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

Wells of Opportunity (WOO): Amplify II & ReAmplify

WOO
WELLS OF OPPORTUNITY
U.S. DEPARTMENT OF ENERGY

Funding Opportunity Announcement (FOA) Number: DE-FOA-0002525
FOA Type: Modification 0001
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FOA Issue Date:	06/10/2021
Informational Webinar:	06/30/2021 2:00pm ET
Submission Deadline for Full Applications:	08/16/2021 5:00pm ET
Expected Submission Deadline for Replies to Reviewer Comments:	09/15/2021 5:00pm ET
Expected Date for EERE Selection Notifications:	10/27/2021
Expected Timeframe for Award Negotiations:	November 2021 - February 2022

- To apply to this FOA, applicants must register with and submit application materials through the EERE Program Information Center (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	7/20/2021	1. Updated submission deadline from 7/26/2021 to 8/16/2021 2. Updated Submission Deadline for Replies to Reviewer Comments from 8/25/2021 to 9/15/2021 3. Updated Expected Date for EERE Selection Notifications from 10/6/2021 to 10/27/2021 4. Removed the IPMP requirement 5. Topic Area 1: Amplify corrected TRL level to 6 6. Topic Area 2: "For this FOA, minimal well work is less than or equal to $300,000" 7. Added Program policy factor

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I. Funding Opportunity Description

A. Background and Context

i. Background and Purpose

Background:

Geothermal energy is a renewable and diverse solution for the United States—providing reliable and flexible electricity generation and delivering unique technology solutions to America's heating and cooling demands. Geothermal resources can be found nationwide, are "always on," 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. In fact, the U.S. Department of Energy's (DOE's) Geothermal Technologies Office's (GTO) recent *GeoVision* report concludes that with technology improvements, especially in areas relevant to enhanced geothermal systems (EGS), geothermal power generation could increase 26-fold from today, representing 60 gigawatts-electric (GWe) by 2050[1].

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 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 rock. This fluid transports heat to the surface where electricity can be generated with current power generation technologies.

In addition to geothermal wells that have been targeted for EGS development, the hydrocarbon[2] industry also has an opportunity to contribute to the development of geothermal resources nationwide through the use of wells for power or heat production. The adaptation of hydrocarbon reservoirs, which are traditionally located in sedimentary basins, to geothermal production and utilization would expand the sector's geographic reach outside of the Western U.S. where natural geothermal systems reside. Many hydrocarbon fields enounter temperatures high enough for geothermal energy and heat production. This unused heat, combined with the wealth of data, knowledge, workforce, and infrastructure in place in support of these fields underscores the benefits of exploring their geothermal potential. While a comprehensive

[1] 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.

[2] Hydrocarbon: An organic chemical compound of hydrogen and carbon in the gaseous, liquid, or solid phase. https://www.eia.gov/tools/glossary/index.php

nationwide resource assessment that evaluates the potential of existing hydrocarbon wells for geothermal development does not yet exist, a number of studies have looked at geographic subsets of the sedimentary basins of the U.S., where most hydrocarbon exploration and development occurs. Blackwell et al. (2006) provided a conservative estimate of 100,000 EJ of thermal energy in basins nationwide deeper than 4km[3]. A more detailed study on a subset of 15 U.S. basins by Porro et al. (2012) reported 135,000 EJ including only basins in the western United States (not including the Gulf Coast region)[4]. Finally, a study by Zafer & Cutright (2014) estimate the thermal energy resource base for the state of Texas alone to be 166,000 EJ[5].

Purpose:
Through periodic funding opportunity announcements (FOAs), GTO partners with industry, academia, national laboratories, industry experts, etc. to increase the use of domestic geothermal energy across a range of resource types by improving technologies, reducing costs, and mitigating barriers. Within GTO, the EGS Program actively pursues research, development, and demonstration projects to facilitate technology validation and deployment, 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. While achieving cost-competitive electricity generation from EGS is a long-term goal, in the near-term, research, development, and demonstration projects will move industry along the learning curve toward technological readiness.

Through the FY21 Wells of Opportunity (referred to as WOO going forward) FOA, GTO is soliciting geothermal and hydrocarbon well owners or operators with existing wells that are willing to partner with DOE to advance and test EGS technologies in-situ. These wells could be "idle" or currently used for injection, production, and/or monitoring. Due to the criticality of the technology prototyping and methodology testing phase of research and development in the innovation pipeline, this FOA focuses on active field testing, where the Federal government takes on the majority of the associated cost and risks.

- **Topic Area 1 – Amplify (EGS Near-Field RD&D):** This field validation effort will culminate in new power production, adding to the commercial viability of existing geothermal fields. The goal of Amplify is to illustrate

[3] Blackwell, D., Negraru, P., and Richards, M., 2006. Assessment of the Enhanced Geothermal System Resource Base of the United States. Natural Resources Research, Vol. 15, No. 4, December 2006. DOI: 10.1007/s11053-007-9028-7.
[4] Porro, C., Esposito, A., Augustine, C., and Roberts, B., 2012. An Estimate of the Geothermal Energy Resource in the Major Sedimentary Basins in the United States. GRC Transactions, Vol. 36, 2012.
[5] Zafar, S. and Cutright, B., 2014. Texas' geothermal resource base: A raster-integration method for estimating in-place geothermal energy resources using ArcGIS. Geothermics, Vol. 50, April 2014.

that near-field and in-field EGS can be successfully deployed now as a result of recent technology advancements and that low permeability/underproductive wells near and in existing hydrothermal fields can be turned into valuable assets using EGS techniques.

- **Topic Area 2 – ReAmplify (Geothermal production from hydrocarbon wells):** The objective of this initiative is to establish the commercial viability of geothermal energy production from existing hydrocarbon fields. The goal of ReAmplify is to establish a pilot program where the production of geothermal heat from existing hydrocarbon fields can be demonstrated for electricity production or direct use applications.

Building a clean and equitable energy economy and addressing the climate crisis is a top priority of the Biden Administration. This FOA will advance the Biden Administration's goals to achieve carbon pollution-free electricity by 2035 and to "deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050"[6] to the benefit of all Americans. The Department of Energy is committed to pushing the frontiers of science and engineering, catalyzing clean energy jobs through research, development, demonstration, and deployment (RDD&D), and ensuring environmental justice and inclusion of underserved communities.

The research and development (R&D) activities to be funded under this FOA will support the government-wide approach to the climate crisis by driving the innovation that can lead to the deployment of clean energy technologies, which are critical for climate protection. Specifically, this FOA focuses on critical aspects of reservoir management needed for widespread commercialization of EGS technologies which directly supports the Biden Administration's goals for a clean energy future. In addition, this FOA provides an opportunity to reduce carbon emissions from the fossil fuel sector and facilitate clean geothermal energy/heat production from hydrocarbon wells.

ii. Technology Space and Strategic Goals

As identified in the *GeoVision* report, improving the tools, technologies, and methodologies used to explore, identify, access, create, and manage geothermal resources will reduce costs and risks associated with geothermal development. These reductions, possible via the development of EGS-enabling technologies, could increase geothermal power generation nearly 26-fold from today, representing 60 gigawatts-electric (GWe) of always-on, flexible electricity-generation capacity by 2050[7]. This capacity would comprise 3.7% of total U.S.

[6] Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," January 27, 2021.
[7] GeoVision: Harnessing the Heat Beneath Our Feet, 2019.

installed capacity, and 8.5% of all U.S. electricity generation in 2050. The *GeoVision* analysis demonstrated that EGS resources have the potential to provide extreme growth of geothermal energy in the electric sector and can also support significant growth within the non-electric sector for district heating and other direct-use applications.

The technology developments targeted in this FOA are intended to increase geothermal energy production in the U.S. while facilitating new opportunities for widespread power / heat production in the future from regions where heat is present, yet no geothermal energy production exists.

Strategic goals for this FOA are highlighted below in Table 1, along side GTO EGS Subprogram goals, MYPP 2021 goals and action areas identified in the *GeoVision* Roadmap. The GeoVision Roadmap outlines a compilation of technical, economic, and institutional actions that the entire geothermal community including DOE, Industry, and Academia must address in order for geothermal technologies to play a larger role in the Nation's energy mix.

Table 1: Wells of Opportunity (WOO) FOA Goals and Applicable GTO Goals

	Topic Area 1: Amplify Goal: From the portfolio of awards made as a result of this FOA, demonstrate the capability of producing >5 MWe additional capacity (per site/well) using advanced stimulation techniques in existing geothermal wells**.**	**Topic Area 2: ReAmplify** Goal: From the portfolio of awards made as a result of this FOA, develop and execute a successful hydrocarbon field pilot test where the viability of producing 1 MWe or 10 MWt can be demonstrated.
GeoVision Roadmap	**Key Action 1.2**: Improve detection of subsurface signals **Key Action 1.4**: Improve geothermal energy resource recovery **Key Action 1.5**: Improve geothermal resource and asset monitoring, modeling, and management. **Key Action 4.2:** Improve public education and outreach about geothermal energy	**Key Action 1.4:** Improve geothermal energy resource recovery **Key Action 1.5:** Improve geothermal resource and asset monitoring, modeling, and management. **Key Action 4.2:** Improve public education and outreach about geothermal energy
EGS Subprogram Goals	• From the portfolio of awards made as a result of this Topic Area, demonstrate stimulation of at least 3 unique geothermal reservoirs and correlate to increased reservoir performance • Demonstrate stimulation techniques for initiating or re-opening fractures in subsurface. • Reduce the number of wells required per MW produced through multizone stimulation of existing wells	• Demonstrate the viability of producing geothermal energy from existing hydrocarbon wells • Demonstrate the use of existing oilfield tools and techniques in the production of geothermal energy • Demonstrate the use of EGS reservoir enhancement methods in hydrocarbon wells to support geothermal production

Topic Area 1: Amplify

- Goal: Demonstrate the capability of producing >5MWe (per site/well) additional capacity using advanced stimulation techniques in geothermal wells.

Topic Area 2: ReAmplify

- Goal: Facilitate the execution of a successful hydrocarbon field pilot test(s) where the viability of producing 1 MWe or 10MWt can be demonstrated.

iii. Diversity, Equity, and Inclusion

It is the policy of the Biden Administration that:

[T]he Federal Government should pursue a comprehensive approach to advancing equity[8] for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is the responsibility of the whole of our Government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity.

By advancing equity across the Federal Government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.[9]

As part of this whole of government approach, this FOA seeks to encourage the participation of underserved communities[10] and underrepresented groups.

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

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

[10] The term "underserved communities" refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list of in the definition of "equity." E.O. 13985. For purposes

Applicants are highly encouraged to include individuals from groups historically underrepresented[11,12]in STEM on their project teams. As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a Diversity, Equity, and Inclusion Plan that describes the actions the applicant will take to foster a welcoming and inclusive environment, support people from underrepresented groups in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities (See Section IV.B.i). The plan should include SMART (Specific, Measurable, Assignable, Realistic and Time-Related) milestones supported by metrics to measure the success of the proposed actions. This plan will be evaluated as part of the technical review process.

Further, Minority Serving Institutions[13], Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses, Veteran Owned Businesses, or

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of this FOA, as applicable to geographic communities, applicants can refer to economically distressed communities identified by the Internal Revenue Service as Qualified Opportunity Zones; communities identified as disadvantaged or underserved communities by their respective States; communities identified on the Index of Deep Disadvantage referenced at HYPERLINK "https://news.umich.edu/new-index-ranks-americas-100-most-disadvantaged-communities/" https://news.umich.edu/new-index-ranks-americas-100-most-disadvantaged-communities/, and communities that otherwise meet the definition of "underserved communities" stated above.

[11] According to the National Science Foundation's 2019 report titled, "Women, Minorities and Persons with Disabilities in Science and Engineering", women, persons with disabilities, and underrepresented minority groups—blacks or African Americans, Hispanics or Latinos, and American Indians or Alaska Natives—are vastly underrepresented in the STEM (science, technology, engineering and math) fields that drive the energy sector. That is, their representation in STEM education and STEM employment is smaller than their representation in the U.S. population. HYPERLINK "https://ncses.nsf.gov/pubs/nsf19304/digest/about-this-report" https://ncses.nsf.gov/pubs/nsf19304/digest/about-this-report For example, in the U.S., Hispanics, African Americans and American Indians or Alaska Natives make up 24 percent of the overall workforce, yet only account for 9 percent of the country's science and engineering workforce. DOE seeks to inspire underrepresented Americans to pursue careers in energy and support their advancement into leadership positions. HYPERLINK "https://www.energy.gov/articles/introducing-minorities-energy-initiative" https://www.energy.gov/articles/introducing-minorities-energy-initiative

[12] See also. Note that Congress recognized in section 305 of the American Innovation and Competitiveness Act of 2017, Public Law 114-329:

> (1) [I]t is critical to our Nation's economic leadership and global competitiveness that the United States educate, train, and retain more scientists, engineers, and computer scientists; (2) there is currently a disconnect between the availability of and growing demand for STEM-skilled workers; (3) historically, underrepresented populations are the largest untapped STEM talent pools in the United States; and (4) given the shifting demographic landscape, the United States should encourage full participation of individuals from underrepresented populations in STEM fields.

[13] Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities/Other Minority Institutions) as educational entities recognized by the Office of Civil Rights (OCR), U.S. Department of Education, and identified on the OCR's Department of Education U.S. accredited postsecondary minorities' institution list. See

entities located in an underserved community that meet the eligibility requirements (See Section III.A) are encouraged to apply as the prime applicant or participate on an application as a proposed partner to the prime applicant. The Selection Official may consider the inclusion of these types of entities as part of the selection (See Section V.C.i).

B. Topic Areas

i. Topic Area 1: Amplify

As identified in the Strategic Development of EGS[14] and FORGE Roadmaps [15], stimulation activities are central to the success of EGS. Stimulations enhance in-situ permeability and increase the permeable surface area within the subsurface, increasing heat exchange between a circulating fluid and the hot rock, and thus increasing reservoir energy output and well productivity. Well stimulation creates a productive geothermal reservoir where only hot rock existed previously. Historically, most EGS stimulations involved activating a single zone or multiple zones of fractures from an open-hole section of the wellbore. In these cases, fluids are pumped downhole, creating or re-opening fractures when the injection pressure reduces the normal/shear stress ratio sufficiently across a fracture surface to cause shearing.

Through this Topic Area, new stimulation techniques and technologies will be validated in the field, culminating in new, clean, baseload geothermal power production. The Amplify effort will demonstrate that the use of EGS methods can transform low permeability or underproductive wells in or near existing

HYPERLINK "https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html" https://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst.html.

[14] A Technology Roadmap for Strategic Development of Enhanced Geothermal Systems

[15] Frontier Observatory for Research in Geothermal Energy: A Roadmap

hydrothermal fields into productive, economically beneficial assets for geothermal developers. GTO seeks to expand the portfolio of EGS stimulation projects selected under the 2020 Amplify Topic Area and to continue to build upon the knowledge gained from previous EGS demonstration projects funded by the U.S. Department of Energy at Desert Peak, The Geysers, Newberry Volcano, Raft River, and Brady's Hot Springs. Publically 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/ (final technical reports, conference proceedings, journal articles, etc.), and https://www.energy.gov/eere/geothermal (GTO EGS information and GTO Peer Review reports). These demonstration projects dramatically advanced EGS research, but questions remain regarding reproduciblitly of field-scale EGS stimulation methods that limit commercialization, including:

- 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 fluid injection, thermal rock-fluid interaction, chemical stimulation, zonal isolation, and/or other techniques
- Adoption of successful EGS well stimulation techniques by the geothermal industry at a commercial scale[16]

Subsequent to the completion of the DOE-funded EGS demonstration projects, a number of new technologies or those adopted from the hydrocarbon 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 shown promise in initial field tests. 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, where infrastructure costs are low and MW can be added now.

The awards funded under this FOA will stimulate existing geothermal 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. An in-field well is defined as a well located within the boundaries of a known geothermal system, while a near-field well is defined as a well located outside the boundaries of a known geothermal system as depicted by an existing, credible, subsurface geologic model. Minimum requirements for the target well are described below under Initial Compliance Criteria.

[16] Frontier Observatory for Research in Geothermal Energy: A Roadmap

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 discussed above 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 or combinations of well stimulation techniques) is required. The use of available or experimental technologies from geothermal, hydrocarbon, or other relevant industries are allowable but the Technology Readiness Level (TRL) of proposed stimulation/isolation technologies must be at least a six (6). Please see Appendix E for TRL definitions.

Awards made under this announcement will be cooperative agreements that will include well stimulation, data collection, and analysis over three Phases. The projects funded under this announcement will help accelerate EGS technology improvements in order to fully commercialize unproductive or underproductive geothermal resources and transition them into valuable assets.

Applicants should refer to Section III.C of this announcement to review the Initial Compliance Review requirements.

It is a requirement that target well(s) exist at the proposed project site prior to an award being made by DOE under this announcement. In addition, DOE seeks wells that are in good condition and capable of being put into operations relatively quickly and with minimal workover. Any costs incurred prior to the award selection date (such as well drilling, 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.

Evidence of compliance with relevant environmental laws and regulations must be provided.

Non-proprietary data provided to DOE during all three phases of the projects will be shared with the United States Geological Survey (USGS) and/or other federal agencies without restriction.

Project Phase Descriptions

Proposed projects should be completed in three distinct phases with go/no-go decision points after Phase 1, after Phase 2, and elsewhere if appropriate.

Via a separate initiative, DOE will support Lawrence Berkeley National Laboratory (LBNL) and Sandia National Laboratories (SNL) for on-site surface and borehole seismic monitoring design, deployment and analysis during the stimulations that take place under this initiative. Therefore, seismic monitoring and costs associated with seismic monitoring will not be required of the recipients under this topic area except for those required to develop Induced Seismicity Moniotring Plans (ISMP), which are required by DOE for all government funded EGS projects.

Phase descriptions are as follows:

Phase 1 – Pre-Stimulation

The goal of Phase 1 is to create a detailed well stimulation plan that includes required tasks with a go/no-go decision, a budget, and a schedule. Phase 1 should consist of four objectives as outlined below, with SMART (Specific, Measurable, Achievable, Relevant, and Timely) milestones that demonstrate achievement included at the end of each objective. 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.

Objective 1.1: Site/Wellbore Readiness

The minimum requirement for Objective 1 is completion of the candidate well so that it is ready for stimulation work. DOE seeks wells that are in operational condition and/or require minimal workover. If minimal work over is required, applications should clearly discuss the drilling plan/level of workover anticipated for the proposed well and prepare the budget documents accordingly. Applications that do not describe well conditions and plans for minimal re-completion will not be scored as highly during merit review.

Objective 1.2: Development of Stimulation Plan

The minimum requirements for Objective 1.2 are to develop a plan for well stimulation. The applicant 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, as well as subsurface stress direction and magnitudes. If critical data gaps exist, DOE will consider the acquisition of new well characterization data in order to develop a successful stimulation plan, if it is clearly outlined in the application materials and budget document, but DOE's expectation is that existing datasets will be utilized to develop the stimulation plan. All relevant geological,

geomechanical, geochemical, geophysical and seismological data may be considered in the development of the stimulation plan.

Objective 1.3: Planning and Permitting, Induced Seismicity Mitigation Plan
Awardees are expected to work closely with the Amplify Monitoring Team (AMT) run jointly by Lawrence Berkeley National Laboratory (LBNL) and Sandia National Laboratories (SNL) in developing a plan for seismic monitoring. The AMT will advise on the appropriate location for seismic sensors and the Awardee will be responsible for secure necessary permits to enable the required surface and borehole seismic monitoring. Costs for permitting will be included in the Awardees total project costs, while most other costs associated with seismic monitoring will be borne by LBNL and SNL via directly funded agreements with DOE. Additional details will be provided during award negotiations.

As part of this objective, awardees will also be required to develop an Induced Seismicity Mitigation Plan (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)

The AMT's seismic data collection and analysis effort, funded separately by DOE, will provide direct input into the development of this plan.

Objective 1.4: Reporting and Publications
The minimum requirement for Objective 1.4 is to provide sufficient information to DOE (in the form of a Phase 1 Report) and regulatory entities to receive authorization to proceed to Phase 2 stimulation activities. This information should be documented in a Phase 1 Report.

The Phase 1 Report should include the items listed below. If any of these items were included in the initial application, an updated version must be included as part of the Phase 1 Report.

- 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 of fracture growth;
- Updated preliminary plans submitted with the application materials on full-scale resource utilization with details on the potential use case and the business-case for the local well field under consideration in the Pilot project;
- Please Note: Resource characterization, for both the pilot study site and the broader subsurface reservoir should include an estimate of the

capacity of the geothermal resource in terms of either MWth or MWe, and should be supported by thermal and reservoir based models;

- Provide an overview, with associated costs (outlined in budget) for any site/pad work, characterization, or workover operations required to enable pilot testing. This portion of the report should clearly discuss the technical specifics and operational requirements of any workover or other remedial efforts anticipated for the proposed well(s) and prepare budget documents accordingly;
- Historical productivity or injectivity of the candidate well. Results of all flow or injection tests of the well and productivities of neighboring wells. (The data on neighboring wells may be provided in a separate document which may be labeled "Proprietary");
- Estimated or actual pre-stimulation power potential (MWe) of the candidate well;
- A final compilation of the detailed well stimulation plan that includes required tasks with Go/no-go decisions, a budget, and a field operations schedule; and
- All reports, plans, permits, licenses, and other items required by governmental regulatory agencies for the performance of this work, including NEPA determination and documentation.

The Phase 1 report should include the ISMP as an appendix and must provide an overview of seismicity measured at the site via AMT monitoring or existing monitoring networks, predictions for maximum events, and mitigation strategies for addressing any seismicity.

Following completion of the objectives listed above, the project should include a go/no-go decision point with measureable criteria before implementation of successive activities.

Phase 2 – Reservoir Creation and Characterization

The goal of Phase 2 is to complete well stimulation(s) and establish flow of geothermal fluid between wells. Phase 2 should include execution of well stimulation(s), and near-term post stimulation data collection.

Phase 2 should consist of three Objectives, with SMART milestones that demonstrate achievement included at the end of each objective:

Objective 2.1: Stimulation

The minimum requirement for Objective 2.1 is to complete stimulation of the candidate geothermal well via hydraulic stimulation (or other means) and to establish inter-well connectivity. Some monitoring of stimulation success will be

permitted including running geophysical or production logs, fluid sampling, tests, tracer tests, etc. as long as they are relevant to analyzing stimulation success. Proposed monitoring should be described in detail in the Application materials. Seismic/microseismic monitoring will not be the responsibility of the awardees; seismic arrays and analysis will be provided by DOE via another related project in cooperation with the AMT.

Objective 2.2: Communications

Recipients must conduct and promote communications, education, and outreach activities with DOE, outside stakeholders, and the general public to promote awareness of this initiative and EGS in general. These activities should be coordinated with other ongoing key communications, education, and outreach efforts supported by DOE outside of the scope of this funding announcement.

Objective 2.3: Reporting and Publications

The minimum requirement for Phase 2 is the stimulation of the well and preparation for subsequent Phase 3 monitoring, data collection and validation work. Initial results of the stimulation must be reported within two months of completion of the stimulation as a publicly available DOE report.

At a minimum, the Phase 2 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 for both pre- and post-stimulation;
- Pumping and related data to evaluate the stimulation; and
- Seismic data prior to and after stimulation.

Following completion of the objectives listed above, the project should include a go/no-go decision point with measureable criteria before implementation of successive activities.

Phase 3 – Validation and Power Generation

The goal of Phase 3 is to produce power and to track reservoir sustainability / production following well stimulation.

Phase 3 should consist of two objectives with SMART milestones that demonstrate achievement included at the end of each objective:

Objective 3.1: Post Stimulation Data Collection

Applicants must agree to collect data and monitor the stimulation well and other wells within the field, especially those affected by the stimulation for a minimum of one year.

Recipients should collect and provide to the GDR, on a quarterly basis, updates to the data requested in the Phase 2 Report as well as the following additional data:

- Productivity or injectivity data and analysis;
- Logs as needed; and
- Well flow rates, pressures, and well head temperatures.

Not required but relevant:

- Chemistry of produced fluid and mineral dissolution/precipitation; 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.

DOE may require more data, if necessary based on proposed well readiness/stimulation techniques and specific properties of the target geothermal reservoir, and will work with successful applicants prior to work commencing on Phase 1 to determine the final set of required data. In consultation with the awardee, DOE will determine the type, format, and frequency of data collected over all phases of the project. Non-proprietary data collected during all phases of the projects will be uploaded by award recipients and made available to the public through the Geothermal Data Repository (GDR).

Objective 3.2: Reporting and Publications

The minimum requirement of this Objective is to provide short and long term flow test reports. At the end of Phase 3, the recipient shall submit a final technical report that includes all Phases of the award.

Go/no-go Decision Points

There should be Go/no-go decision points after the end of each phase, and/or elsewhere if appropriate. 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, and adherence to the proposed project schedule:

- "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. It is anticipated that a project would remain in a "Hold" status for a period of weeks to allow awardees to submit additional information for review by GTO.
- "No-Go" – DOE may not provide further funding for the project. This may be due to irresolvable technical difficulties; changes in the GTO mission, goals, or portfolio; lack of appropriated funds; etc. Should the project be terminated, the final annual report will be accepted by GTO to fulfill the final technical report requirement.

All work under EERE funding agreements must be performed in the United States, and the proposed project site must also be located in the U.S. See Section IV.J.iii. and Appendix B.

ii. Topic Area 2: ReAmplify

WOO
ReAMP
OLD WELLS. NEW IDEAS.
U.S. DEPARTMENT OF ENERGY

The U.S. Department of Energy's Geothermal Technologies Office seeks to spur collaboration between the geothermal and hydrocarbon communities on geothermal systems research, demonstration, and development (RD&D) by demonstrating the technical and economic feasibility of geothermal energy production using existing hydrocarbon wells situated in hot sedimentary basins.

The intent of this FOA is two-fold: to develop pilot-scale test site(s) in hydrocarbon fields that demonstrate the viability of geothermal production, and to evaluate the commercial feasibility of geothermal production from hydrocarbon fields. This is an opportunity to begin to transition a subset of the oil and gas workforce and hydrocarbon wellfields towards the production of clean, renewable energy. The

hydrocarbon industry sustains a large, highly skilled workforce that is naturally poised to pivot from hydrocarbons to geothermal bringing with them decades of experience in technology that is directly applicable to the development and growth of EGS and other geothermal resources. The Federal support provided through The ReAmplify effort can represent an opportunity to start this critical transition from hydrocarbons to clean energy. The goal is to demonstrate a proof of concept in operational wells/fields which will provide the hydrocarbon industry and interested investors with the data needed to incentivize larger-scale geothermal deployment, which has the potential to greatly expand geothermal's geographic impact.

Applications under this Topic Area must develop a detailed feasibility study, pilot-scale testing (in hydrocarbon fields) of geothermal energy production, followed by the development of a commercial justification and/or value proposition outlining the potential for expanded geothermal resource development in the proposed well field. For the purposes of this FOA, GTO defines two means of producing geothermal energy from hydrocarbon wells: the wells can be repurposed for exclusive geothermal production (conversion), or the the wells can produce hydrocarbons (and other produced fluids) and heat simultaneously (co-production).

Applicants are encouraged to partner with knowledgeable geothermal experts from national laboratories, academic institutions, and/or the geothermal industry to assist in achieving the FOA objectives.

EERE is compiling a Teaming Partner List to facilitate the widest possible national participation in the formation of applicant teams for this Topic Area. The list allows organizations who may wish to participate in an application, but do not wish to apply as the Prime applicant, or those who are seeking partners.

The Teaming Partner List will be available on EERE Exchange at https://eere-Exchange.energy.gov under FOA DE-FOA-0002525 during the time of its release through its closing. The Teaming Partner List will be updated at least weekly until the close of the Full Application period, to reflect new Teaming Partners who have provided their information. Any organization that would like to be included on this list should submit the following information to WellsofOpportunity@ee.doe.gov, with the subject line "Teaming Partner Information":

Organization Name, Contact Name, Contact Address, Contact Email, Contact Phone, Organization Type, Area of Technical Expertise, and Brief Description of Capabilities and partners sought.

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 this Teaming Partner List, EERE does not endorse or otherwise evaluate the qualifications of the entities that self-identify themselves for placement on the Teaming Partner List. EERE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information.

Please note the following operational considerations required in this topic area:

- Applicants to this FOA must propose the use of existing wells – no new well drilling will be permitted. Projects that propose new drilling will be deemed non-compliant (see compliance criteria in Section I.C.).
- DOE seeks wells that are in operational condition and/or require minimal remedial well work. For this FOA, minimal well work is less than or equal to $300,000. If remedial workover is required, applications should clearly discuss the recompletion plan/level of workover anticipated for the proposed well, any operational risks associated with the proposed workover, and prepare the budget documents accordingly.
- DOE funds may be used for time and materials costs of target well recompletions as well as requisite surface equipment; however, a capital cost cap of $500,000 will be imposed on the purchase of any surface power conversion equipment. Power conversion equipment is defined as that used to convert heat to electrical power or heat exchangers (including heat pumps) employed in direct use applications.
- The Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal rights to surface ingress/egress and hold title to fluid mineral rights necessary for production of hydrocarbon/water/thermal resources at the proposed site at the time of application and throughout the proposed project lifetime.

Projects for this Topic Area should be composed of the following three phases.

Phase 1 – Feasibility Study and Engineering Design and Permitting (>1 year)

Phase 1 should consist of three objectives as outlined below, with SMART (Specific, Measurable, Achievable, Relevant, and Timely) milestones that demonstrate achievement included at the end of each objective. 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. If remedial workover is required, it will be completed at the end of phase 1.

Objective 1.1: Feasibility Study

Complete a feasibility study to demonstrate geothermal energy utilization of the proposed pilot test site, characterize the target geothermal resource, and fully design/engineer the equipment necessary to implement the pilot test. Feasibility studies should incorporate:

- Resource Characterization (update resource characterization submitted with application materials):
    - Overview of subsurface geological conditions via a summary of the existing geological model, including a description of existing stratigraphy, as well as all documented and inferred faults;
    - Historical productivity or injectivity of the candidate well(s) including documented injection tests / productivities of the candidate (required) and neighboring wells (if available – not required);
    - Measured or estimated reservoir temperatures and produced fluids in pilot test candidate well(s);
    - Measured or approximated fluid composition of reservoir fluids accessible by the candidate well(s); and
    - Potential recoverable capacity of the geothermal resource in MWth or MWe, as supported by structural and reservoir-based models, for the candidate well(s).
- Site/Wellbore Readiness (update Site/Wellbore Readiness overview submitted with application materials):
    - Provide an overview, with associated costs (outlined in budget) for any site/pad work, characterization, or workover operations required to enable pilot testing; and
    - Applications should clearly discuss the level of workover anticipated for the proposed well(s) and prepare the required budget documents accordingly.
- Pilot System Design and Operations Plan:
    - A plan that includes:
        - A detailed narrative describing the planned operational procedures proposed to demonstrate the viability of geothermal production from the candidate well;
            - Please provide a detailed description of the planned use(s) of oil, natural gas, or natural gas liquids that would be produced as a direct result of this project, including but not limited to sales, on lease consumption, reinjection, flaring, or disposal.
        - A detailed design for the development and implemenation of the pilot test; and
        - The Operations Plan should include all required tasks with Go/no-go decisions, a budget for equipment and personnel time, and a field operations schedule.
- Resource Utilization Plan (update resource utilization plan submitted with application materials):
    - Update the preliminary plans submitted with the application materials on full-scale resource utilization including details of the business case(s) for implementation of the Field Pilot test.

Specifically, the business case(s) should outline, from a commercial perspective, why deployment of this technology provides tangible benefits and offers opportunities for scalability of geothermal production from the pilot well to the surrounding hydrocarbon-producing field; and
    - Please Note: Resource characterization, both for the pilot study site/well and the broader available resource should include an estimate of the capacity of the geothermal resource in MWth or MWe, supported by structural and/or reservoir-based models, as required.
- Regulatory and Permitting:
    - Demonstration of completion of all regulatory requirements and environmental permitting (including NEPA) required for the proposed project;
    - If the permitting/NEPA is not complete, a clear and reasonable schedule should be provided for expected completion of permitting activities, however:
        - Please Note: the project will not move into Phase 2 until permitting is completed;
    - The PI or project partner must provide documentation of rights to (select appropriate) hydrocarbon /water/heat resources in the pilot test well(s).

Objective 1.2: Induced Seismicity Mitigation Plan (ISMP)

- All DOE funded EGS project are required to develop a strategy for mitigating induced seismicity associated with injection. Therefore, recipients that plan to inject fluid, otherwise not injected during normal field operations, into the subsurface as part of their Pilot site design will be required to develop an Induced Seismicity Mitigation Plan (ISMP) in compliance with the current version of the "Protocol for Induced Seismicity Associated with Enhanced Geothermal Systems." (https://wellbore.lbl.gov/downloads/Best_Practices_EGS_Induced_Seismicity_8-APR-2016.pdf);
- The ISMP should include a discussion and evaluation of the regional setting, structure, and stratigraphy as related to seismic risk. Please note that the full extent of the ISMP described in the "Best Practices" document above may not be necessary for each field project. The level of detail required will be assessed collaboratively by DOE and the recipient at the start of Phase 1;
    - Note: there are commercial groups that can help with the development of this document.
- If an ISMP is required, Awardees are expected to work closely with the Amplify Monitoring Team (AMT) run jointly by Lawrence Berkeley National

Laboratory (LBNL) and Sandia National Laboratories (SNL) in developing a plan for seismic monitoring. Based on available data and in collaboration with the Awardee, the AMT will advise on the appropriate location for seismic sensors. The Awardee will be responsible for secure necessary permits to enable the required surface and borehole seismic monitoring. Costs for permitting will be included in the Awardees total project costs, while most other costs associated with seismic monitoring will be borne by LBNL and SNL via directly funded agreements with DOE. Additional details will be provided during award negotiations.

Objective 1.3: Wellbore/site workover (if required)

- If required, wellbore workovers and/or site upgrades should be completed according to the operational plans developed in Phase 1, within the scope and costs outlined in the Phase 1 plan. As applicable, the quality and pertinence of the proposed well workover/site upgrade plan will be analyzed during the merit review process. During negotiations leading to awards for for selected applicants, DOE may designate well workover/site upgrade tasks as "optional", i.e., results of the feasibility study, ISMP, or other tasks may dictate whether certain workover operations or site upgrades are required or not. Depending on the level of proposed well workover/site upgrade, DOE may also include a go/no-go decision point before implementation of successive activities.

Objective 1.4: Phase 1 Reporting

- **Phase 1 Deliverables:** The Recipient shall provide reports in accordance with the enclosed Federal Assistance Reporting Checklist and the instructions accompanying the Checklist. In addition to the reporting requirements described in the Federal Reporting Assistance Checklist, the following Task-Specific Report/Plans are required during the implementation of the project.

  - Feasibility Study;
  - Final ISMP, IF REQUIRED;
  - Phase 1 Report:
    - At the completion of Phase 1, a comprehensive report must be submitted to DOE. The Phase 1 Report should include the items listed below:
      - All reports, plans, permits, licenses, and other items required by governmental regulatory agencies for the performance of this work, including NEPA determination and documentation;
      - Resource characterization;

- Site/wellbore readiness;
- Summary of wellbore workover activities, if required;
- Pilot system design and operations plan;
- Resource utilization plan;
- Budget- costs for testing;
- Phase 2 Project Management Plan (PMP); and
- Recipients will be required to submit an updated cost proposal consistent with their defined scope detailing costs associated with all site operations for Phase 2 and inclusive of decommissioning/disposition activities (if necessary).

- **Note**: The applicant must state, in writing with concurrence from an authorized representative from the organization, that **non-proprietary data collected during the project period will be made available to the public through the National Geothermal Data System** (please reference http://www.geothermaldata.org/Home.aspx or http://apps1.eere.energy.gov/geothermal/projects/projects.cfm/ProjectID=27 for more information). The data shall be converted to a common file format (Word, PDF, .jpg, etc.) if necessary.

Phase 1 will end with a Go/No-go decision point where DOE will assess the feasibility of the proposed plan from a production and engineering standpoint.

The Go/No-Go Criteria that will be utilized to assess the projects are listed below:

- Satisfactory completion of a feasibility study that demonstrates that thermal energy may be produced from the target reservoir;
- Satisfactory completion of engineering design activities that demonstrate how the pilot site will be constructed;
- Satisfactory completion of wellbore workovers and/or site upgrades;
- Demonstration of completion of all regulatory and environmental permitting (including NEPA) required for the proposed project. If the permitting/NEPA review is not complete, a clear and reasonable schedule should be provided for expected completion of permitting activities;
    - NEPA Evaluation:
    - The degree to which the Awardee has adequately evaluated the level of foreseeable site operations as it pertains to their potential cumulative environmental, safety, health, and socioeconomic effects to be evaluated under NEPA.
    - The clarity and thoroughness of the Awardee's technical approach as outlined in the SOPO for conducting environmental reviews as necessary, in order to ensure the Re-Amplify project site meets

NEPA and other federal, state, and local regulations and permitting requirements.
    - Feasibility of meeting project goals and objectives on schedule, given NEPA and permitting constraints as supported by the SOPO and PMP provided in Phase 1 Report.
- Summary of wellbore workover activities, if required;
- Satisfactory completion of all proposed Phase 1 goals including a discussion of variance from the proposed project budget, schedule, and scope; and
- Clear definition on all proposed Phase 2/Phase 3 tasks and activities including discussion of the project budget, schedule, and scope for subsequent phases.

Phase 2 – Procurement, Installation, and Commissioning of Equipment (1 year)

Phase 2 should consist of three objectives as outlined below, with SMART (Specific, Measurable, Achievable, Relevant, and Timely) milestones that demonstrate achievement included at the end of each objective. 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. Supporting activities such as reservoir engineering may be added as an additional objective.

The objectives of Phase 2 are to procure, install, and commission, and operate the pilot test evaluating the potential to harness geothermal energy and to prepare for subsequent Phase 3 monitoring, data collection and validation work.

Objective 2.1: Installation, Commissioning , and Implementation of Geothermal Pilot Plant

- Equipment procurements and surface infrastructure modification required to install and commission a working geothermal pilot plant should be completed and the pilot plant should be constructed per the Phase 1 submitted plans. The geothermal plant will be commissioned and readied for Phase 3 activities;
- After commissioning, an initial 1 month of system operational data will be collected prior to the end of Phase 2.

Objective 2.2: Phase 2 Reporting

Phase 2 Deliverables: The applicant shall provide reports in accordance with the enclosed Federal Assistance Reporting Checklist and the instructions accompanying the Checklist. In addition to the reporting requirements described in the Federal Reporting Assistance Checklist, the following Task-Specific Report/Plans are required during the implementation of the project;

- Phase 2 Report:
  - At the completion of Phase 2 (or within two months of completion of the installation, whichever is first) a comprehensive report must be submitted to DOE. The Phase 2 Report should include the items listed below:
    - Summary of pilot plant design details and as built details if changes were made to the design
    - Overview of the initial operational data, including a comparison of the expected vs actual results
- At a minimum, the following data sets which must be uploaded to the Geothermal Data Repository (GDR):
  - Pilot plant design and as built
  - Initial operational data
- Revised/Updated Project Management Plan (PMP)

Phase 2 will end with a Go/No-go decision point where DOE will assess the operational success of the well workover (if applicable) and Field Pilot Plant comissioning.

The Go/No-Go Criteria that will be utilized to assess the projects are listed below:

- Satisfactory completion of installation and commissioning of the pilot plant
- Results of the initial operational data collected as compared to predicted

Phase 3 – Operation & Monitoring (2-3 years)

Phase 3 should consist of four objectives as outlined below, with SMART (Specific, Measurable, Achievable, Relevant, and Timely) milestones that demonstrate achievement included at the end of each objective.

The objective of Phase 3 is to operate the Field Pilot Test for a minimum of two years while collecting data on the performance and operating characteristics of the pilot site.

Objective 3.1: Long-Term Pilot Plant Operations and Data Collection

Operational data collected during pilot plant testing should enable a thorough evaluation of the subsurface and surface systems. In consultation with the awardee, DOE will determine the type, format, and frequency of data collected during the long term pilot testing prior to the initation of Phase 3. Examples of data:

Subsurface Data	Surface Data
Production flow rate	Heat exchanger efficiency
Reservoir temperature	Inlet/outlet temperature
Reservoir pressure	Energy produced

Fluid composition	

- During phase 3, the awardee will provide all pilot plant operational data and other non-proprietary data to GTO on a quarterly basis. These data must also be uploaded to the GDR at the conclusion of Phase 3.

Objective 3.2: Updated Feasibility Study and Analysis

- Applicants will update Feasibility studies and Resource Utilization Plans developed in Phase 1. Updates should incorporate operational data collected during Phase 3 and re-evaluate the previously proposed Resource Utilization Plan use-case for broader adoption of geothermal energy production in the resource being considered in this study. Applicants should account for any new factors that might play a role in hindering or accelerating potential expansion.

Objective 3.3: Decommissioning

- If required, the decommissioning of the pilot facility or transfer of ownership (eliminating all DOE future liability and spending) should take place at the conclusion of Phase 3 activities. DOE will support the costs of decommissioning if funds are set aside at the outset of the project.

Objective 3.4: Phase 3 Reporting

- Phase 3 Deliverables:
  - Long Term Data Sets uploaded to GDR;
  - Updated / Revised Feasibility Study and accompanying analysis; and
  - Final Report:
    - to include an overview of the 2-year pilot testing, including all pilot plant operational data, demonstrated validation of technical and economic assumptions, and documentation of lessons learned.
    - If relevant – a separate decommissioning report will be attached to the final report as an appendix.

All work under EERE funding agreements must be performed in the United States. See Section IV.H.iii. and Appendix C.

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 for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Applications for Topic Area 1 (Amplify) that propose open hole stimulation with no zonal isolation; i.e., stimulation from the casing shoe.
- Applications for Topic Area 2 (ReAmplify) that propose drilling of a new wellbore for pilot study testing.

D. Authorizing Statutes

The programmatic authorizing statute is For Topic Area 1 (Amplify), the programmatic authorizing statute is the Energy Act of 2020, Section 615(b), as codified at 42 U.S.C. 16231(a)(2)(C)(ii),(iii),(v) shown below:

b) ENHANCED GEOTHERMAL SYSTEMS TECHNOLOGIES.—In collaboration with industry partners, institutions of higher education, and the national laboratories, the Secretary shall support a program of research, development, demonstration, and commercial application of the technologies to achieve higher efficiency and lower cost enhanced geothermal systems, including—

(1) reservoir stimulation;
(2) drilled, non-stimulated (e.g. closed-loop) reservoir technologies;
(3) reservoir characterization, monitoring, and modeling and understanding of the surface area and volume of fractures;
(4) stress and fracture mapping including real time monitoring and modeling;
(5) tracer development;
(6) three and four-dimensional seismic imaging and tomography;
(7) well placement and orientation;
(8) long-term reservoir management;
(9) drilling technologies, methods, and tools;
(10) improved exploration tools;
(11) zonal isolation; and
(12) understanding induced seismicity risk from reservoir engineering and stimulation."

For Topic Area 2 (ReAmplify), the programmatic authorizing statute is the Energy Act of 2020, Section 614(d), as codified at 42 U.S.C. 16231(a)(2)(C)(ii),(iii),(v) shown below:

b) ENHANCED GEOTHERMAL SYSTEMS TECHNOLOGIES.—In collaboration with industry partners, institutions of higher education, and the national laboratories,

the Secretary shall support a program of research, development, demonstration, and commercial application of the technologies to achieve higher efficiency and lower cost enhanced geothermal systems, including—

(1) reservoir stimulation;
(2) drilled, non-stimulated (e.g. closed-loop) reservoir technologies;
(3) reservoir characterization, monitoring, and modeling and understanding of the surface area and volume of fractures;
(4) stress and fracture mapping including real time monitoring and modeling;
(5) tracer development;
(6) three and four-dimensional seismic imaging and tomography;
(7) well placement and orientation;

(d) OIL AND GAS TECHNOLOGY TRANSFER INITIATIVE.—

(1) IN GENERAL.—The Secretary shall support an initiative among the Office of Fossil Energy, the Office of Energy Efficiency and Renewable Energy, and the private sector to research, develop, and demonstrate relevant advanced technologies and operation techniques used in the oil and gas sector for use in geothermal energy development.
(2) PRIORITIES.—In carrying out paragraph (1), the Secretary shall prioritize technologies with the greatest potential to significantly increase the use and lower the cost of geothermal energy in the United States, including the cost and speed of geothermal drilling surface technologies, large- and small-scale drilling, and well construction.

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.

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.

II. Award Information

A. Award Overview

i. Estimated Funding

EERE expects to make a total of approximately $14,500,000 of federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 3 to 13 awards under this FOA. EERE may issue one, multiple, or no awards. Individual awards may vary between $450,000 and $2,500,000.

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

Topic Area Number	Topic Area Title	Anticipated Number of Awards	Anticipated 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)
1	Amplify	2-5	$450,000	$2,500,000	$7,250,000	24-48
2	ReAmplify	1-8	$500,000	$2,500,000	$7,250,000	36-48

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed. Before the expiration of the initial budget period(s), EERE may perform a down-select among different recipients and provide additional funding only to a subset of recipients.

ii. Period of Performance

EERE anticipates making awards that will run from 24 months up to 48 months in length, comprised of one or more budget periods. Project continuation will be contingent upon several elements, including satisfactory performance and Go/No-Go decision review. For a complete list, see Section VI.B.xiv. 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. As a result of this evaluation, 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.

Topic Area Number	Topic Area Title	Estimated Duration of Award (months)
1	Amplify	24-48
2	ReAmplify	36-48

iii. New Applications Only

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

B. EERE Funding Agreements

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

i. Cooperative Agreements

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

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

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

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

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. Technology Investment Agreements (TIAs)

In rare cases and if determined appropriate, EERE will consider awarding a 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, 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 the intellectual property provisions. In both cases, TIAs are not necessarily subject to all of the requirements of 2 CFR Part 200 as amended by 2 CFR Part 910.

In a TIA, EERE may modify the standard government terms and conditions, including but not limited to:

- Intellectual Property Provisions: EERE may negotiate special arrangements with recipients to avoid the encumbrance of 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 a TIA in support of an application from a consortium or a team arrangement that includes cost sharing with the private sector, 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 a TIA if it believes that using 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 a TIA, 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 a TIA 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 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. Individuals

U.S. citizens and lawful permanent residents are eligible to apply for funding as a prime recipient or subrecipient.

ii. Domestic Entities

For-profit entities, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a particular state or territory of the United States and have a physical location for business operations in the United States are eligible to apply for funding as a prime recipient or subrecipient. 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.

State, local, and tribal government entities are eligible to apply for funding as a prime recipient or subrecipient.

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

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

Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a subrecipient, but are not eligible to apply as a prime recipient.

iii. Foreign Entities

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding under this FOA. Other than as provided in the "Individuals" or "Domestic Entities" sections above, 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. If a foreign entity applies for funding as a prime recipient, it must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a state or territory of the United States to be the prime recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

Foreign entities may request a waiver of the requirement to designate a subsidiary in the United States as the prime recipient in the Full Application (i.e., a foreign entity may request that it remains the prime recipient on an award). To

do so, the applicant must submit an explicit written waiver request in the Full Application. Appendix C lists the necessary information that must be included in a request to waive this requirement. The applicant does not have the right to appeal EERE's decision concerning a waiver request.

In the waiver request, the applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to have a foreign entity serve as the prime recipient. EERE may require additional information before considering the waiver request.

A foreign entity may receive funding as a subrecipient.

iv. Incorporated Consortia

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding 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 in foreign countries, please refer to the requirements in "Foreign Entities" above.

Each incorporated 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 EERE Contracting Officer.

v. Unincorporated Consortia

Unincorporated Consortia, which may include domestic and foreign entities, 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.

Upon request, unincorporated consortia must provide the EERE 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 discuss, among other things, 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

The cost share must be at least 20% of the total allowable costs for research and development projects (i.e., the sum of the government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.)

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

i. Legal Responsibility

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

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

ii. Cost Share Allocation

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

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable federal cost principles, as described in Section IV.H.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 as amended by 2 CFR 910.130 for additional cost sharing requirements.

iv. Cost Share Contributions by FFRDCs

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

v. Cost Share Verification

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

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

vi. Cost Share Payment

EERE 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 EERE 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

Full Applications and Replies to Reviewer Comments must meet all compliance criteria listed below or they will be considered noncompliant. EERE will not review or consider noncompliant submissions, including Full Applications and Replies to Reviewer Comments that were: submitted through means other than

EERE EXCHANGE; submitted after the applicable deadline; and/or submitted incomplete. EERE 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

1. *Full Applications*
   Full Applications are deemed compliant if:

TOPIC AREA 1: AMPLIFY

- The Applicant provides sufficient evidence documenting the maximum recorded temperature of the target well is ≥ 135°C (275°F);
- The Applicant or partners provide sufficient legal documentation[17] to demonstrate that they have the legal surface and subsurface rights necessary for stimulation and heat mining. Legal documentation to demonstrate surface and subsurface rights necessary for stimulation and heat mining could be provided in the form of legal documentation from an applicant/prime recipient directly, or legal documentation could be provided in the form of a binding legal contract between the applicant/prime recipient and proposed subrecipients/partners. Letters of support from partners or subcontractors do not take the place of the legal documentation;
- The Full Application complies with the content and form requirements in Section IV.C. of the FOA; and
- The applicant successfully uploads all required documents and clicks the "Submit" button in EERE Exchange by the deadline stated in the FOA.

TOPIC AREA 2: REAMPLIFY

- The Applicant may not propose drilling of new wells for pilot testing;
- Applications must describe well conditions and plans for minimal re-completion if required;
- The Applicant or partners must provide sufficient legal documentation to demonstrate that they have the legal surface and subsurface rights necessary for hydrocarbon/water/heat resources at the proposed site at the time of application. Legal documentation to demonstrate surface and subsurface rights could be provided in the form of legal documentation from an applicant/prime recipient

[17] 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.

directly, or legal documentation could be provided in the form of a binding legal contract between the applicant/prime recipient and proposed subrecipients/partners. Letters of support from partners or subcontractors do not take the place of the legal documentation;

- The Full Application complies with the content and form requirements in Section IV.C. of the FOA; and
- The applicant successfully uploads all required documents and clicks the "Submit" button in EERE Exchange by the deadline stated in the FOA.

2. *Replies to Reviewer Comments*
   Replies to Reviewer Comments are deemed compliant if:
   - The Reply to Reviewer Comments complies with the content and form requirements in Section IV.D. of the FOA; and
   - The applicant successfully uploaded all required documents to 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/National Nuclear Security Agency (NNSA) Federally Funded Research and Development Centers (FFRDC) 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.
> (end of acceptable authorization)

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 Federally Funded Research and Development Centers 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:

1. *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.

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

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

3. *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 contractor through the DOE field work proposal (WP) system and non-DOE/NNSA FFRDC through an interagency agreement with the sponsoring agency.

4. *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.

5. *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 contractor.

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 project.

G. Questions Regarding Eligibility

EERE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to 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 a Full Application phase.

Topic Area(s)	Phase 1: Full Application
Topic Areas 1 and 2	Yes

At each phase, EERE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. EERE 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. **EERE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, or incomplete submissions**. EERE 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 Full Application and Reply to Reviewer Comments 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, EERE 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 Full Applications and Replies to Reviewer Comments at least 48 hours in advance of the submission deadline**. Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Full Application or Reply to Reviewer Comments. Once the 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 Full Application or Reply to Reviewer Comments before the applicable deadline.

EERE urges applicants to carefully review their Full Applications and Replies to Reviewer Comments to allow sufficient time for the submission of required information and documents. All Full Applications that pass the initial eligibility review will undergo comprehensive technical merit review according to the criteria identified in Section V.A.ii. 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) . 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 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.

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 Concept Paper" 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

EERE will not review or consider ineligible Full Applications (see Section III. of the FOA).

Each Full Application shall be limited to a single concept or technology. Unrelated concepts and technologies shall not be consolidated in a single Full Application. Full Applications must conform to the following requirements:

Topic Area 1:

Component	File Format	Page Limit	File Name
Technical Volume	PDF	15	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	1 page each	ControlNumber_LeadOrganization_Resumes

Letters of Commitment	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives	MS Word	10	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 Entities and Foreign Work Waivers	PDF	n/a	ControlNumber_LeadOrganization_Waiver
U.S. Manufacturing Plan	PDF		ControlNumber_LeadOrganization_USMP
Diversity Equity and Inclusion Plan	PDF	5	ControlNumber_LeadOrganization_DEIP
Site and Well Characterization Data	PDF	20	ControlNumber_LeadOrganization_SITE

Topic Area 2:

Component	File Format	Page Limit	File Name
Technical Volume	PDF	15	ControlNumber_LeadOrganization_TechnicalVolume
Resumes	PDF	1 page each	ControlNumber_LeadOrganization_Resumes
Letters of Commitment	PDF	1 page each	ControlNumber_LeadOrganization_LOCs
Statement of Project Objectives	MS Word	10	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 Entities and Foreign Work Waivers	PDF	n/a	ControlNumber_LeadOrganization_Waiver
U.S. Manufacturing Plan	PDF		ControlNumber_LeadOrganization_USMP
Diversity Equity and Inclusion Plan	PDF	5	ControlNumber_LeadOrganization_DEIP
Site, Wellbore, Regulatory Data & Documentation	PDF	20	ControlNumber_LeadOrganization_SITE

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

EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 50MB.

EERE 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. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages. This volume must address the Merit Review Criteria as discussed in Section V.A.ii. of the FOA. Save the Technical Volume in a single PDF file.

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

The Technical Volume to the Full Application may not be more than 15 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the evaluation criteria (see Section V.A.ii of the FOA) when preparing the Technical Volume.

The Technical Volume must conform to the following content requirements:

FOR TOPIC AREA 1: AMPLIFY

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page	The cover page should include the project title, the specific FOA Topic Area being addressed, both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Project Overview (Approximately 10% of the Technical Volume)	The Project Overview should contain the following information: • Background: The applicant should discuss the background of their organization, including the history, successes, and current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify the targeted improvements to the baseline well performance and the critical success factors in achieving that goal. • DOE Impact: The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives.
Technical Description, Innovation, and Impact (Approximately 30% of the Technical Volume)	The Technical Description should contain the following information: • Relevance and Outcomes: The applicant should provide a detailed description of the well stimulation / isolation methodology to be used, including the scientific objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets. The applicant should clearly specify the expected outcomes of the project. • Feasibility: The applicant should demonstrate the technical feasibility of the proposed methodology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The applicant should describe the advantages of proposed methodology over previous methods, and

	the overall impact on power production at the relevant site if the project is successful.
Workplan and Market Transformation Plan (Approximately 40% of the Technical Volume)	The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information: • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on Go/No-Go decision points). The applicant should describe the specific expected end result of each performance period. • WBS and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can

	be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.
	• Go/No-Go Decision Points: The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. A Go/No-Go decision point 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 a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 18-month period) of the project. See Section VI.B.xiv. The applicant should also provide the specific technical criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone.
	• End of Project Goal: The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.
	• Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.
	• Project Management: The applicant should discuss the team's proposed management plan, including the following:
	  ○ The overall approach to and organization for managing the work
	  ○ The roles of each project team member
	  ○ Any critical handoffs/interdependencies among project team members
	  ○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices

	○ The approach to project risk management ○ A description of how project changes will be handled ○ If applicable, the approach to Quality Assurance/Control ○ How communications will be maintained among project team members
Technical Qualifications and Resources (Approximately 20% of the Technical Volume)	The Technical Qualifications and Resources should contain the following information: • Describe the project team's unique qualifications and expertise, including those of key subrecipients. • Describe the project team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project. • This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives. • Describe the time commitment of the key team members to support the project. • Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable. • For multi-organizational or multi-investigator projects, describe succinctly: ○ The roles and the work to be performed by each PI and Key Participant; ○ Business agreements between the applicant and each PI and Key Participant; ○ How the various efforts will be integrated and managed; ○ Process for making decisions on scientific/technical direction; ○ Publication arrangements; ○ Intellectual Property issues; and ○ Communication plans
Diversity, Equity, Inclusion (Address in the Diversity, Equity, and Inclusion Plan)	The Diversity, Equity, and Inclusion Plan should contain the following information: • Equity Impacts: the impacts of the proposed project on underserved communities, including social and environmental impacts. • Benefits: The overall benefits of the proposed project, if funded, to underserved communities; and

	• How diversity, equity, and inclusion objectives will be incorporated in the project. See [Section IV.C.xviii] for more information on the contents of the Diversity, Equity, and Inclusion Plan.
Topic Area 1: Amplify Site and Well Characterization Data	**Topic Area 1 (Amplify)**: Applications should include the following items as attachments to the Project Narrative. Failure to include these items will result in a reduced Merit Review score. • Relevant exploration data including well-documented site characterizations and sound justifications as to why the candidate site is suitable for stimulation. • A geological map of the project area with lease boundaries, right of access to the candidate site, and surface and subsurface rights of ownerships. • Relevant geological site data derived from geophysical logs, regional geological logs, surveys, cross sections, etc. • A geological model that demonstrates an understanding of the specific rock mass properties, stress regime (if available), and a petrologic/mineralogical evaluation of cuttings/core • A stratigraphic/lithologic column for the proposed well including a temperature profile plotted against depth. • A baseline flow-rate of the candidate well. • The results and data of all flow or injection tests (Please note that application materials always remain proprietary and cannot become public) • Evidence that the well is open to depth of interest, casing schedule, well completion history, and evidence of casing integrity. • Historic seismic data from the proposed project area if available. • Sufficient legal documentation to demonstrate that the Applicant or partners have the legal surface and subsurface rights necessary for stimulation and heat mining. Legal documentation to demonstrate surface and subsurface rights necessary for stimulation and heat mining could be provided in the form of legal documentation from an applicant/prime recipient directly, or legal documentation could be provided in the form of a binding legal contract between the applicant/prime recipient and proposed subrecipients/partners. Letters of support from partners or subcontractors do not take the place of the legal documentation.

For Topic Area 2: ReAmplify

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page	The cover page should include the project title, the specific FOA Topic Area being addressed, both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality.
Project Overview (Approximately 10% of the Technical Volume)	The Project Overview should contain the following information: • Background: The applicant should discuss the background of their organization, including the history current research and development status (i.e., the technical baseline) relevant to the technical topic being addressed in the Full Application. • Project Goal: The applicant should explicitly identify the targeted fluid source and the critical success factors in achieving energy production. • DOE Impact: The applicant should discuss the impact that DOE funding would have on the proposed project. Applicants should specifically explain how DOE funding, relative to prior, current, or anticipated funding from other sources, is necessary to achieve the project objectives.

Technical Description, Innovation, and Impact (Approximately 30% of the Technical Volume)	The Technical Description should contain the following information:
	• Relevance and Outcomes: The applicant should provide a detailed description of the proposed plan for geothermal production from a hydrocarbon well(s), the methodology to be used, and other scientific objectives that will be pursued during the project.
	  ○ Within the discussion on the proposed project plan, the Applicant should provide a "Resource Characterization Overview" to include:
	  ▪ Overview of subsurface geological conditions via a summary of the existing geological model, including a description of existing stratigraphy, as well as all documented and inferred faults.
	  ▪ Historical productivity or injectivity of the candidate well(s) including documented injection tests / productivities of the candidate (required) and neighboring wells (if available – not required);
	  ▪ Measured or estimated reservoir temperature, pressure and temperatures of produced fluids in pilot test candidate well(s).
	  ▪ Measured or approximated fluid composition of those fluids in the reservoir accessible by the candidate well(s).
	  ○ This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including a

	preliminary estimate of potential recoverable capacity of the geothermal resource in MWth or MWe for the candidate well(s).
	
	• Feasibility: The applicant should discuss the technical feasibility of the proposed methodology and capability of achieving the anticipated performance targets.
	  ○ Within this Section, the Applicant should prepare a "Site/Wellbore Readiness Overview" to include:
	  ▪ Evidence that the well is open to depth of interest, casing schedule, well completion history, and evidence of casing integrity.
	  ▪ An overview, with associated costs (please outline here and in the requested budget documents) for any site/pad work, characterization
	  ▪ Applications should clearly discuss their initial scoping on anticipated workover activities for the proposed well(s) and prepare the budget documents accordingly
	  ▪ A map of the project area with lease boundaries, right of access to the candidate site, and surface and subsurface rights of ownerships.
	• Innovation and Impacts: The applicant should describe the advantages of proposed methodology over previous methods, and the overall impact on power production at the relevant site if the project is successful.
	  ○ Within this section, the Applicant should include a separate "Resource Utilization" narrative, to include:
	  ▪ An outline of the applicant's preliminary concept for full-scale resource utilization, if project success is achieved at a pilot scale. This includes an overview of the business case(s) for implementation of the field pilot test. Specifically, this preliminary business case(s) should outline the commercial justification(s) and reasoning for implementing geothermal production in the proposed field and should provide an overview of thepotential tangible benefits . This narrative should also include a high-level overview of the larger potential - including the opportunity to scale-up within the proposed hydrocarbon-producing field or beyond.
	  ▪ In this section please provide a detailed description of the planned use(s) of oil, natural gas, or natural gas liquids that would be produced

	as a direct result of this project, including but not limited to sales, on lease consumption, reinjection, flaring, or disposal. ▪ NOTE: This plan will be further defined and updated in Phase 1 of all awards.
Workplan and Market Transformation Plan (Approximately 40% of the Technical Volume)	The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure (WBS), Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed SOPO is separately requested. The Workplan should contain the following information: • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on Go/No-Go decision points). The applicant should describe the specific expected end result of each performance period. • WBS and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard WBS for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be Specific, Measurable, Achievable, Relevant, and Timely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also

provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO.

- Go/No-Go Decision Points: The applicant should provide a summary of project-wide Go/No-Go decision points at appropriate points in the Workplan. A Go/No-Go decision point 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 a minimum, each project must have at least one project-wide Go/No-Go decision point for each budget period (12 to 18-month period) of the project. See Section VI.B.xiv. The applicant should also provide the specific technical criteria to be used to evaluate the project at the Go/No-Go decision point. The summary provided should be consistent with the SOPO. Go/No-Go decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone.
- End of Project Goal: The applicant should provide a summary of the end of project goal(s). At a minimum, each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO.
- Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and Go/No-Go decision points.
- Project Management: The applicant should discuss the team's proposed management plan, including the following:
    - The overall approach to and organization for managing the work
    - The roles of each project team member
    - Any critical handoffs/interdependencies among project team members
    - The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices
    - The approach to project risk management
    - A description of how project changes will be handled
    - If applicable, the approach to Quality Assurance/Control
    - How communications will be maintained among project team members

Technical Qualifications and Resources (Approximately 20% of the Technical Volume)	The Technical Qualifications and Resources should contain the following information:
	• Describe the project team's unique qualifications and expertise, including those of key subrecipients.
	• Describe the project team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project.
	• This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives.
	• Describe the time commitment of the key team members to support the project.
	• Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable.
	• For multi-organizational or multi-investigator projects, describe succinctly:
	  ○ The roles and the work to be performed by each PI and Key Participant;
	  ○ Business agreements between the applicant and each PI and Key Participant;
	  ○ How the various efforts will be integrated and managed;
	  ○ Process for making decisions on scientific/technical direction;
	  ○ Publication arrangements;
	  ○ Intellectual Property issues; and
	  ○ Communication plans

Diversity, Equity, Inclusion (Address in the Diversity, Equity, and Inclusion Plan)	The Diversity, Equity, and Inclusion Plan should contain the following information: • Equity Impacts: the impacts of the proposed project on underserved communities, including social and environmental impacts. • Benefits: The overall benefits of the proposed project, if funded, to underserved communities; and • How diversity, equity, and inclusion objectives will be incorporated in the project. See Section IV.C.xvii for more information on the contents of the Diversity, Equity, and Inclusion Plan.
Topic Area 2: ReAmplify Relevant Site, Wellbore, Regulatory	**Topic Area 2 (ReAmplify): Applications should include the following items as attachments to the Project Narrative. Failure to include these items will result in a reduced Merit Review score.**

Data and Documentation	*Proprietary documentation should be marked as such and will not be shared outside of the DOE review process.*
	
	• Any supplemental datasets or records relevant to the "Resource Characterization," "Site/Wellbore Readiness," and "Resource Utilization" narratives provided in the Technical Description, Innovation, and Impact portion of the Technical Volume.
	• Regulatory and Permitting:
	  ○ Sufficient legal documentation to demonstrate that the Applicant or partners have the legal surface and subsurface rights necessary for stimulation and heat mining.
	  ○ Legal documentation to demonstrate surface and subsurface rights necessary for stimulation and heat mining could be provided in the form of legal documentation from an applicant/prime recipient directly, or legal documentation could be provided in the form of a binding legal contract between the applicant/prime recipient and proposed subrecipients/partners. Please note that letters of support from partners or subcontractors do not take the place of the legal documentation.

iii. Resumes

Applicants are required to submit 1-page resumes for key participating team members. Multi-page resumes are not allowed. Save the resumes in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_Resumes".

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 partners/end users (1-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 the page limits listed in the table below. The SOPO must not exceed the page limit when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. If uploading the SOPO, save the SOPO in a single MS

Word file using the following convention for the title "ControlNumber_LeadOrganization_SOPO".

Topic Area Number	Topic Area Title	Page Limit
1	Amplify	10
2	ReAmplify	10

Topic Area 1 (Amplify)

A Go/no-go decision point must take place at the conclusion of Phase 1. At this Go/No-go decision point, DOE will make a decision for each award based on the technical progress made relative to the Statement of Project Objectives (including site/wellbore readiness, stimulation plan, and permitting/Induced Seismicity Management Plan (ISMP) status), actual spending during the project period, and adherence to the proposed project schedule.

An additional Go/no-go decision point must take place at the conclusion of Phase 2. At this Go/No-go decision point, DOE will make a decision for each award based on the technical progress made relative to the Statement of Project Objectives (include execution of the well stimulation plan and communications), actual spending during the project period, and adherence to the proposed project schedule.

Topic Area 2 (ReAmplify)

A Go/no-go decision point must be take place at conclusion of Phase 1. The Go/No-Go Criteria that will be utilized to assess the pilot projects are listed below:

- Satisfactory completion of a feasibility study that demonstrates that thermal energy may be produced from the target reservoir
- Satisfactory completion of engineering design activities that demonstrate how the pilot site will be constructed
- Satisfactory completion of wellbore workovers and/or site upgrades
- Demonstration of completion of all regulatory and environmental permitting (including NEPA) required for the proposed project. If the permitting/NEPA review is not complete, a clear and reasonable schedule should be provided for expected completion of permitting activities
    - NEPA Evaluation:
    - The degree to which the Awardee has adequately evaluated the level of foreseeable site operations as it pertains to their potential cumulative environmental, safety, health, and socioeconomic effects to be evaluated under NEPA.
    - The clarity and thoroughness of the Awardee's technical approach as outlined in the SOPO for conducting environmental reviews as necessary, in order to ensure the

Re-Amplify project site meets NEPA and other federal, state, and local regulations and permitting requirements.
    - Feasibility of meeting project goals and objectives on schedule, given NEPA and permitting constraints as supported by the SOPO and PMP provided in Phase 1 Report.
  - Satisfactory completion of all proposed Phase 1 goals including a discussion of variance from the proposed project budget, schedule, and scope
  - Clear definition on all proposed Phase 2/Phase 3 tasks and activities including discussion of the project budget, schedule, and scope for subsequent phases

A go/no-go decision point must be take place at the conclusion of Phase 2. The Go/No-Go Criteria that will be utilized to assess the pilot projects are listed below:

  - Satisfactory completion of installation and commissioning of the pilot plant
  - Results of the initial operational data collected as compared to predicted

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".

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). 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 MS Powerpoint slide summarizing the proposed project. This slide is used during the evaluation process.

The Summary Slide template requires the following information:

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

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

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 contractor 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", which can be found on the EERE Program Information Center at 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: Foreign Entities and Foreign Work (if applicable)

1. **Foreign Entity Participation:**

As set forth in Section III.A.iii., 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. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix C lists the necessary information that must be included in a request to waive this requirement.

2. **Performance of Work in the United States (Foreign Work Waiver)**
As set forth in Section IV.H.iii., all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the prime recipient should make every effort to purchase supplies and equipment within the United States. Appendix C lists the necessary 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. U.S. Manufacturing Commitments

Pursuant to the DOE Determination of Exceptional Circumstances (DEC) dated September 9, 2013, each applicant is required to submit a U.S. Manufacturing Plan as part of its application. The U.S. Manufacturing Plan represents the applicant's measurable commitment to support U.S. manufacturing as a result of its award.

Each U.S. Manufacturing Plan must include a commitment 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 applicant can show to the satisfaction of DOE that it is not commercially feasible to do so (referred to hereinafter as "the U.S. Competitiveness Provision"). The applicant further agrees to make the U.S. Competitiveness Provision binding on any subawardee and any assignee or licensee or any entity otherwise acquiring rights to any subject invention, including subsequent assignees or licensees. A subject invention is any invention conceived of or first actually reduced to practice under an award.

Due to the lower technology readiness levels of this FOA, DOE does not expect the U.S. Manufacturing Plans to be tied to a specific product or technology. However, in lieu of the U.S. Competitiveness Provision, an applicant may propose a U.S. Manufacturing Plan with more specific commitments that would be beneficial to the U.S. economy and competitiveness. For example, an applicant may commit specific products to be manufactured in the U.S., commit

to a specific investment in a new or existing U.S. manufacturing facility, keep certain activities based in the U.S. or support a certain number of jobs in the U.S. related to the technology. An applicant which is likely to license the technology to others, especially universities for which licensing may be the exclusive means of commercialization the technology, the U.S. Manufacturing Plan may indicate the applicant's plan and commitment to use a specific licensing strategy that would likely support U.S. manufacturing.

If DOE determines, at its sole discretion, that the more specific commitments would provide a sufficient benefit to the U.S. economy and industrial competitiveness, the specific commitments will be part of the terms and conditions of the award. For all other awards, the U.S. Competitiveness Provision shall be incorporated as part of the terms and conditions of the award as the U.S. Manufacturing Plan for that award.

The U.S. Competitiveness Provision is also a requirement for the Class Patent Waiver that applies to domestic large business under this FOA (see Section VIII.K. Title to Subject Inventions).

Save the U.S. Manufacturing Plan in a single PDF file using the following convention for the title “ControlNumber_LeadOrganization_USMP”.

xvi. Data Management Plan (DMP)

Applicants whose Full Applications are selected for award negotiations will be required to submit a DMP during the award negotiations phase.

An applicant may select one of the template Data Management Plans (DMP) listed below. Alternatively, instead of selecting one of the template DMPs below, an applicant may submit another DMP provided that the DMP, at a minimum, (1) describes how data sharing and preservation will enable validation of the results from the proposed work, how the results could be validated if data are not shared or preserved and (2) has a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publications. DOE Public Access Plan dated July 24, 2014 provides additional guidance and information on DMPs.

For any publication that includes results of the project, the underlying research data will be made available according to the policies of the publishing media. Where no such policy exists, the recipient must indicate on the publication a means for requesting and digitally obtaining the underlying research data. This includes the research data necessary to validate any results, conclusions, charts, figures, images in the publications.

Save the DMP in a single Microsoft Word file using the following convention for the title "ControlNumber_LeadOrganization_DMP".

xvii. Diversity, Equity and Inclusion Plan

As part of the application, applicants are required to describe how diversity, equity, and inclusion objectives will be incorporated in the project. Specifically, applicants are required to submit a Diversity, Equity, and Inclusion Plan that describes the actions the applicant will take to foster a welcoming and inclusive environment, support people from groups underrepresented in STEM, advance equity, and encourage the inclusion of individuals from these groups in the project; and the extent the project activities will be located in or benefit underserved communities (also see Section I.A.iii). The plan should include SMART milestones supported by metrics to measure the success of the proposed actions.

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

a. Include persons from groups underrepresented in STEM as PI, co-PI, and/or other senior personnel;
b. Include persons from groups underrepresented in STEM as student researchers or post-doctoral researchers;
c. Include faculty or students from Minority Serving Institutions as PI/co-PI, senior personnel, and/or student researchers, as applicable;
d. Enhance or collaborate with existing diversity programs at your home organization and/or nearby organizations;
e. Collaborate with students, researchers, and staff in Minority Serving Institutions;
f. Disseminate results of research and development in Minority Serving Institutions or other appropriate institutions serving underserved communities;
g. Implement evidence-based, diversity-focused education programs (such as implicit bias training for staff) in your organization;
h. Identify Minority Business Enterprises, Minority Owned Businesses, Woman Owned Businesses and Veteran Owned Businesses to solicit as vendors and sub-contractors for bids on supplies, services and equipment.

Save the Diversity, Equity and Inclusion Plan in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_DEIP".

D. Content and Form of Replies to Reviewer Comments

If replies to reviewer comments are applicable, EERE will provide applicants with reviewer comments following the evaluation of all eligible Full Applications. Applicants will have a brief opportunity to review the comments and to prepare a short Reply to Reviewer Comments responding to the comments however they desire or supplementing their Full Application. The Reply to Reviewer Comments is an optional submission; applicants are not required to submit a Reply to Reviewer Comments. EERE will post the Reviewer Comments in EERE EXCHANGE. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor EERE EXCHANGE in the event that the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their reply due to failure to check EERE EXCHANGE or relying on the expected date alone. Applicants should anticipate having approximately three (3) business days to submit Replies to Reviewer Comments.

EERE will not review or consider ineligible Replies to Reviewer Comments (see Section III of the FOA). EERE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

Replies to Reviewer Comments must conform to the following content and form requirements, including maximum page lengths, described below. If a Reply to Reviewer Comments is more than three (3) pages in length, EERE will review only the first three (3) pages and disregard any additional pages.

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages max	Applicants may respond to one or more reviewer comments or supplement their Full Application.
Optional	1 page max	Applicants may use this page however they wish; text, graphs, charts, or other data to respond to reviewer comments or supplement their Full Application are acceptable.

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):

- Indirect cost information;
- Other budget information;

- Commitment Letters from Third Parties Contributing to Cost Share, if applicable;
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5);
- Representation of Limited Rights Data and Restricted Software, if applicable; and
- Environmental Questionnaire.

F. Dun and Bradstreet Universal Numbering System (DUNS) Number 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 DUNS 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 DUNS 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. Funding Restrictions

i. Allowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable federal cost principles.

Refer to the following applicable federal cost principles for more information:

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

ii. Pre-Award Costs

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

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 these NEPA requirements to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the environment or limit the choice of reasonable alternatives. Likewise, if an application is selected for negotiation of award, and the prime recipient elects to undertake activities that are not authorized for federal funding by the Contracting Officer in advance of EERE completing a NEPA review, the prime recipient is doing so at risk of not

receiving federal funding and such costs may not be recognized as allowable cost share.

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

1. Requirement

All work performed under EERE awards must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment; however, the prime recipient should make every effort to purchase supplies and equipment within 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 necessary information that must be included in a request for a foreign work waiver.

The applicant must demonstrate to the satisfaction of EERE that a waiver would further the purposes of the FOA and is in the economic interests of the United States. EERE may require additional information before considering a waiver request. 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

Topic Area 1 - Amplify

It is critical for those in the domestic EGS community, including those likely to be funded under this Topic Area, to interact and maintain relationships with the international EGS community. Knowledgeable and well-funded sectors in Switzerland, Germany, France, Iceland, Australia, New Zealand, Japan, and China have complementary goals and strengths to those of the domestic EGS community. These interactions and relationships may require foreign travel, and will enable both the spread of domestic ideas as well as taking advantage of best practices, lessons learned, and cutting edge technologies from the international geothermal community efforts in the past decade.

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

<u>Topic Area 2 – ReAmplify</u>
Foreign travel costs are not allowable under this Topic Area

vi. Equipment and Supplies

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

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. Domestic Preference – Infrastructure Projects

As appropriate and to the extent consistent with law, Applicants shall ensure that, to the greatest extent practicable, iron and aluminum as well as steel, cement, and other manufactured products (items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber) used in the proposed project shall be produced in the United States. This requirement shall flow down to all

sub-awards including all contracts, subcontracts and purchase orders for work performed under the proposed project.

viii. Lobbying

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

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

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

ix. Risk Assessment

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; 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.

x. Invoice Review and Approval

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

- Summary of costs by cost categories;
- Timesheets or personnel hours report;
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs;
- UCC filing proof for equipment acquired with project funds by for-profit recipients and subrecipients;
- Explanation of cost share for invoicing period;
- Analogous information for some subrecipients; and
- Other items as required by DOE.

V. Application Review Information

A. Technical Review Criteria

i. Full Applications

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

Topic Area 1: Amplify

Criterion 1: Technical Merit, Innovation, and Impact (50%)

- Technical merit and feasibility of the proposed work (i.e., is it based on sound scientific/engineering principles and on an understanding of current state of the art technology/methods in the geothermal industry, is it feasible to accomplish and deploy proposed technology within the project time-frame, assessed via an appropriate level of detail provided on current well condition and planned well rework activities)
- Extent that proposed well stimulation/isolation methods are field-ready (Technology Readiness Level (TRL) 6 or above), and have demonstrated successful functionality in the field (regardless of industry use)
- Adequacy of existing site characterization data and subsurface geologic/geothermal model including but not limited to data on rock properties, stratigraphy/lithology, temperature profile, petrologic/mineralogical evaluations of cuttings/core, geophysical/geological logs, stress data, etc. to support project objectives

- Availability and adequacy of historic seismic data from the proposed project area

Criterion 2: Project Research and Market Transformation Plan (10%)

- Soundness of the project management concept with respect to proposed tasks and organizational structure to achieve project/phase objectives
- Clarity and completeness of a plan to address potential risks and liabilities (e.g., technical, financial, and environmental) that are associated with the project including a discussion of the proposed well rework and/or stimulation plan (as applicable)
- Likelihood of achieving DOE goals outlined in the FOA and project objectives through realistic milestones, timely schedule, and task structure
- Appropriateness of proposed Go/no-go decision points

Criterion 3: Team and Resources (30%)

- The capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team as detailed in the task descriptions and budget;
- The sufficiency of the facilities to support the work including extent of the characterization, planning and regulatory and environmental permitting of the target site;
- The degree to which the proposed 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; and
- The reasonableness of the budget and spend plan for the proposed project and objectives.

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

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

Topic Area 2: ReAmplify

Criterion 1: Technical Merit, Innovation, and Impact (50%)

- Technical merit and feasibility of the proposed work (i.e., is it based on sound scientific/engineering principles). Feasibility to accomplish FOA goals and deploy proposed geothermal Pilot plant within the project time-frame, including any planned workovers and surface infrastructure modification to accommodate the Pilot plant;
- Extent to which the geologic and reservoir models, produced fluid temperatures and chemistries support the development of a geothermal Pilot Plant and potential for the production of geothermal energy (electrical or thermal) based on the inclusion of adequate geophysical, geochemical and logging data and analysis and interpretations of local stratigraphy and existing subsurface fracture system (inferred fracture growth direction as well);
- Extent to which the proposed site and associated well(s) can accommodate the proposed Pilot plant and the degree of subsurface operations/workovers to accomplish the establishement and operation of a Pilot plant;
- The extent to which the proposed Pilot plant accomplishes the goal of evaluating the potential for geothermal energy production at the host hydrocarbon field;
- The extent to which the operator has outlined the value proposition and business case for geothermal production at the target hydrocarbon field.

Criterion 2: Project Research and Market Transformation Plan (10%)

- Clarity and completeness of the project management concept with respect to proposed tasks and organizational structure to achieve project/phase objectives;
- Clarity and completeness of a plan to address potential risks and liabilities (e.g., technical, financial, and environmental) that are associated with the project including a discussion of the proposed well rework and/or stimulation plan (as applicable);
- Likelihood of achieving project objectives through realistic milestones, timely schedule, and task structure.

Criterion 3: Team and Resources (30%)

- The capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a high probability of success. The qualifications, relevant expertise, and time commitment of the individuals on the team;
- The sufficiency of the facilities to support the work;
- The degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further 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; and
- The reasonableness of the budget and spend plan for the proposed project and objectives.

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

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

ii. Criteria for Replies to Reviewer Comments

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

B. Standards for Application Evaluation

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

C. Other Selection Factors

i. Program Policy Factors

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

Topic Area 1 & 2:

- The level of net power production feasible from proposed projects
- 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 employment and manufacturing in the United States;
- The degree to which the proposed project is likely to lead to increased employment and manufacturing in the United States;
- 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 environmental or regulatory permitting uncertainties will impact project timelines and success;
- The degree to which applicants are willing to share data;
- The degree to which the proposed projects pose risk to public perception of geothermal energy;
- The degree to which the proposed project incorporates diversity, equity, and inclusion elements, including but not limited to 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, or members within underserved communities.
- The degree to which the proposed project takes into account and addresses the current Administration priorities and goals to develop a carbon pollution-free electric sector by 2035 and a net-zero emissions economy by 2050.

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. 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, and will be limited to information already provided in the application documentation. 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 C.F.R. § 200.205.

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.H.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 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. **DUNS Number**
   Obtain a DUNS number (including the plus 4 extension, if applicable) at http://fedgov.dnb.com/webform.

3. **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.

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

5. **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 Full Applications will not be accepted through Grants.gov.

6. **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 Access Under DOE Order 142.3A, "Unclassified Foreign Visits and Assignments Program"

All applicants selected for an award under this FOA may be required to provide information to DOE in order to satisfy requirements for foreign nationals' access to DOE sites, information, technologies, equipment, programs or personnel. A foreign national is defined as any person who is not a U.S. citizen by birth or naturalization. If a selected applicant (including any of its subrecipients, contractors or vendors) anticipates involving foreign nationals in the performance of its award, the selected applicant may be required to provide DOE with specific information about each foreign national to ensure compliance with the requirements for access approval. National laboratory personnel already cleared for site access may be excluded. Access approval for foreign nationals from countries identified on the U.S. Department of State's list of State Sponsors of Terrorism must receive final approval authority from the Secretary of Energy or the Secretary's assignee before they commence any work under the award.

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.

For both topic areas, many field-based activities such as well logging, remedial or other wellbore preparation may be required depending on the current operational status of the well. Also, operation of downhole tools and monitoring equipment will likely be required in order to fully assess well conditions prior to any potential well stimulation activities.

Please provide sufficient information to describe the extent of environmental benefits and impacts resulting from the proposed project including assumptions and quantitative data – provide as much information as possible on topics including, but not limited to, cultural and biological resources, handling/disposal of geothermal and power plant working fluids, road construction, transmission lines, and site restoration.

Sufficiently characterize the technical work to be accomplished and all historical and future environmental related activities in support of the proposed technical work. Include completed documents or links to completed documents and identify work remaining to be completed. These documents include, but are not limited to, permits, regulatory approvals, environmental assessments and environmental impact statements.

In the Technical Volume, GTO will request that the applicants list the various environmental and regulatory requirements that must be satisfied before, during, and after the project is implemented. These requirements should include all statutory, regulatory, and permitting requirements that would be applicable to the proposed project, including the National Environmental Policy Act (NEPA). Applicants will be instructed to: (1) explain any environmental requirements that have already been satisfied; (2) identify any issues, conditions, concerns and/or constraints associated with on-going permitting efforts; and (3) set forth a plan to satisfy the remaining requirements and the anticipated time frame for meeting those requirements.

Selected applicants will submit EQ1 forms during award negotiations.

vii. Applicant Representations and Certifications

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

2. **Corporate Felony Conviction and Federal Tax Liability Representations**
   In submitting an application in response to this FOA, the applicant represents that:

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

   b. It is **not** a corporation that has any unpaid federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

   For purposes of these representations the following definitions apply:

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

3. **Nondisclosure and Confidentiality Agreements Representations**

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

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

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

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

(2) The limitation above shall not contravene requirements applicable to Standard Form 312 Classified Information Nondisclosure Agreement (https://fas.org/sgp/othergov/sf312.pdf), Form 4414 Sensitive Compartmented Information Disclosure Agreement (https://fas.org/sgp/othergov/intel/sf4414.pdf), or any other form issued by a federal department or agency governing the nondisclosure of classified information.

(3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States

government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

viii. Statement of Federal Stewardship

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.

ix. 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.

5. The DOE Geothermal Technologies Office will be involved in site characterization, reservoir creation and oversight of the management of the reservoir. Specific involvement may include:
   - Halting an activity if detailed performance specifications are not met
   - Providing joint technical collaboration with recipient
   - Monitoring to permit specified kinds of direction and redirection of work because of interrelationships with other projects

~~x. Intellectual Property Management Plan (IPMP)~~

~~With the Full Application applicants must submit an executed IPMP between the members of the consortia or team.~~

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

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

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

xi. Subject Invention Utilization Reporting

In order 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.

GTO will require submission of applicable project data to the National Geothermal Data System (NGDS) / Geothermal Data Repository (GDR) on a regular basis for both topic areas.

Daily operations reports will be anticipated during field-based operations for both topic areas.

The recipient may be asked to provide a Project Update Report, an Operating Plan, and/or a Peer Review Report.

Awardees will also provide a Baseline Well Status Report detailing the costs of historical and proposed well workover processes/technologies to be used.

Award recipients will be expected to submit or present the following reports, at a minimum:

- Technical and Financial reports will be submitted quarterly;
- Technical and Financial reports will be submitted annually;
- Phase 1 Report;
- Phase 2 Report;
- Preliminary Stimulation Report within two weeks of stimulation (if applicable);
- Final Stimulation Report, for public dissemination, within two months of stimulation (if applicable);
- Phase 3 Report;
- Final Report;
- Annual Operating Plan;
- Peer/Program Review Report; and
- Other reports as deemed necessary by the GTO Project Officer.

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. At the Go/No-Go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the EERE 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; and (8) written approval of the continuation application by the Contracting Officer.

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

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

xv. Conference Spending

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

xvi. Uniform Commercial Code (UCC) Financing Statements

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

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

xvii. Implementation of Executive Order 13950, Combating Race and Sex Stereotyping

In submitting an application in response to this FOA, the applicant represents that it will not use Federal funds, including funds to meet cost share requirements, to promote the concepts that (a) one race or sex is inherently superior to another race or sex; (b) an individual, by virtue of his or her race or sex, is inherently racist, sexist, or oppressive, whether consciously or unconsciously; (c) an individual should be discriminated against or receive adverse treatment solely or partly because of his or her race or sex; (d) members of one race or sex cannot and should not attempt to treat others without respect to race or sex; (e) an individual's moral character is necessarily determined by his or her race or sex; (f) an individual, by virtue of his or her race or sex, bears responsibility for actions committed in the past by other members of the same race or sex; (g) any individual should feel discomfort, guilt, anguish, or any other form of psychological distress on account of his or her race or sex; or (h) meritocracy or traits such as a hard work ethic are racist or sexist, or were created by a particular race to oppress another race.

xviii. Table of Personnel

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. The table should include the individuals' names, job titles, role in the project and their organization. Recipients will have an ongoing

responsibility to notify DOE of changes to the personnel and submit an updated list during the life of the life of the award as there are changes to the personnel working on the project.

xix. Pending and Current Sources of 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. If selected for award negotiations, the principal investigator and each senior/key person at the recipient 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 foreign government-sponsored talent recruitment programs must be identified in current and pending support. 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.

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).
- The person-months of effort per year being dedicated to the award or activity
- If required 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.

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 the content of this FOA must be submitted to: WellsofOpportunity@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. **Please note that you must first select this specific FOA Number in order to view the questions and answers specific to this FOA**. EERE will attempt to respond to a question within 3 business days, unless a similar question and answer has already been posted on the website.

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

VIII. Other Information

A. FOA Modifications

Amendments to this FOA will be posted on the EERE EXCHANGE website and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. EERE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

B. Government Right to Reject or Negotiate

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

C. Commitment of Public Funds

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

D. Treatment of Application Information

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

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

Full Applications, Replies to Reviewer Comments, and other submissions containing confidential, proprietary, or privileged information 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 U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

The cover sheet of the Full Application, Reply to Reviewer Comments, and other submission must be marked as follows and identify the specific pages containing trade secrets, confidential, proprietary, or privileged information:

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

The header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: "Contains Trade Secrets, Confidential, Proprietary, or Privileged Information Exempt from Public

Disclosure." In addition, each line or paragraph containing proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

E. Evaluation and Administration by Non-Federal Personnel

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

F. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this FOA include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

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

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

H. Requirement for Full and Complete Disclosure

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

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

I. Retention of Submissions

EERE expects to retain copies of all Full Applications and Replies to Reviewer Comments 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, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.

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

- Each applicant is required to submit a U.S. Manufacturing Plan as part of its application. If selected, the U.S. Manufacturing Plan shall be incorporated into the award terms and conditions for domestic small businesses and nonprofit organizations. DOE has determined that exceptional circumstances exist that warrants the modification of the standard patent rights clause for small businesses and non-profit awardees under Bayh-Dole to the extent necessary

to implement and enforce the U.S. Manufacturing Plan. Any Bayh-Dole entity (domestic small business or nonprofit organization) affected by this DEC has the right to appeal it.

K. Government Rights in Subject Inventions

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

1. 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.

2. 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 U.S. government regulates the transfer of information, commodities, technology, and software considered to be strategically important to the U.S. 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". To ensure compliance with Export Controls, it is the prime recipient's responsibility to determine when its project activities trigger Export Controls and to ensure compliance.

Export Controls may apply to individual projects, depending on the nature of the tasks. When Export Controls apply, the recipient must take the appropriate steps to obtain any required governmental licenses, monitor and control access to restricted information, and safeguard all controlled materials. Under no circumstances may foreign entities (organizations, companies or persons) receive

access to export controlled information unless proper export procedures have been satisfied and such access is authorized pursuant to law or regulation.

O. 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).

P. 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 C.F.R. § 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 C.F.R. § 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.

Q. 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 Concept Papers.

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 with the applicable cost principles prescribed in FAR Part 31 for For-Profit entities and 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

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

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

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

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

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

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

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

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

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

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

(6) They are provided for in the approved budget.

(B) Valuing and documenting contributions

(1) Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser or the following:

a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or

b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.

(2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.

(3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

(4) Valuing property donated by third parties.

a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

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

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

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

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

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

APPENDIX B – SAMPLE COST SHARE CALCULATION FOR BLENDED COST SHARE PERCENTAGE

The following example shows the math for calculating required cost share for a project with $2,000,000 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 AND APPROVAL PROCESSES: 1. FOREIGN ENTITY PARTICIPATION AS THE PRIME RECIPIENT; AND 2. PERFORMANCE OF WORK IN THE UNITED STATES (FOREIGN WORK WAIVER)

1. Waiver for Foreign Entity Participation as the Prime Recipient

As set forth in Section III.A.iii., 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.

Overall, the applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to have a foreign entity serve as the prime recipient. A request to waive the *Foreign Entity Participation as the prime recipient* requirement must include the following:

- Entity name;
- The rationale for proposing a foreign entity to serve as the prime recipient;
- Country of incorporation and the extent, if any, the entity is state owned or controlled;
- A description of the project's anticipated contributions to the US economy;
- 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;
- A description of how the foreign entity's participation as the prime recipient is essential to the project;
- A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP; and
- 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 for waiver of the Performance of Work in the United States requirement).

EERE may require additional information before considering the waiver request.

The applicant does not have the right to appeal EERE'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.J.iii., all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the prime recipient should make every effort to purchase supplies and equipment within the United States. 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 waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request to waive the *Performance of Work in the United States* requirement must include the following:

- The rationale for performing the work outside the U.S. ("foreign work");
- A description of the work proposed to be performed outside the U.S.;
- An explanation as to how the foreign work is essential to the project;
- A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the US economy;
- The associated benefits to be realized and the contribution to the project from the foreign work;
- How the foreign work 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 foreign work will promote domestic American manufacturing of products and/or services;
- A description of the likelihood of Intellectual Property (IP) being created from the foreign work and the treatment of any such IP;
- The total estimated cost (DOE and recipient cost share) of the proposed foreign work;
- The countries in which the foreign work is proposed to be performed; and
- The name of the entity that would perform the foreign work.

EERE may require additional information before considering the waiver request.

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

APPENDIX D – GLOSSARY

Applicant – The lead organization submitting an application under the FOA.

Continuation application – 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 to EERE its continuation application, which includes the following information:

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

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

iii. A description of any planned changes from the negotiated Statement of Project Objectives and/or Milestone Summary Table.

Cooperative Research and Development Agreement (CRADA) – 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

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/.

Go/No-Go Decision Points: – A decision point at the end of a budget period that defines the overall objectives, milestones and deliverables to be achieved by the recipient in that budget period. As of a result of EERE's review, EERE may take one of the following actions: 1) authorize federal funding for the next budget period; 2) recommend redirection of work; 3) discontinue providing federal funding beyond the current budget period; or 4) place a hold on federal funding pending further supporting data.

Project – The entire scope of the cooperative agreement which is contained in the recipient's Statement of Project Objectives.

Recipient or "Prime Recipient" – A non-federal entity that receives a federal award directly from a federal awarding agency to carry out an activity under a federal program. The term recipient does not include subrecipients.

Subrecipient – A non-federal entity that receives a subaward from a pass-through entity to carry out part of a federal program; but does not include an individual that is a beneficiary of such program. A subrecipient may also be a recipient of other federal awards directly from a federal awarding agency. Also, a DOE/NNSA and non-DOE/NNSA FFRDC may be proposed as a subrecipient on another entity's application. See section III.E.ii.

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

COI	Conflict of Interest
DEC	Determination of Exceptional Circumstances
DMP	Data Management Plan
DOE	Department of Energy
DOI	Digital Object Identifier
EERE	Energy Efficiency and Renewable Energy
EGS	Enhanced Geothermal Systems
FAR	Federal Acquisition Regulation
FFATA	Federal Funding and Transparency Act of 2006
FOA	Funding Opportunity Announcement
FOIA	Freedom of Information Act
FORGE	Frontier Observatory for Research in Geothermal Energy
FFRDC	Federally Funded Research and Development Center
GAAP	Generally Accepted Accounting Principles
GDR	Geothermal Data Repository
GTO	Geothermal Technologies Office
IPMP	Intellectual Property Management Plan
M&O	Management and Operating
MPIN	Marketing Partner ID Number
MYPP	Multi-Year Program Plan
NDA	Non-Disclosure Acknowledgement
NEPA	National Environmental Policy Act
NGDS	National Geothermal Data System
NNSA	National Nuclear Security Agency
OMB	Office of Management and Budget
OSTI	Office of Scientific and Technical Information
P&A	Plug & Abandon
PII	Personal Identifiable Information
R&D	Research and Development
RFI	Request for Information
RFP	Request for Proposal
SAM	System for Award Management
SMART	Specific, Measurable, Achievable, Relevant, and Timely
SOPO	Statement of Project Objectives
SPOC	Single Point of Contact
STAT	Science Technology and Analysis Team
TIA	Technology Investment Agreement
TRL	Technology Readiness Level
UCC	Uniform Commercial Code
WBS	Work Breakdown Structure
WOO	Wells of Opportunity
WP	Work Proposal