE may not provide further funding. This may be due to irresolvable technical difficulties, changes in the GTO mission, goals or portfolio or lack of appropriated funds. Should the project be terminated, the final annual report will be accepted by GTO to fulfill the final technical report requirement.

## **C. Applications Specifically Not of Interest**

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

- Applications that fall outside the technical parameters specified in Section I.A. and I.B. of the FOA.
- Applications that propose to conduct demonstration activities outside of the United States of America.
- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications that do not intend to establish feasibility for power production.
- Applications which propose a cost share percentage less than 20%.

## **D. Authorizing Statutes**

The programmatic authorizing statute is

Section 615 of the Energy Independence and Security Act of 2007 (as amended by Section 3002 of the Energy Act of 2020 (codified at 42 U.S.C. § 17194(d)) and

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Section 41007 of the Infrastructure Investment and Jobs Act of 2021 (Pub. L. 117-58)

Awards made under this announcement will fall under the purview of 2 Code of Federal Regulation (CFR) Part 200 as amended by 2 CFR Part 910.

## **E. Notice of Bipartisan Infrastructure Law-Specific Requirements**

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

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

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

Be advised that BIL funds can be used in conjunction with other funding, as necessary to complete projects, but tracking and reporting must be separate to meet the reporting requirements of the BIL and related Office of Management and Budget (OMB) Guidance. Applicants for projects funded by sources other than the BIL should plan to keep separate records for BIL funds and to ensure those records comply with the requirements of the BIL.

## II. Award Information

### A. Award Overview

#### i. Estimated Funding

DOE expects to make a total of approximately \$74 M of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. DOE anticipates making approximately 4-7 awards under this FOA. DOE may issue one, multiple, or no awards. Individual awards may vary between \$5 Million and \$25 Million.

DOE may issue awards in one, multiple, or none of the following Topic Areas:

Topic Area Number	Topic Area Title	Anticipated Number of Awards	Anticipated Minimum Award Size for Any One Individual Award (Fed Share)	Anticipated Maximum Award Size for Any One Individual Award (Fed Share)	Approximate Total Federal Funding Available for All Awards	Anticipated Period of Performance (months)
Topic Area 1	EGS Proximal Pilot Demonstrations	1-4	\$5 M	\$15 M	\$24 M	36-60
Topic Area 2	EGS Green Field Pilot Demonstrations	1-3	\$5 M	\$25 M	\$25 M	36-60
Topic Area 3	Super-hot / Supercritical EGS Pilot Demonstrations	1	\$5 M	\$20 M	\$20 M	36-60
Topic Area 4	Eastern-US EGS Pilot Demonstration	1	\$5 M	\$14 M	\$14 M	36-60

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

#### ii. Period of Performance

DOE anticipates making awards that will run from 36 up to 60 months in length, comprised of one or more budget periods. Project continuation will be contingent upon several elements, including satisfactory performance and DOE's Go/No-Go decision. For a complete list and more information on the Go/No-Go review, see Section VI.B.xiii.

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**iii. New Applications Only**

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

**B. DOE Funding Agreements**

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

**i. Cooperative Agreements**

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

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

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

**ii. Funding Agreements with Federally Funded Research and Development Center (FFRDCs)<sup>34</sup>**

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.

**iii. Other Transactions Authority Agreements (OTAs)**

In rare cases and if only if determined necessary to better achieve the program mission, DOE will consider awarding a contract using its Other Transactions Authority, such as a Technology Investment Agreement (TIA), to a non-FFRDC applicant. TIAs, governed by 10 CFR Part 603, are assistance instruments used to increase the involvement of commercial entities in the Department's research,

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<sup>34</sup> Federally Funded Research and Development Centers (FFRDC) - FFRDCs are public-private partnerships which conduct research for the United States government. A listing of FFRDCs can be found at <http://www.nsf.gov/statistics/ffrdclist/>.

development, and demonstration programs. A TIA may be either a type of cooperative agreement or an assistance transaction other than a cooperative agreement, depending on certain terms, such as financial accounting and/or the intellectual property provisions. In both cases, OTAs are not necessarily subject to all of the requirements of 2 CFR Part 200 as amended by 2 CFR Part 910.

In an OTA, DOE may modify the standard government terms and conditions, including but not limited to:

- Intellectual Property Provisions: DOE may negotiate special arrangements with recipients to modify existing intellectual property rights or to facilitate the commercial deployment of inventions conceived or first actually reduced to practice under the EERE funding agreement.
- Accounting Provisions: EERE may authorize the use of Generally Accepted Accounting Principles (GAAP) where recipients do not have accounting systems that comply with government recordkeeping and reporting requirements.

EERE will be more amenable to awarding an OTA in support of an application from a consortium or a team arrangement that includes cost sharing with the private sector and MSI's, as opposed to an application from a single organization. Such a consortium or teaming arrangement could include a FFRDC. If a DOE/NNSA FFRDC is a part of the consortium or teaming arrangement, the value of, and funding for, the DOE/NNSA FFRDC portion of the work will be authorized and funded under the DOE field work authorization system and performed under the laboratory's Management and Operating (M&O) contract. Funding for a non-DOE/NNSA FFRDC would be through an interagency agreement under the Economy Act or other statutory authority. Other appropriate contractual accommodations, such as those involving intellectual property, may be made through a "funds in" agreement to facilitate the FFRDCs' participation in the consortium or teaming arrangement. If a TIA is awarded, certain types of information described in 10 CFR 603.420(b) are exempt from disclosure under the Freedom of Information Act (FOIA) for five years after DOE receives the information.

An applicant may request an OTA if it believes that using an OTA such as a TIA could benefit the RD&D objectives of the program (see section 603.225) and can document these benefits. If an applicant is seeking to negotiate an OTA, the applicant must include an explicit request in its Full Application. After an applicant is selected for award negotiation, the Contracting Officer will determine if awarding an OTA would benefit the RD&D objectives of the program in ways that likely would not happen if another type of assistance agreement (e.g., cooperative agreement subject to the requirements of 2 CFR

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Part 200 as amended by 2 CFR Part 910). The Contracting Officer will use the criteria in 10 CFR 603, Subpart B, to make this determination.

### **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. Non-profit entities; and
4. State and local governmental entities, and Tribal Nations.

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

DOE/NNSA FFRDCs are eligible to apply for funding as a prime recipient or subrecipient.

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, 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.

Entities identified on a Department of Homeland Security, Binding Operational Directives as an entity publicly banned from doing business with the United States government are not eligible. See <https://cyber.dhs.gov/directives/>.

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. Nonprofit organizations described in section 501(c)5 of the Internal Revenue Code are eligible to apply for funding.

**ii. Foreign Entities**

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

Appendix C 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.

**iii. Incorporated Consortia**

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

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

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

**iv. Unincorporated Consortia**

Unincorporated Consortia must designate one member of the consortium to serve as the prime recipient/consortium representative. The prime recipient/consortium representative must be incorporated (or otherwise formed) under the laws of a state or territory of the United States. The eligibility of the consortium will be determined by the eligibility of the prime recipient/consortium representative under Section III.A. of the FOA.



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

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

## **B. Cost Sharing**

Applicants are bound by the cost share proposed in their Full Applications if selected for award negotiations.

Please note that cost share has been reduced to 20% for this FOA to attract the broadest group of potential applicants.

Any costs incurred prior to the award selection date (such as well drilling or workovers, collection of rock/core cuttings, well-field development, or power plant construction) are not eligible for consideration as recipient cost share. However, recipient cost share for wells drilled only after December 31, 2008, and prior to the project period start date may be allowable if those costs fall into depreciation covered under an indirect rate agreement or allocation method approved by a governmental agency. Please note that target wells that have been drilled prior to December 31, 2008, are still eligible for stimulation, but will not be allowable for consideration as cost share.

### **i. Legal Responsibility**

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

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

**ii. Cost Share Allocations**

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

**iii. Cost Share Types and Allowability**

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

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

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

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

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

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

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

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

Cost share contributions must be specified in the project budget, verifiable from the prime recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same federal regulations as federal dollars to the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

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

**iv. Cost Share Contributions by FFRDCs**

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

**v. Cost Share Verification**

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

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

**vi. Cost Share Payment**

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

In limited circumstances, and where it is in the government's interest, the DOE Contracting Officer may approve a request by the prime recipient to meet its

cost share requirements on a less frequent basis, such as monthly or quarterly. Regardless of the interval requested, the prime recipient must be up-to-date on cost share at each interval. Such requests must be sent to the Contracting Officer during award negotiations and include the following information: (1) a detailed justification for the request; (2) a proposed schedule of payments, including amounts and dates; (3) a written commitment to meet that schedule; and (4) such evidence as necessary to demonstrate that the prime recipient has complied with its cost share obligations to date. The Contracting Officer must approve all such requests before they go into effect.

## C. Compliance Criteria

**Letters of Intent and Full Applications must meet all compliance criteria listed below or they will be considered noncompliant. DOE will not review or consider noncompliant submissions**, including Letters of Intent and Full Applications that were: submitted through means other than EERE Exchange; submitted after the applicable deadline; and/or submitted incomplete. DOE will not extend the submission deadline for applicants that fail to submit required information by the applicable deadline due to server/connection congestion.

### i. Compliance Criteria

#### i. *Letters of Intent*

Letters of Intent are deemed compliant if:

- The applicant entered all required information and clicked the “Submit” button in EERE Exchange by the deadline stated in the FOA.

#### ii. *Full Applications*

Full Applications are deemed compliant if:

- The applicant submitted a compliant Letter of Intent;
- The Full Application complies with the content and form requirements in Section IV.D. of the FOA; and
- The applicant successfully uploaded all required documents and clicked the “Submit” button in EERE Exchange by the deadline stated in the FOA.

## D. Responsiveness Criteria

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

## E. Other Eligibility Requirements

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

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

The following wording is acceptable for the authorization:

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

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

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

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

#### iii. 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.

#### iv. 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

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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.

v. *Value/Funding*

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

vi. *Cost Share*

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

vii. *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.

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

DOE/NNSA FFRDCs participating as a subrecipient on a project and funded directly through the DOE WP System are strongly encouraged to establish a Cooperative Research and Development Agreement<sup>35</sup> (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

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<sup>35</sup> 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>



any project work begins. Any questions regarding the use of a CRADA or TAA should be directed to the cognizant DOE field intellectual property (IP) counsel.

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

## **F. Limitation on Number of Full Applications Eligible for Review**

An entity may submit more than one Full Application to this FOA, provided that each application describes a unique, scientifically distinct, or geographically distinct project.

## **G. Questions Regarding Eligibility**

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

# **IV. Application and Submission Information**

## **A. Application Process**

The application process will include two phases: a Letter of Intent phase and a Full Application phase.

At each phase, DOE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. DOE will not review or consider submissions that do not meet the eligibility requirements of Section III. All submissions must conform to the following form and content requirements, including maximum page lengths (described below) and must be submitted via EERE Exchange at <https://eere-Exchange.energy.gov>, unless specifically stated otherwise. **DOE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, or incomplete submissions.** DOE will not extend deadlines

for applicants who fail to submit required information and documents due to server/connection congestion.

A **Control Number** will be issued when an applicant begins the EERE Exchange application process. This control number must be included with all application documents, as described below.

The Letter of Intent and Full Application must conform to the following requirements:

- Each must be submitted in Adobe PDF format unless stated otherwise;
- Each must be written in English;
- All pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Calibri typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement;
- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page; and
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting each submission deadline. **Applicants are strongly encouraged to submit their Letters of Intent and Full Applications at least 48 hours in advance of the submission deadline.** Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Letter of Intent, Full Application, or Reply to Reviewer Comments. Once the Letter of Intent, 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 Letter of Intent, Full Application, or Reply to Reviewer Comments before the applicable deadline.

DOE urges applicants to carefully review their Letters of Intent and Full Applications to allow sufficient time for the submission of required information and documents.

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Full Applications that pass the initial eligibility review will undergo comprehensive technical merit review according to the criteria identified in Section V of the FOA.

**i. Additional Information on EERE Exchange**

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

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

**B. Application Forms**

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

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

**TechnicalVolume\_Part\_1**

**TechnicalVolume\_Part\_2**

**C. Content and Form of the Letter of Intent**

Applicants must submit a Letter of Intent by the specified due date and time to be eligible to submit a Full Application. Letters of Intent will be used by DOE to plan for the merit review process. The letters should not contain any proprietary or sensitive business information. The letters will not be used for down-selection purposes, and do not commit an applicant to submit an application.

Each applicant must provide the following information as part of the Letter of Intent:

- Project Title;
- Lead Organization;
- Organization Type (Business < 500 Employees; Business > 1000 Employees; Business 500-1000 Employees; FFRDC; Government-Owned, Government Operated; Non-Profit; University);

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- Whether the application has been previously submitted to DOE;
- % of effort contributed by the Lead Organization;
- The Project Team, including:
  - The Principal Investigator (PI) for the prime recipient;
  - Team Members (i.e., subrecipients); and
  - Senior/Key Personnel (i.e., individuals who contribute in a substantive, measurable way to the execution of the proposed project);
- Technical Topic Area; and
- Abstract – The abstract provided should be not more than 200 words in length and should provide a truncated explanation of the proposed project.

## **D. Content and Form of the Full Application**

Applicants must submit a Full Application by the specified due date and time to be considered for funding under this FOA. Applicants must complete the following application forms found on the EERE Exchange website at <https://eere-Exchange.energy.gov/>, in accordance with the instructions.

Applicants will have approximately 120 days from receipt of the Letter of Intent to prepare and submit a Full Application. The submission deadline for the Full Application is 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. Applicants will receive a control number upon clicking the “Create Letter of Intent” button in EERE Exchange, and should include that control number in the file name of their Full Application submission (i.e., *Control number\_Applicant Name\_Full Application*).

### **i. Full Application Content Requirements**

Each Full Application must be limited to a single concept or technology. Do not consolidate unrelated concepts and technologies in a single Full Application. Full Applications must conform to the following content and form requirements, and must not exceed the stated page limits. If applicants exceed the maximum page lengths indicated below, DOE will review only the authorized number of pages and disregard any additional pages.

Component	File Format	Page Limit	File Name
Technical Volume	PDF	30	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	2 pages each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives	MS Word	12	ControlNumber_LeadOrganization_SOPO
SF-424	PDF	n/a	ControlNumber_LeadOrganization_App424
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, if applicable (see DOE O 412.1A, Attachment 3)	PDF	n/a	ControlNumber_LeadOrganization_WP
Authorization from cognizant Contracting Officer for FFRDC	PDF	n/a	ControlNumber_LeadOrganization_FFRDCAuth
SF-LLL Disclosure of Lobbying Activities	PDF	n/a	ControlNumber_LeadOrganization_SF-LLL
Foreign Entity Waiver Requests and Foreign Work Waiver Requests	PDF	n/a	ControlNumber_LeadOrganization_Waiver
Buy America Requirements for Infrastructure Projects Waiver Requests	PDF	n/a	ControlNumber_LeadOrganization_BAWaiver
Community Benefits Plan	PDF	5	ControlNumber_LeadOrganization_CBenefits
Current and Pending Support	PDF	n/a	ControlNumber_LeadOrganization_CPS
Geothermal Drilling Permits and Legal Rights Documentation	PDF	n/a	ControlNumber_LeadOrganization_Permits_and_Lease

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

**TechnicalVolume\_Part\_1**

**TechnicalVolume\_Part\_2**

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

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

**ii. Technical Volume**

The Technical Volume must be submitted in PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. This volume must address the technical review criteria as discussed in Section V of the FOA. Save the Technical Volume in a single PDF file using the following convention for the title “ControlNumber\_LeadOrganization\_TechnicalVolume”.

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

The Technical Volume to the Full Application may not be more than 30 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the technical review criterion (see Section V of the FOA) when preparing the Technical Volume.

The Technical Volume should clearly describe the significance, technical merit, technological risks, and operational risks specific to the project. The Technical Volume must conform to the following content requirements:



Technical Volume Content Requirements	
SECTION/PAGE LIMIT	DESCRIPTION
<b>Cover Page</b>	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 senior/key personnel and their organizations, the project location(s), and any statements regarding confidentiality.
<b>Project Overview and Impacts</b> (Approximately 5% of the Technical Volume)	<p>The Project Overview should contain the following information:</p> <ul style="list-style-type: none"> <li>• <b>Background:</b> The applicant should discuss the background of their organization, including their history and notable successes in the geothermal space.</li> <li>• <b>Project Goal:</b> The applicant should describe, at a high level, their planned technical, deployment, community benefit related goals and critical success factors in achieving those goals.</li> <li>• <b>DOE Impact:</b> The applicant should discuss the impact of DOE funding with respect to advancement of EGS technologies and the impacts and anticipated benefits that will accrue to the local community, workers on the project including the chance for workers to join, form, or be represented by a labor union, and disadvantaged communities (including, but not limited to, the support of minority business enterprises). 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.</li> <li>• <b>Overview of how the project team will approach incorporating and documentation of technical &amp; organizational learning opportunities during the pilot demonstration project's period of performance.</b></li> </ul>
<b>Site and Technology Overview</b> (Approximately 35% of the Technical Volume)	<p>The Site and Technology Overview should contain two sections, one that provides an overview of the proposed site and the other, that describes the high-level strategy for drilling, stimulation, and utilization of other technologies at the proposed sites to advance GTO goals:</p> <p>Site Information:</p> <ul style="list-style-type: none"> <li>• <b>Site Characterization:</b> The applicant should provide all relevant information and interpretations associated with site characterization needed to support the application. <ul style="list-style-type: none"> <li>○ Applicants must include a preliminary but thorough analysis of electrical power potential, prior to, and following the planned permeability enhancement activities as part of their Application's Technical Volume.</li> </ul> </li> <li>• <b>Well Information:</b> The applicant should provide all relevant information regarding existing target well(s) as applicable and suitability of the</li> </ul>

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	<p>well(s) for stimulation. Any new well(s) should be described with respect to well design, completions, well construction approaches, and locations. The applicant should provide a high-level overview of the field configuration and why the proposed strategy was prioritized over others (e.g., To propose to recompleting one well and drill a new well).</p> <ul style="list-style-type: none"> <li>The applicant should identify any potential constraints on community access to natural resources (e.g., water) that the project could create.</li> </ul> <p>Workforce Strategy:</p> <ul style="list-style-type: none"> <li>Knowledge, Skills, and Abilities (KSAs): The Applicant should propose a methodology and approach for documenting and reporting the KSAs of workers engaged in the project.</li> </ul> <p>Site Strategy:</p> <ul style="list-style-type: none"> <li>Drilling Plan: The Applicant should provide an overview of any initial plans on how wells will be recompleting and / or how new wells will be drilled, describing what efficiency measures will be implemented to improve on recent drilling rate improvements at FORGE.</li> <li>Stimulation and Testing: The applicant should describe the initial plans for stimulation and testing and detail the proposed approach in sufficient detail to allow an assessment of the TRL levels of proposed technologies and methods.</li> <li>Technology Advancement: The applicant should provide a detailed description of any other innovative technologies proposed for utilization during the project to help meet FOA Goals (note that site characterization is not a focus of this FOA, except in limited circumstances and under Topic Area 3), including the scientific objectives associated with deployment of that technology.</li> <li>Risks: Risks should be clearly described in terms of the significance of technological and operational risks specific to the project. Applicants must also provide detailed descriptions of potential outcomes associated with each risk and provide detailed discussion of all relevant mitigatory actions specific to each risk identified. The applicant should discuss the risks associated with meeting GTO power / heat production goals and the feasibility of their project to do so.</li> <li>Induced Seismicity Mitigation: Applicants should provide their plans for compliance with the "Protocol for Induced Seismicity Associated with Enhanced Geothermal Systems," and demonstrate an understanding of the importance of clear transparent data and communications on this subject with DOE and stakeholders.</li> <li>This section should also address if/how the project will secure and/or retain trained and qualified workers to meet goals, as well as how the</li> </ul>
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	proposed project location and underlying infrastructure and workforce will contribute to the success of the overall project.
<b>Workplan</b> (Approximately 40% of the Technical Volume)	<p>The Workplan should include project-management-focused information on the following: (please note that a detailed SOPO is separately requested):</p> <ul style="list-style-type: none"><li>• <b>Technical Scope Summary:</b> The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on Go/No-Go decision points). The applicant should describe the specific expected end result of each performance period, including milestones detailed in the Community Benefits Plan.</li><li>• <b>WBS and Task Description Summary:</b> 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.</li><li>• <b>Milestone Summary:</b> The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.</li><li>• <b>Go/No-Go Decision Points</b> (See Section VI.B.xiii. for more information on the Go/No-Go Review): Provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. At a</li></ul>

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	<p>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. See Section VI.B.xiii. The applicant should also provide the specific technical criteria to be used to evaluate the project at the Go/No-Go decision point. The applicant should also provide the specific technical and Community Benefits Plan criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered “SMART” and can fulfill the requirement for an annual SMART milestone.</p> <ul style="list-style-type: none"><li>• <b>End of Project Goal:</b> 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.</li><li>• <b>Project Schedule (Gantt Chart or similar):</b> The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.</li><li>• <b>Buy America Requirements for Infrastructure Projects:</b> Within the first 2 pages of the Workplan, include a short statement on whether the project will involve the construction, alteration, and/or repair of infrastructure in the United States. See Appendix D for applicable definitions and other information to inform this statement.</li><li>• <b>Project Management:</b> The applicant should discuss the team’s proposed management plan, including the following:<ul style="list-style-type: none"><li>○ The overall approach to and organization for managing the work.</li><li>○ The roles of each project team member.</li><li>○ Any critical handoffs/interdependencies among project team members.</li><li>○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices.</li><li>○ The approach to project risk management, including a plan for securing a qualified workforce and mitigating risks to project performance including but not limited to community or labor disputes.</li><li>○ A description of how project changes will be handled.</li><li>○ If applicable, the approach to Quality Assurance/Control.</li><li>○ How communications will be maintained among project team members.</li></ul></li></ul>
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<p><b>Technical Qualifications and Resources</b> (Approximately 20% of the Technical Volume)</p>	<p>The Technical Qualifications and Resources should contain the following information:</p> <ul style="list-style-type: none"> <li>• Describe the project team’s unique qualifications and expertise, including those of key subrecipients.</li> <li>• Describe the project team’s existing equipment and facilities, or equipment or facilities already in place on the proposed project site, that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project.</li> <li>• This section should also include relevant, previous work efforts, demonstrated successes in managing large-scale field demonstration projects.</li> <li>• Describe the time commitment of the key team members to support the project.</li> <li>• Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable.</li> <li>• For multi-organizational or multi-investigator projects, describe succinctly: <ul style="list-style-type: none"> <li>○ The roles and the work to be performed by each PI and senior/key personnel;</li> <li>○ Role of “aspiring PI” in project;</li> <li>○ Business agreements between the applicant and each PI and senior/key personnel;</li> <li>○ How the various efforts will be integrated and managed;</li> <li>○ Process for making decisions on scientific/technical direction;</li> <li>○ Publication arrangements;</li> <li>○ Intellectual Property issues; and</li> <li>○ Internal Team communication.</li> </ul> </li> </ul>
<p><b>Appendix 1 to Technical Volume</b></p>	<p>Appendix 1 to Technical Volume: Communications Plan</p> <p>The Communications Plan should present an overview of how the Team will promote communications and outreach activities with stakeholders and the general public to listen to concerns, provide details on their project plans, and share their successes. Engagement with local stakeholders must begin at the outset of any selected projects and must be maintained on a recurring basis throughout the duration of the project. The initial plan for engagement as well as the pathway towards recruiting an “information officer,” and what their role will entail, can be described in this Appendix.</p>

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**iii. Resumes**

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

1. Contact Information;
2. Education and training: Provide institution, major/area, degree, and year for undergraduate, graduate, and postdoctoral training; including a certification or graduate credential for a Registered Apprenticeship or Labor Management Partnership;
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; and
6. Synergistic Activities: List up to five professional and scholarly activities related to the proposed effort.

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

Save the resumes in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_Resumes".



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**iv. Letters of Commitment**

Submit letters of commitment from all subrecipient and third-party cost share providers. If applicable, also include any letters of commitment from suppliers/partners/end users/future customers/labor unions/community-based organizations (one-page maximum per letter). Save the letters of commitment in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_LOCs".

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

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

**vi. SF-424: Application for Federal Assistance**

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_424".

**vii. Budget Justification Workbook**

Applicants are required to complete the Budget Justification Workbook. This form is available on EERE Exchange at <https://eere-Exchange.energy.gov/>. Prime recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the prime recipient and its subrecipients and contractors. Applicants should include costs associated with 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".

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**viii. Summary/Abstract for Public Release**

Applicants are required to submit a one-page summary/abstract of their project. The project summary/abstract must contain a summary of the proposed activity 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). It should also include the project's commitments and goals described in the Community Benefits Plan. This document must not include any proprietary or sensitive business information as DOE may make it available to the public after selections are made. The project summary must not exceed 1 page when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the Summary for Public Release in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_Summary".

**ix. Summary Slide**

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

The Summary Slide template requires the following information:

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

Save the Summary Slide in a single Microsoft PowerPoint file using the following convention for the title "ControlNumber\_LeadOrganization\_Slide".

**x. Subrecipient Budget Justification (if applicable)**

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

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

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

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

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

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

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

Prime 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".

**xiv. Waiver Requests (if applicable)**

To ensure that the best international researchers and experts are engaged in these important demonstrations, DOE will allow foreign subcontractors to

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support prime applicants on this FOA subject. Note that 20% of work completed by foreign subs may be completed outside of the U.S. with an approved waiver, with the remaining 80% must be completed in the U.S..

#### **Foreign Entity Participation**

For projects selected under this FOA, as set forth in Section III.A.ii., all prime recipients and subrecipients 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. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application.

Appendix C lists the information that must be included in a waiver request.

#### **Performance of Work in the United States (Foreign Work Waiver)**

As set forth in Section IV.I.iii., all work for projects selected under this FOA must be performed in the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application.

Appendix C lists the information that must be included in a foreign work waiver request.

Save the Waivers in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_Waiver".

#### **xv. Waiver of the Buy America Requirement for Infrastructure Projects**

As set forth in Section IV.I.vii., federally assisted projects which involve, 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.

In limited circumstances, DOE may grant a waiver of this requirement. Appendix D to this FOA provides guidance on how "infrastructure work" is defined, explains the applicable justifications under which a waiver may be granted, and lists the information that must be included in the waiver request.

Save the Waivers in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_BAWaiver".

#### **xvi. Community Benefits Plan**

The Community Benefits Plan must set forth the applicant's approach to ensuring the Federal investments advance the following three objectives: (1) advance diversity, equity, inclusion and accessibility (DEIA); (2) contribute to

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energy equity; and (3) invest in America's workforce. The below sections set forth the content requirements for the Community Benefits Plan, which addresses each of the foregoing objectives. Applicants must address all three sections.

The applicant's Community Benefits Plan must include at least one Specific, Measurable, Achievable, Relevant and Timely (SMART) milestone per budget period to measure progress on the proposed actions. The Community Benefits Plan will be evaluated as part of the technical review process. If EERE selects a project, EERE will incorporate the Community Benefits Plan into the award and the recipient must implement its Community Benefits Plan as part of carrying out its project. During the life of the EERE award, EERE will evaluate the recipient's progress, including as part of the Go/No-Go review process.

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

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

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

**1) Diversity, Equity, Inclusion, and Accessibility:**

To build 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. Submitting an institutional DEIA plan without specific integration into the project will be deemed insufficient.

**2) Energy Equity:**

This section must articulate the applicant's consideration of long-term equity implications of the research. It must identify how the specific project integrates equity considerations into the project design to support equitable outcomes should the innovation be successful. Like cost reductions and commercialization plans, the Community Benefits Plan requires description of the equity implications of the innovation if successful.

**3) Workforce Implications:**

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

See Appendix G for more guidance.

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

For every activity, list the following items:

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

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- The person-months of effort per year being dedicated to the award or activity

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

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

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

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

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



Save the Current and Pending Support in a single PDF file using the following convention for the title "ControlNumber\_LeadOrganization\_CPS".

**Definitions:**

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

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

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**Senior/key personnel** – an individual who contributes in a substantive, meaningful way to the scientific development or execution of a research, development and demonstration (RD&D) project proposed to be carried out with DOE award.<sup>36</sup>

**xviii. Geothermal Drilling Permit and Geothermal Leasehold/Legal Rights Documentation**

Applicants must submit copies of existing geothermal drilling permits, or other relevant documents indicating a clear pathway to securing necessary drilling permits within the timeframe of Phase I. Applicants must also provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for geothermal resource extraction at the proposed site at the time of application, or must provide clear documentation that surface and subsurface rights for geothermal resource extraction can be obtained within the timeframe of Phase 1 of the project. Letters of support from partners or subcontractors do not take the place of legal documentation of surface and subsurface rights.

**E. Post Selection Information Requests**

If selected for award, EERE reserves the right to request additional or clarifying information regarding the following (non-exhaustive list):

- Personnel proposed to work on the project and collaborating organizations (See Section VI.B.xvii. Participants and Collaborating Organizations);
- Current and Pending Support (See Sections IV.D.xvi. and VI.B.xviii. Current and Pending Support);
- 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.xxi.;
- Indirect cost information;
- Other budget information;
- Commitment Letters from Third Parties Contributing to Cost Share, if applicable;

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<sup>36</sup> 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.

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- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Representation of Limited Rights Data and Restricted Software, if applicable;
- Information related to Community Benefits Agreements, Good Neighbor Agreements, or other agreements applicants may have made with the relevant community
- Environmental Questionnaire.

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

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

## **G. Submission Dates and Times**

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

## **H. Intergovernmental Review**

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

## **I. Funding Restrictions**

### **i. Allowable Costs**

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable federal cost principles. Pursuant to 2 CFR 910.352, the cost principles in the Federal Acquisition Regulations (48 CFR Part 31.2) apply to for-

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profit entities. The cost principles contained in 2 CFR Part 200, Subpart E apply to all entities other than for-profits.

Costs to support or oppose union organizing, whether directly or as an offset for other funds, are unallowable.

## **ii. Pre-Award Costs**

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

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

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

### **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 override the requirement to obtain the written authorization from

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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**

There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a foreign work waiver, the applicant must submit a written waiver request to EERE. Appendix C 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 not allowable under this FOA.

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**vi. Equipment and Supplies**

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

**vii. Buy America Requirements for Infrastructure Projects**

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

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

Whether a given project must apply this requirement is project-specific and dependent on several factors, such as the recipient’s entity type, whether the work involves “infrastructure,” as that term is defined in Section 70914 of the Bipartisan Infrastructure Law, 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 (OMB) issued on April 18, 2022, the Buy America requirements of the BIL do not apply to DOE projects in which the prime recipient is a for-profit entity; the requirements only apply to projects whose prime recipient is a “non-Federal entity,” e.g., a State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization. Subawards should conform to the terms of the prime award from which they flow; in other words, for-profit prime recipients are not required to flow down these Buy America requirements to subrecipients, even if those subrecipients are non-Federal entities as defined above. Conversely, prime recipients which are non-Federal entities must flow the Buy America requirements down to all subrecipients, even if those subrecipients are for-profit entities. Finally, for all applicants—both non-Federal entities and for-profit entities—DOE is including a Program Policy Factor that the Selection Official may consider in determining which Full Applications to select for award negotiations that considers whether

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the applicant has made a commitment to procure U.S. iron, steel, manufactured products, and construction materials in its project.

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

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.

#### **viii. Davis-Bacon Act Requirements**

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

Applicants shall provide written assurance acknowledging the DBA requirements above, and confirming that the laborers and mechanics performing construction, alteration, or repair work on projects funded in whole or in part by awards made as a result of this FOA are paid or will be paid wages at rates not less than those



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prevailing on projects of a character similar in the locality as determined by subchapter IV of Chapter 31 of Title 40, United States Code (Davis-Bacon Act).

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

- (1) ensuring that the wage determination(s) and appropriate Davis-Bacon clauses and requirements are flowed down to and incorporated into any applicable subcontracts or subrecipient awards.
- (2) ensuring that if wage determination(s) and appropriate Davis-Bacon clauses and requirements are improperly omitted from contracts and subrecipient awards, the applicable wage determination(s) and clauses are retroactively incorporated to the start of performance.
- (3) being responsible for compliance by any subcontractor or subrecipient with the Davis-Bacon labor standards.
- (4) receiving and reviewing certified weekly payrolls submitted by all subcontractors and subrecipients for accuracy and to identify potential compliance issues.
- (5) maintaining original certified weekly payrolls for 3 years after the completion of the project and must make those payrolls available to the DOE or the United States Department of Labor ("DOL") upon request, as required by 29 CFR 5.6(a)(2).
- (6) conducting payroll and job-site reviews for construction work, including interviews with employees, with such frequency as may be necessary to assure compliance by its subcontractors and subrecipients and as requested or directed by the DOE.
- (7) cooperating with any authorized representative of the DOL in their inspection of records, interviews with employees, and other actions undertaken as part of a DOL investigation.
- (8) posting in a prominent and accessible place the wage determination(s) and DOL Publication: WH-1321, Notice to Employees Working on Federal or Federally Assisted Construction Projects.
- (9) notifying the Contracting Officer of all labor standards issues, including all complaints regarding incorrect payment of prevailing wages and/or fringe benefits, received from the recipient, subrecipient, contractor, or

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subcontractor employees; significant labor standards violations, as defined in 29 CFR 5.7; disputes concerning labor standards pursuant to 29 CFR Parts 4, 6, and 8 and as defined in FAR 52.222-14; disputed labor standards determinations; DOL investigations; or legal or judicial proceedings related to the labor standards under this Contract, a subcontract, or subrecipient award.

(10) preparing and submitting to the Contracting Officer, the Office of Management and Budget Control Number 1910-5165, Davis Bacon Semi-Annual Labor Compliance Report, by April 21 and October 21 of each year. Form submittal will be administered through the iBenefits system (<https://doeibenefits2.energy.gov>), its successor system, or other manner of compliance as directed by the Contracting Officer.

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

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

## **ix. Lobbying**

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

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

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

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- An employee of a Member of Congress.

**x. Risk Assessment**

Prior to making a federal award, the DOE is required by 31 U.S.C. 3321 and 41 U.S.C. 2313 to review information available through any Office of Management and Budget (OMB)-designated repositories of government-wide eligibility qualification or financial integrity information, such as SAM Exclusions and “Do Not Pay.”

In addition, DOE evaluates the risk(s) posed by applicants before they receive federal awards. This evaluation may consider: results of the evaluation of the applicant's eligibility; the quality of the application; mitigation of labor and community disputes; financial stability; quality of management systems and ability to meet the management standards prescribed in this part; history of performance; reports and findings from audits; and the applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-federal entities.

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.

**xi. Invoice Review and Approval**

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

- Summary of costs by cost categories;
- Timesheets or personnel hours report;
- Disclosure of any citations related to NLRA, FLSA, OSH, SCA, or DBA, or Title VII;
- 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.

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

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

**b. Definitions**

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

future compensation, or other types of remuneration or consideration, including in-kind compensation.

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

**xiii. Affirmative Action and Pay Transparency Requirements**

All federally assisted construction contracts exceeding \$10,000 annually will be subject to the requirements of Executive Order 11246, as amended, Equal Employment Opportunity:

(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.

The Department of Labor's (DOL) Office of Federal Contractor Compliance Programs (OFCCP) uses a neutral process to schedule contractors for compliance evaluations. OFCCP's Technical Assistance Guide<sup>37</sup> should be consulted to gain an understanding of the requirements and possible actions the recipients, subrecipients, contractors and subcontractors must take.

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<sup>37</sup> 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>

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## V. Application Review Information

### A. Technical Review Criteria

#### i. Full Applications

Applications will be evaluated against the technical review criteria shown below. All sub-criteria are of equal weight.

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

This criterion involves consideration of the following factors:

##### Technical Merit and Innovation

- Degree to which existing site characterization data supports the planned EGS demonstration
- Degree to which existing wells are available to substantiate site characterization
- Degree to which existing wells can be used for stimulation activities and the level of workover / recompletion needed for wells to be suitable for stimulation
- For projects requiring new wells, the degree to which innovative drilling approaches are incorporated to reduce costs and increase average daily Rate-Of-Penetration
- Degree to which the stimulation approach is demonstrated to yield production potential required for the respective Topic Areas (desired but not required in Topic Area 3).
- Degree to which the stimulation plan incorporates methods and technologies that will support the proposed stimulation approach
- The current state of permitting and the degree to which the proposed location will be fully permitted within Phase 1 of the project.  
Degree to which the project will result in electrical power production (required for Topic Area 1; desired but not required for Topic Areas 2,3, and 4)
- Extent to which the proposed stimulation process incorporates multi-zone stimulation while presenting a technology that is at TRL 6 (multi-zone stimulation is not required in Topic Area 3)
- Degree to which the proposed drilling, stimulation, and other operational plans are clearly described, including adequate discussion of technological and operational risks specific to all proposed field activities, as well as mitigatory actions and/or contingencies

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- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state-of-the-art to the proposed advancement; and
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious, including relevant data, calculations and discussion of prior work with analyses that support the viability of the proposed work.

#### Impact of Technology Advancement

- The extent the project supports the Topic Area objectives and target specifications and metrics;
- The potential impact of the project on advancing the state-of-the-art; and

#### Project Management

- 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 possible labor and community opposition or disputes, and “timely” and appropriate strategies for mitigation and resolution.
- Soundness of a plan to expeditiously address environmental, siting, and other regulatory requirements for the project

### **Criterion 2: Project Approach (20%)**

This criterion involves consideration of the following factors:

#### Research Approach, Workplan and SOPO

- Description of benefits from technical, organizational, and market learning (only Topic Areas 2, 3, and 4) opportunities of demonstration efforts in complex geothermal settings.
- Degree to which the approach and plans 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.

#### Workforce

- Extent to which there is clarity and appropriate allocation of resources to documenting the workforce KSAs of demonstration projects.

#### Identification of Technical Risks

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- 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 a 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, and infrastructure requirements.

### **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 and relevant expertise of the individuals on the team with respect to managing large-scale demonstration projects;
- The sufficiency of the facilities to support the work;
- The clear identification of key personnel including project management experts to run demonstrations and information officers to communicate directly with stakeholders.
- The degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- The level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan, Workplan; and
- The reasonableness of the budget and spend plan for the proposed project and objectives.

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**Criterion 4: Community Benefits Plan (15%)**

This criterion involves the consideration of the following factors:

**Diversity, Equity, Inclusion and Accessibility (DEIA)**

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

**Energy Equity**

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

**Workforce Implications**

- Clear and comprehensive plan to mitigate workforce-related risks
- Approach and qualified personnel to document the knowledge, skills, and abilities of the workforce required for successful commercial deployment of innovations resulting from this research; and
- Applicant's approach to engage registered apprentices for construction and other apprenticeable activities.

**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

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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 is likely to lead to increased high-quality employment and manufacturing in the United States;
- The degree to which the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty;
- The degree to which the proposed project, or group of projects, represent a desired geographic distribution (considering past awards and current applications);
- The degree to which the proposed project incorporates diversity, equity, inclusion, and accessibility elements, including, but not limited to, applicant or team members from Minority Serving Institutions (e.g., Historically Black Colleges and Universities (HBCUs)/Other Minority Institutions), Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, Tribal Nations, or members within underserved communities;
- The degree to which the proposed project will lead to quality job creation in the near and long-term.
- The degree to which the proposed project maximizes benefits to disadvantaged communities;
- The degree to which the proposed project minimizes environmental impacts to disadvantaged communities;
- The degree to which the project methods or strategy will maximize deployment or replication;
- The level of net power production feasible from proposed projects;

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- The degree to which environmental or regulatory permitting uncertainties will impact project timelines and success;
- The degree to which the project promotes increased coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer;
- The degree to which the proposed project collectively represents diverse types and sizes of applicant organizations;

## **D. Evaluation and Selection Process**

### **i. Overview**

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

### **ii. Pre-Selection Interviews**

As part of the evaluation and selection process, 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. 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.

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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 Integrity and Performance Matters**

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

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

DOE will consider any written comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of

performance under federal awards when completing the review of risk posed by applicants as described in 2 CFR 200.206.

**v. Selection**

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

**E. Anticipated Notice of Selection and Award Negotiation Dates**

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

**VI. Award Administration Information**

**A. Award Notices**

**i. Ineligible Submissions**

Ineligible 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 Full Application is ineligible and not considered for further review.

**ii. 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.

**iii. Successful Applicants**

Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by EERE to issue an award. Applicants do not receive an award until award negotiations are

complete and the Contracting Officer executes the funding agreement, accessible by the prime recipient in FedConnect.

The award negotiation process will take approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE Exchange with whom 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.I.ii. of the FOA for guidance on pre-award costs.

#### **iv. 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.

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

#### **1. EERE Exchange**

Register and create an account on EERE Exchange at <https://eere-Exchange.energy.gov>. This account will then allow the user to register for any

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

**2. System for Award Management**

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

**3. FedConnect**

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

**4. Grants.gov**

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

**5. Electronic Authorization of Applications and Award Documents**

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

**ii. Award Administrative Requirements**

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

**iii. Foreign National Participation**

All applicants selected for an award under this FOA and project participants (including subrecipients and contractors) who anticipate involving foreign

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nationals in the performance of an award, may be required to provide DOE with specific information about each foreign national to satisfy requirements for foreign national participation. A “foreign national” is defined as any person who is not a United States citizen by birth or naturalization. The volume and type of information collected may depend on various factors associated with the award. DOE concurrence may be required before a foreign national can participate in the performance of any work under an award.

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

**iv. Subaward and Executive Reporting**

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

**v. National Policy Requirements**

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

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

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.

**vii. Flood Resilience**

Applications should indicate whether the proposed project location(s) is within a floodplain, how the floodplain was defined, and how future flooding will factor into the project's design. The base floodplain long used for planning has been the 100-year floodplain, that is, a floodplain with a 1.0 percent 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, 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 percent 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 in response to this FOA, the applicant represents that:

- a.** It is **not** a corporation that has been convicted of a felony criminal violation under any federal law within the preceding 24 months; and
- b.** It is **not** a corporation that has any unpaid federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

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For purposes of these representations the following definitions apply:

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

### **3. Nondisclosure and Confidentiality Agreements Representations**

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

- a. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contractors 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.

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- (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 as a whole. 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. Subject Invention Utilization Reporting**

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

**xii. Intellectual Property Provisions**

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

**xiii. Reporting**

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement. This helpful EERE checklist can be accessed at <https://www.energy.gov/eere/funding/eere-funding-application-and-management-forms>. See Attachment 2 Federal Assistance Reporting Checklist, after clicking on "Model Cooperative Agreement" under the Award Package section.

Additional reporting requirements apply to projects funded by BIL. As part of tracking progress toward key departmental goals – ensuring justice and equity, creating jobs, boosting domestic manufacturing, reducing greenhouse gas emissions, and advancing a pathway to private sector – DOE may require specific data collection to be reported on a quarterly basis or on a cumulative basis at the end of the project. Examples of data that may be collected include:

- New manufacturing production, and recycling capacity
- Training hours provided, certificates and training credentials received by employees, ratio of apprentice-to-journey level workers employed
- Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses acting as vendors and sub-contractors for bids on supplies, services and equipment
- Value, number, and type of partnerships with MSIs
- Community Benefits Plan data:
  - Activities implemented to advance DEIA goals;
  - Number of team members with substantive research roles, including students and postdocs from disadvantaged



communities funded under the award and their next career step if known;

- o Number of members of labor unions funded under the award;
  - o Number and type of stakeholder events and attendees, communities supported or represented by stakeholders;
  - o Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Disability Owned Businesses, and Veteran Owned Businesses acting as suppliers, vendors, and sub-contractors; and
  - Other quantitative or qualitative data that would help DOE assess the effectiveness of DEIA efforts implemented by awardees.
- Funding leveraged, follow-on funding, Intellectual Property (IP) Generation and IP Utilization

#### **xiv. Go/No-Go Review**

Each project selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. A Go/No-Go Review is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. At the Go/No-Go decision points, EERE will evaluate project performance, project schedule adherence, the extent milestone objectives are met, compliance with reporting requirements, and overall contribution to the program goals and objectives. Federal funding beyond the Go/No-Go decision point (continuation funding) is contingent upon (1) availability of federal funds appropriated by Congress for the purpose of this program; (2) the availability of future-year budget authority; (3) recipient's technical progress compared to the Milestone Summary Table stated in Attachment 1 of the award; (4) recipient's submittal of required reports; (5) recipient's compliance with the terms and conditions of the award; (6) EERE's Go/No-Go decision; (7) the recipient's submission of a continuation application<sup>38</sup>; and (8) written approval of the continuation application by the Contracting Officer.

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<sup>38</sup> 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



As a result of the Go/No-Go Review, EERE 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.

**xv. Conference Spending**

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

**xvi. Uniform Commercial Code (UCC) Financing Statements**

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

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of \$5,000 purchased with project funds. These financing statement(s) must be

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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.

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approved in writing by the Contracting Officer prior to the recording, and they shall provide notice that the recipient's title to all equipment (not real property) purchased with federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or additional recordings, including appropriate continuation statements, as necessary or as the Contracting Officer may direct.

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

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

**xiv. Participants and Collaborating Organizations**

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

**xv. 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.xvi.

**xx. U.S. Manufacturing Commitments**

A primary objective of DOE's multi-billion dollar research, development, and demonstration investments is to cultivate new research and development ecosystems, manufacturing capabilities, and supply chains for and by United

States industry and labor. Therefore, in exchange for receiving taxpayer dollars to support an applicant's project, the applicant must agree to a U.S. Competitiveness provision requiring that any products embodying any subject invention or produced through the use of any subject invention will be manufactured substantially in the United States unless the Recipient can show to the satisfaction of DOE that it is not commercially feasible. Award terms, including the specific U.S. Competitiveness Provision applicable to the various types of Recipients and projects, are available at <https://www.energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards>.

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

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

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

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

**xxi. Interim Conflict of Interest Policy for Financial Assistance**

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

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

**xxii. Data Management Plan (DMP)**

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

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**xxiii. Fraud, Waste and Abuse**

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

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

Additionally, recipients of DOE awards must be cognizant of the requirements of [2 CFR 200.113 Mandatory disclosures](#), which states:

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

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

**xxiv. Human Subjects Research**

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

Federal regulation and the DOE Order require review by an Institutional Review Board (IRB) of all proposed human subjects research projects. The IRB is an

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interdisciplinary ethics board responsible for ensuring that the proposed research is sound and justifies the use of human subjects or their data; the potential risks to human subjects have been minimized; participation is voluntary; and clear and accurate information about the study, the benefits and risks of participating, and how individuals' data/specimens will be protected/used, is provided to potential participants for their use in determining whether or not to participate.

The recipient shall provide the Federal Wide Assurance number identified in item 1) below and the certification identified in item 2) below to DOE prior to initiation of any project that will involve interactions with humans in some way (e.g., through surveys); analysis of their identifiable data (e.g., demographic data and energy use over time); asking individuals to test devices, products, or materials developed through research; and/or testing of commercially available devices in buildings/homes in which humans will be present. Note: This list of examples is illustrative and not all inclusive.

No DOE funded research activity involving human subjects, biospecimens, or identifiable private information shall be conducted without:

- 1) A registration and a Federal Wide Assurance of compliance accepted by the Office of Human Research Protection (OHRP) in the Department of Health and Human Services; and
- 2) Certification that the research has been reviewed and approved by an Institutional Review Board (IRB) provided for in the assurance. IRB review may be accomplished by the awardee's institutional IRB; by the Central DOE IRB; or if collaborating with one of the DOE national laboratories, by the DOE national laboratory IRB.

The recipient is responsible for ensuring all subrecipients comply and for reporting information on the project annually to the DOE Human Subjects Research Database (HSRD) at <https://science.osti.gov/HumanSubjects/Human-Subjects-Database/home>. Note: If a DOE IRB is used, no end of year reporting will be needed.

Additional information on the DOE Human Subjects Research Program can be found at: [HUMAN SUBJECTS Human Subjects Pr... | U.S. DOE Office of Science \(SC\) \(osti.gov\)](#).



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**xxv. Cybersecurity Plan (if applicable)**

Be advised that under Section 40126 of the BIL, the Secretary of Energy has determined that this FOA requires an applicant to submit a Cybersecurity Plan to the DOE prior to the issuance of an award.

Each applicant whose Full Application is selected for award negotiations must submit a Cybersecurity Plan during the award negotiations phase. A Cybersecurity Plan explains how basic cybersecurity practices throughout the life of the proposed the project will be maintained.

**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 as described below. Specifically, questions regarding this FOA must be submitted to: [BIL\\_EGSPilotDemos@ee.doe.gov](mailto:BIL_EGSPilotDemos@ee.doe.gov). Questions must be submitted not later than 3 business days prior to the application due date and time. Please note, feedback on individual concepts will not be provided through Q&A.

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

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

**VIII. Other Information****A. FOA Modifications**

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

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## C. Commitment of Public Funds

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

## D. Treatment of Application Information

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

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

If an applicant chooses to submit business sensitive, trade secrets, proprietary, or otherwise confidential information, the applicant must provide **two copies** of the submission (e.g., Letter of Intent, Full Application). The first copy should be marked, "non-confidential" with the information believed to be confidential deleted. The second copy should be marked "confidential" and must clearly and conspicuously identify the business sensitive, trade secrets, proprietary, or otherwise confidential information and must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose as authorized by law.

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

### Notice of Restriction on Disclosure and Use of Data:

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Problems with EERE Exchange? Email [EERE-ExchangeSupport@hq.doe.gov](mailto:EERE-ExchangeSupport@hq.doe.gov) Include FOA name and number in subject line.

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

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

## **E. Evaluation and Administration by Non-Federal Personnel**

In conducting the merit review evaluation, the Go/No-Go Reviews and Peer Reviews, the government may seek the advice of qualified non-federal personnel as reviewers. The government may also use non-federal personnel to conduct routine, nondiscretionary administrative activities, including 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).

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

- Advance and Identified Waivers: For an applicant not covered by a Class Patent Waiver or the Bayh-Dole Act, the applicant may request a patent

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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 data terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

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

## **K. Government Rights in Subject Inventions**

Where prime recipients and subrecipients retain title to subject inventions, the 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 contractors doing work on behalf of the government.

### **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 U.S. 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 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 awards intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

## **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 uses *covered telecommunications equipment or services* as a substantial or essential component of any system, or as critical technology as part of any system. As described in Section 889 of Public Law 115-232, *covered telecommunications equipment* is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

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

## **P. Personally Identifiable Information (PII)**

All information provided by the applicant must to the greatest extent possible exclude PII. The term “PII” refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric



records, alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name. (See OMB Memorandum M-07-16 dated May 22, 2007, found at:

<https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2007/m07-16.pdf>

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

## **Q. Annual Independent Audits**

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

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

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

## **R. Informational Webinar**

EERE will conduct one informational webinar during the FOA process. It will be held after the initial FOA release but before the due date for Full Applications.

Attendance is not mandatory and will not positively or negatively impact the overall review of any applicant submissions. As the webinar will be open to all applicants who wish to participate, applicants should refrain from asking questions or communicating information that would reveal confidential and/or proprietary information specific to their project. Specific dates for the webinar can be found on the cover page of the FOA.



## **APPENDIX A – COST SHARE INFORMATION**

### **Cost Sharing or Cost Matching**

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

### **How Cost Sharing Is Calculated**

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

- Formula: Federal share (\$) divided by federal share (%) = Total Project Cost  
Example: \$1,000,000 divided by 80% = \$1,250,000
- Formula: Total Project Cost (\$) minus federal share (\$) = Non-federal share (\$)  
Example: \$1,250,000 minus \$1,000,000 = \$250,000
- Formula: Non-federal share (\$) divided by Total Project Cost (\$) = Non-federal share (%)  
Example: \$250,000 divided by \$1,250,000 = 20%

### **What Qualifies For Cost Sharing**

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

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

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

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, 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 item or service is reimbursed for, it is cash cost share. All cost share items must be necessary to the performance of the project.
2. **In-Kind Cost Share** – encompasses all contributions to the project made by the recipient or subrecipient(s) that do not involve a payment or reimbursement and represent donated items or services. In-Kind cost share items include volunteer personnel hours, donated existing equipment, donated existing supplies. The cash value and calculations thereof for all In-Kind cost share items must be justified and explained in the Cost Share section of the project Budget Justification. All cost share items must be necessary to the performance of the project. If questions exist, consult your DOE contact before filling out the In-Kind cost share section of the Budget Justification.
3. **Funds from other federal sources MAY NOT be counted as cost share.** This prohibition includes FFRDC subrecipients. Non-federal sources include any source not originally derived from federal funds. Cost sharing commitment letters from subrecipients must be provided with the original application.
4. **Fee or profit, including foregone fee or profit, are not allowable as project costs (including cost share) under any resulting award.** The project may only incur those costs that are allowable and allocable to the project (including cost share) as determined in accordance

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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

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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

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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 \$2,000,000 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 as the Prime Recipient**

As set forth in Section III.A.ii., all prime recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a state or territory of the United States 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 U.S. industry and U.S. 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 U.S. 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 U.S. and the entity acknowledges and demonstrates that it has the intent and ability to comply with the U.S. Manufacturing Plan; and
- e. The foreign entity will satisfy other conditions that may be deemed necessary by DOE to protect U.S. 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 with the Institute;
- b. Country of incorporation, the extent of the ownership/level control by foreign entities, whether the entity is state owned or controlled, a summary of the ownership breakdown of the foreign entity and the percentage of 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 U.S. economy;

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- How the project will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
- How the project will promote domestic American manufacturing of products and/or services;
- e. A description of how the foreign entity's participation is essential to the project;
- f. A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP; and
- g. Countries where the work will be performed (Note: if any work is proposed to be conducted outside the U.S., 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, but the prime recipient must make a representation to DOE as to whether it believes the data protection protocols are adequate and make a representation of the risk assessment – high, medium or low risk of data leakage to a foreign entity.
- Additional language be added to any agreement or subagreement to protect IP, mitigate risk or other related purposes.

DOE may require additional information before considering the waiver request.

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

## **2. Waiver for Performance of Work in the United States (Foreign Work Waiver)**

As set forth in Section IV.I.iii., all work under funding under this FOA must be performed in the United States. Waiver requests will not be considered under this FOA.

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

## 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, 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<sup>39</sup>—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.

In addition to the above, the infrastructure in question must be publicly-owned or must serve a public function; privately owned infrastructure that is solely utilized for private use is not considered “infrastructure” for purposes of Buy America applicability. 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, 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)

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<sup>39</sup> BIL, § 70917(c)(1).

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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<sup>40</sup> are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. The Buy America requirements only applies 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 a Buy America requirement 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.

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

These requirements must flow down to all sub-awards, all contracts, subcontracts and purchase orders for work performed under the proposed project.

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<sup>40</sup> Excludes cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives.

For additional information related to the application and implementation of these Buy America requirements, please see OMB Memorandum M-22-11, issued April 18, 2022:

<https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf>

### **C. DOE Submission Requirements for Full Application**

Within the first two pages of the workplan, applicants must provide a short statement on whether the project will involve the construction, alteration, and/or repair of infrastructure in the United States. The ultimate determination about whether a project includes infrastructure remains with DOE, but the applicant's statement will assist project planning and integration of domestic preference requirements, which may impact the project's proposed budget.

### **D. Waivers**

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

- (1) applying the Buy America requirements would be inconsistent with the public interest;
- (2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
- (3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent.

If an applicant is seeking a waiver of the Buy America requirements, it must include a written waiver request with the Full Application. 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.

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- Waiver justification including due diligence performed (e.g., market research, industry outreach) by the applicant or recipient
- Anticipated impact if no waiver is issued

DOE may require additional information before considering the waiver request.

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

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

## APPENDIX E – 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 F – LIST OF ACRONYMS

Insert other acronyms applicable to this FOA (e.g., technology office name, technical terms or metrics)

COI	Conflict of Interest
DEC	Determination of Exceptional Circumstances
DEIA	Diversity, Equity, Inclusion, and Accessibility
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
EERE	Energy Efficiency and Renewable Energy
FAR	Federal Acquisition Regulation
FFATA	Federal Funding and Transparency Act of 2006
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FFRDC	Federally Funded Research and Development Center
GAAP	Generally Accepted Accounting Principles
IPMP	Intellectual Property Management Plan
M&O	Management and Operating
MPIN	Marketing Partner ID Number
MSI	Minority Serving Institution
MYPP	Multi-Year Program Plan
NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NNSA	National Nuclear Security Administration
OMB	Office of Management and Budget
OSTI	Office of Scientific and Technical Information
PII	Personal Identifiable Information
R&D	Research and Development
RFI	Request for Information
RFP	Request for Proposal
SAM	System for Award Management
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STEM	Science, Technology, Engineering, and Mathematics
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
UEI	Unique Entity Identifier
WBS	Work Breakdown Structure
WP	Work Proposal

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## APPENDIX G –COMMUNITY BENEFITS PLAN GUIDANCE

The DOE is committed to pushing the frontiers of science and engineering; catalyzing high-quality domestic clean energy jobs through research, development, demonstration, and deployment; and ensuring energy equity and energy justice<sup>41</sup> 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 (Tackling the Climate Crisis at Home and Abroad),<sup>42</sup> it is important to consider the impacts of the successful commercial deployment of any innovations resulting from this FOA on current and future workforce.

The goal of the three-section Community Benefits Plan is to allow the application to illustrate engagement in critical thought about implications of how the proposed work will benefit the broadest swaths of American people and lead to broadly shared prosperity, including for workers and disadvantaged communities<sup>43</sup>. The sections of the Community Benefits Plans are considered together because there may be significant overlap between audiences considered in workforce and disadvantaged communities.

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<sup>41</sup> At DOE, we define energy justice as “the goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on those disproportionately harmed by the energysystem” (Initiative for Energy Justice, 2019). Aligned with that document, the remainder of this document refers to this as, ‘energy equity,’ and is meant to encompass energy justice as well as DOE’s efforts related to Justice<sup>40</sup>. <https://www.energy.gov/diversity/articles/how-energy-justice-presidential-initiatives-and-executive-orders-shape-equity>

<sup>42</sup> <https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>

<sup>43</sup> See footnote 11 for guidance on the definition and tools to locate and identify disadvantaged communities.

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## Example DEIA and Energy Equity Plan Elements

Outlined below are examples of activities that applicants might consider when developing their Community Benefits Plan. Applicants are not required to implement any of these specific examples and should propose the Plan that best fits their research goals, institutional environment, team composition, and other factors. Creativity is encouraged.

### DEIA

DOE strongly encourages applicants to involve individuals and entities from disadvantaged communities. ~~that are~~ Tapping all of the available talent requires intentional approaches and yields broad benefits.

Equity extends beyond diversity to equitable treatment. Equitable access to opportunity for members of the project team is paramount. This includes ensuring that all members of the team, including students, are paid a living wage, provided appropriate working conditions, and provided appropriate benefits. In the execution of their project plan, applicants are asked to describe efforts in diversity, equity, inclusion, and accessibility. In this context, efforts toward DEIA are defined as:<sup>44</sup>

- 1) the practice of including the many communities, identities, races, ethnicities, backgrounds, abilities, cultures, and beliefs of the American people,
- 2) the consistent and systematic fair, just, and impartial treatment of all individuals, including protecting workers rights and adhering to Equal Employment Opportunity laws,
- 3) the recognition, appreciation, and use of the talents and skills of employees of all backgrounds, and
- 4) the provision of accommodations so that all people, including people with disabilities, can fully and independently access facilities, information and communication technology, programs, and services.

Successful plans will not only describe how the project team seeks to increase DEIA, but will describe the overall approaches to retention, engagement, professional development, and career advancement. Specifically, they will demonstrate clear approaches to ensure all team members' strengths are meaningfully leveraged and all members are provided opportunities and paths for career development, especially including paths for interns and trainees to secure permanent positions. Diversity should

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<sup>44</sup> <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>

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be considered at all levels of the project team, not just leveraging early career individuals to meet diversity goals.

DOE strongly encourages applicants to consider partnerships as a means of promoting diversity, equity, inclusion, accessibility, justice, and workforce participation. Minority Serving Institutions, Minority Business Enterprises, Minority Owned Businesses, Disability Owned Business, Women Owned Businesses, Native American-owned Businesses, Veteran Owned Businesses, or entities located in an underserved community that meet the eligibility requirements are encouraged to lead these partnerships as the prime applicant or participate on an application as a proposed partner to the prime applicant.

When crafting the DEIA section of the Plan, applicants should describe the ways in which they will act to promote each of the four DEIA efforts above into their investigation. It is important to note that diversity, equity, inclusion, and accessibility are four different, but related, concepts that should not be conflated. That is, you can achieve diversity without equity; all four must be addressed. Applicants could discuss how the proposed investigation could contribute to training and developing a diverse scientific workforce. Applicants could describe the efforts they plan to take, or will continue to take, to create an inclusive workplace, free from retaliation, harassment, and discrimination. Applicants could outline any barriers to creating an equitable and inclusive workplace and address the ways in which the team will work to overcome these barriers within the bounds of the specific research project. The plan could detail specific efforts to inform project team members in any capacity of their labor rights and rights under Equal Employment Opportunity laws, and their free and fair chance to join a union.

Equal treatment of workers, including students, is necessary but overcoming institutional bias requires intentionally reducing sometimes hidden barriers to equal opportunity. Applicants could consider measures like childcare, flexible schedules, paid parental leave, pay transparency, and other supports to ensure that societal barriers are not hindering realization of DEIA intentions. Some of these considerations may result in common approaches in different sections of the plan, and that is acceptable, as long as the submission is not a singular approach to all sections.

EERE especially encourages applicants to form partnerships with diverse and often underrepresented institutions, such as Minority Serving Institutions, labor unions, and community colleges that otherwise meet the eligibility requirements. Underrepresented institutions that meet the eligibility requirements are encouraged to lead these partnerships as the prime applicant. The DEIA section of the Plan could include engagement with underrepresented institutions to broaden the participation of disadvantaged communities and/or with local stakeholders, such as residents and

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subject line.*

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businesses, entities that carry out workforce development programs, labor unions, local government, and community-based organizations that represent, support, or work with disadvantaged communities. Applicants should ensure there is transparency, accountability, and follow-through when engaging with community members and stakeholders.

Specific examples include:

- Building collaborations and partnerships with researchers and staff at Minority Serving Institutions
- Addressing barriers identified in climate surveys to remove inequities
- Providing anti-bias training and education in the project design and implementation teams
- Offering training, mentorship, education, and other support to students and early/mid-career professionals from disadvantaged communities
- Providing efforts toward improving a workplace culture of inclusion
- Developing technology and technology integration innovations to meet the needs of disadvantaged communities
- Creating partnerships with local communities, especially under-resourced and disadvantaged communities
- Voluntary recognition of a union and informing employees of their rights, regardless of their classification
- Making research products and engagement materials accessible in a greater variety of formats to increase accessibility of research outputs
- Implementing training or distributing materials to reduce stigma towards individuals with disabilities
- Designing technologies that strategically fit within the existing workforce for installation and maintenance of the potential innovation

### **Energy Equity**

The Energy Equity section should articulate how project proposals will drive equitable access to, participation in, and distribution of the benefits produced from successful technology innovations to disadvantaged communities and groups. Intentional inclusion of energy equity requires evaluating the anticipated long-term costs and benefits that will accrue to disadvantaged groups as a result of the project, and how research questions and project plans are designed for and support historically disadvantaged communities' engagement in clean energy decisions. Similar to potential cost reductions or groundbreaking research findings resulting from the research, energy equity and justice benefits

may be uncertain, occur over a long period of time, and have many factors within and outside the specific proposed research influencing them.

Applicants should describe the influencing factors, and the most likely energy equity implications of the proposed research. Applicants should describe any long-term constraints the proposed technology may pose to communities' access to natural resources and Tribal Cultural resources. There may be existing equity research available to use and citation in this description or the applicant could describe milestone-based efforts toward developing that understanding through this innovation. These near- and long-term outcomes may include, but are not limited to: a decrease in the percent of income a household spends on energy costs (energy burden<sup>45</sup>); an increase in access to low-cost capital; a decrease in environmental exposure and burdens; increases in clean energy enterprise creation and contracting (e.g., women or minority-owned business enterprises); increased parity in clean energy technology access and adoption; increases in energy democracy, including community ownership; and an increase in energy resilience.

Specific examples include:

- Describing how a successful innovation will support economic development in diverse geographic or demographic communities
- Creating a plan to engage equity and justice stakeholders in evaluating the broader impacts of the innovation or in the development of the research methodology
- Describe how the proposed research strategy and methodology was informed by input from a wide variety of stakeholders
- A literature review of the equity and justice implications of the outcomes of the specific research if the innovation is successful or a plan with dedicated budget and expertise (staffing or subawardee) to evaluate the potential equity implications of successful innovation outcomes.

#### **Inclusion of SMART milestones**

EERE requires that the applicant's Community Benefits Plan include one Specific, Measurable, Achievable, Relevant and Timely (SMART) milestone for each

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<sup>45</sup> 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>

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budget period. An exemplar SMART milestone clearly answers the following questions:

- What needs to be accomplished?
- What measures and deliverables will be used to track progress toward accomplishment?
- What evidence suggests that the accomplishment is achievable?
- Why choose this milestone?
- When will the milestone be reached?

## **Workforce**

The Workforce section of the Community Benefits Plan should articulate the future workforce implications of the innovation or a milestone-driven plan for understanding those implications. This includes documenting the skills, knowledge, and abilities that would be required of workers installing, maintaining, and operating the technology that may be derivative of the applicant's research, as well as the training pathways and their accessibility for workers to acquire the necessary skills. There may be field-specific or relevant existing research that could be cited in this section. In addition, applicants could detail the process they will use to evaluate long-term impacts on jobs, including job growth or job loss, a change in job quality, disruptions to existing industry and resulting changes to relationships between employers and employees and improvements or reductions in the ability of workers to organize for collective representation, and anything else that could result in changes to regional or national labor markets.

For additional support with developing the Workforce section of a Community Benefits Plan, please refer to the DOE's Community Benefits Plan Frequently Asked Questions (FAQs) webpage (<https://www.energy.gov/bil/community-benefits-plan-frequently-asked-questions-faqs>). This new resource, though created primarily for demonstration and deployment projects funded by the Bipartisan Infrastructure Law (BIL), may be useful for R&D projects which is the main subject of this FOA template. Applicants will find section 2 of the FAQ ("Investing in America's Workforce") particularly helpful for understanding key federal policies, terms and concepts, as well as workforce development strategies relevant to examination of the workforce implications of applicants' proposed research.

Specific examples include:



- Outlining the challenges and opportunities for commercializing the technology in the US
- Creating a literature review of the workforce implications of the outcomes of the specific research if the innovation is successful or a plan with dedicated budget and expertise (staffing or subawardee) to evaluate the potential equity implications of successful innovation outcomes
- Creating a plan and milestones for assessing how a successful innovation will have implications for job savings or loss, either at the macroeconomic level or within specific industries
- Describing how the project will support training of workforce to address needs of successful innovation
- Voluntary recognition of a union and informing employees of their rights, regardless of their classification
- Creating a plan to evaluate how a successful innovation, will result in potential workforce shifts between industries or geographies.