

NOTICE

Modifications to this Funding Opportunity Announcement (FOA) may have been made since this version was posted. Applicants are strongly advised to consult the FOA version posted on www.FedConnect.com, the official application website, for the latest changes regarding the application materials, dates, and other requirements.

The FedConnect system can be accessed through the following steps:

1. Go to <http://www.FedConnect.net/>
2. Click on "Search Public Opportunities"
3. Select "Reference Number" in the Search Criteria drop down box and then enter the Reference Number of the funding opportunity you are interested in (DE-FOA-XXXXXXX), followed by clicking the "Search" button
4. Click on the Title hyperlink after search results are displayed
5. On the right side of the screen, click on "BODY" under the "Solicitation" or "Amendment" folder; if multiple amendments exist, click on the most recent award amendment for the latest changes.

If you are new to the Federal grant application process, it can take 21 days or more to complete all of the registration processes needed to submit questions or application. These activities include acquiring a DUNS number, completing a Central Contract Registration (CCR), and FedConnect.com registration. Hence, if you are considering applying for this or another Funding Opportunity, we recommend beginning the registration process as soon as possible.

For further assistance throughout the application process, contact the following numbers:

- **General inquiries:** 1-888-DOE-RCVY (1-888-363-7289), <https://recoveryclearinghouse.energy.gov/>
- **Central Contract Registration (CCR) system:** 1-888-227-2423, <http://www.ccr.gov/Help.aspx>
- **FedConnect:** 1-800-899-6665, support@fedconnect.net
- **Specifics on FOA:** see "Questions" portion of the FOA

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT
(FOA)**



**U.S. Department of Energy
Golden Field Office**

**Recovery Act: Enhanced Geothermal Systems Component Research and
Development/Analysis**

Grants.gov FOA Number: DE-PS36-09GO99018

also known as FedConnect FOA Number: DE-FOA-0000075

Announcement Type: Amendment 003

CFDA Number: 81.087

Issue Date: 3/04/2009

Application Due Date: 7/17/2009, 11:59 PM Eastern Time

PLEASE NOTE:

This FOA is also being announced in FedConnect, and applications will be accepted through either FedConnect or Grants.gov. This FOA has two reference numbers: DE-PS36-09GO99018 in Grants.gov; and DE-FOA-0000075 in FedConnect. Applications will be accepted through either portal of Grants.gov or FedConnect. Please do not apply to both portals, only one application in either portal is necessary.

If you have not already submitted an application in Grants.gov, applications should be submitted to FedConnect. If you have already submitted an application to Grants.gov, do not resubmit to FedConnect (only submit to one location).

DE-PS36-08GO99018/DE-FOA-0000075

DATE: June 11, 2009

FROM: Genevieve Wozniak, Contracting Officer

TO: All Prospective Applicants

SUBJECT: Amendment No. 003 to Funding Opportunity Announcement No. DE-PS36-08GO99018/DE-FOA-0000075, "Recovery Act: Enhanced Geothermal Systems Component Research and Development/Analysis"

The Announcement is amended as follows:

- I. The existing Funding Opportunity Announcement document in FedConnect is replaced from Word 2007 to a Word 2003 version, to ensure universal access to the document.

All other parts of the FOA remain unchanged.

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT
(FOA)**



**U.S. Department of Energy
Golden Field Office**

Recovery Act: Enhanced Geothermal Systems Component Research and Development/Analysis

Grants.gov FOA Number: DE-PS36-09GO99018

also known as FedConnect FOA Number: DE-FOA-0000075

Announcement Type: Amendment 002

CFDA Number: 81.087

Issue Date: 3/04/2009

Application Due Date: 7/17/2009, 11:59 PM Eastern Time

PLEASE NOTE:

This FOA is also being announced in FedConnect, and applications will be accepted through either FedConnect or Grants.gov. This FOA has two reference numbers: DE-PS36-09GO99018 in Grants.gov; and DE-FOA-0000075 in FedConnect. Applications will be accepted through either portal of Grants.gov or FedConnect. Please do not apply to both portals, only one application in either portal is necessary.

If you have not already submitted an application in Grants.gov, applications should be submitted to FedConnect. If you have already submitted an application to Grants.gov, do not resubmit to FedConnect (only submit to one location).

DATE: May 27, 2009

FROM: Genevieve Wozniak, Contracting Officer

TO: All Prospective Applicants

SUBJECT: Amendment No. 002 to Funding Opportunity Announcement No. DE-PS36-08GO99018/DE-FOA-0000075, "Enhanced Geothermal Systems Component Research and Development/Analysis"

The Announcement is amended as follows:

- II. The closing due date is extended from June 15, 2009 to **July 17, 2009**.
- III. **\$56.0 million is added to this FOA from the American Recovery and Reinvestment Act (ARRA)**, which replaces the \$10,000,000 in annual appropriation funds. The total amount of DOE funding available under this FOA is \$56,000,000. Because of the addition of ARRA funds, the following changes are made:
 - cost share requirements (See Part III.B. on page 9)
 - reporting requirements (See Part VI.C. on page 23) have changed
 - addition of program policy factor regarding jobs (See Part V.A. on page 21).
- IV. Six new Topic areas are added: (1) Mineral Recovery from Geothermal Fluids; (2) High Temperature Cements; (3) Directional Drilling Systems; (4) High Temperature Downhole MWD Tools for Directional Drilling; (5) Well Stimulation Technologies for Highly Deviated Wells; and (6) Fracture Characterization Technologies (See Part I, pages 6 and 7).
- V. Program Policy Factor regarding the preference for student involvement (See Part V., Section A.3 on page 21).
- VI. Additional clarification for the FedConnect system throughout the FOA.

All amendment 002 changes to the FOA are highlighted below in blue.

All other parts of the FOA remain unchanged.

DATE: April 14, 2009

FROM: Genevieve Wozniak, Contracting Officer

TO: All Prospective Applicants

SUBJECT: Amendment No. 001 to Funding Opportunity Announcement (FOA) No. DE-PS36-08GO99018/DE-FOA-, “Enhanced Geothermal Systems Component Research and Development/Analysis”

The Announcement is amended as follows:

- I. The closing date is extended to **June 15, 2009**.
- II. Applications will be accepted through **FedConnect** in addition to grants.gov. Part IV – APPLICATION AND SUBMISSION INFORMATION, is changed to include information regarding submitting an Application through FedConnect.

All amendment 001 changes to the FOA are highlighted below in yellow.

All other parts of the FOA remain unchanged.

FEDCONNECT QUICK START GUIDE, REGISTRATION/SUBMISSION REQUIREMENTS, AND WHERE TO SUBMIT QUESTIONS

1. Application Submission

APPLICATIONS MAY BE SUBMITTED THROUGH FEDCONNECT TO BE CONSIDERED FOR AWARD. The Adobe Application Package identified in Parv IV. C. is posted as an attachment to this FOA (in FedConnect). It is the responsibility of the applicant, prior to the Application due date and time, to verify successful transmission.

In the Adobe Application Package that is provided as a separate attachment to this announcement in FedConnect, first attach your application documents within the Adobe Application Package. Then save the Adobe Application Package, and submit it via the FedConnect portal. IMPORTANT: DO NOT use the "Save & Submit" button in the Adobe Application Package, since that button is only used when submitting an application in Grants.gov.

Organizations with system-to-system capabilities with Grants.gov for their submissions may continue to use their systems, and their applications will be accepted in Grants.gov to be considered for award.

If you have not already submitted an application in Grants.gov, Applications should be submitted in FedConnect. If you have already submitted an application in Grants.gov, do not resubmit to FedConnect (only submit to one location). It is the responsibility of the applicant, prior to the Application due date and time, to verify successful transmission.

2. Adobe Application Package - Instructions for Completion of Forms in FedConnect

The Adobe Application Package was intended to be utilized in Grants.gov; however, DOE is currently utilizing it with FedConnect. If you are submitting your application via FedConnect, please disregard any information within the Adobe Application Package regarding use with Grants.gov; specifically, DO NOT use the "Save & Submit" button in the Adobe Application Package, since that button is only used when submitting an application in Grants.gov.

1) Copy the Adobe Application Package to your desktop;

2) Open the Adobe Application Package, and first complete the SF-424 Application, Project/Performance Site Location(s) form, and SF-LLL form (if applicable) which are all part of the Adobe Application Package. To start this process, simply click on the form's name to select the item and then click on the => button. This will move the document to the appropriate "Documents for Submission" box and the form will be automatically added to your application package. Open the forms by selecting the form name and clicking on the "Open Form" button, then complete the required data fields.

3) Identify the remaining forms required to be completed, as identified in Part IV of the Announcement. Prepare and save these forms to your desktop (e.g., project narrative, resume file, budget file, ...). Once finalized and files are named as indicated in Part IV of the Announcement, upload (attach) these files individually within the Adobe Application Package by clicking on "Add Mandatory Other Attachment" to attach the

Project Narrative and clicking on “Add Optional Other Attachment” to attach the remaining files;

4) Once all completed files have been attached within the Adobe Application Package, save the Adobe Application Package to your desktop, and submit to FedConnect, following the steps outlined in the FedConnect Quick Start Guide at:

https://www.fedconnect.net/Fedconnect/PublicPages/FedConnect_Ready_Set_Go.pdf.

Note that Applications may be submitted to multiple Topic Areas; however, SEPARATE applications must be submitted for each Topic Area. If submitting to multiple Topic Areas, save the Adobe Application Package in a single file, using up to 10 letters of the Applicant’s Organization Name as the file name (e.g., UCLA). If your organization is submitting more than one Application to different topic areas, you must identify an application number and the Topic Area Number at the end of each file name (e.g., UCLA-1-Topic1).

Note that it is the responsibility of the applicant, prior to the Application due date and time, to verify successful transmission in FedConnect.

2. Electronic Authorization of Applications and Award Documents

Submission of an application and supplemental information under this funding opportunity announcement by the applicant’s authorized representative through electronic systems used by the Department of Energy, including FedConnect and Grants.gov, constitutes the applicant's approval and electronic signature.

Acknowledgement of award documents by the recipient’s authorized representative through electronic systems used by the Department of Energy, specifically FedConnect, constitutes the recipient's acceptance of the terms and conditions of the award.

Acknowledgement via FedConnect by the recipient’s authorized representative constitutes the recipient's electronic signature.

3. FedConnect Quick Start Guide:

Use this guide to assist you with FedConnect:

https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf

4. Registration Process Requirements To submit an application in response to this FOA via FedConnect, Applicants must be registered with FedConnect. Before you can register with FedConnect, you will need the following:

- a. Your company’s DUNS (including plus 4 extension if applicable). If you don’t know your company’s DUNS or if your company does not have a DUNS you can search for it or request one at <http://fedgov.dnb.com/webform/displayHomePage.do>.
- b. A federal Central Contractor Registration (CCR) account. If your company is not currently registered with CCR, please register at www.ccr.gov before continuing with your FedConnect registration.
- c. Possibly, your company’s CCR MPIN. If you are the first person from your company to register, FedConnect will need to create a company account. Only a person who knows your company’s CCR MPIN can do this. To find out who this is in your company, go to <http://www.ccr.gov/> and click **Search CCR**. Once you’ve found your company, locate the Electronic Business Point of Contact.

After the initial FedConnect account is created, employees can register themselves without the MPIN. If you are not sure whether your company has an account with FedConnect, don't worry. Complete the registration form and FedConnect will let you know.

Applicants who are not registered with CCR and FedConnect, should allow at least 21 days to complete these requirements. It is suggested that the process be started as soon as possible. For those Applicants already registered in CCR, the CCR registration must be updated annually at <http://www.ccr.gov/Renew.aspx>. Registration information is available at https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf.

5. FedConnect Questions

Questions pertaining to the submission of applications through FedConnect should be directed by e-mail to support@FedConnect.net or by phone to 800-899-6665.

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PART I – FUNDING OPPORTUNITY DESCRIPTION

Introduction

AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

Projects under this FOA will be issued with funds appropriated by the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, (Recovery Act or Act). The Recovery Act's purposes are to stimulate the economy and to create and retain jobs. The Act gives preference to activities that can be started and completed expeditiously, including a goal of using at least 50 percent of the funds made available by it for activities that can be initiated not later than June 17, 2009. Due to the schedule of this FOA, the preceding date does not impact applications to this FOA. Accordingly, special consideration will be given to projects that promote and enhance the objectives of the Act, especially job creation, preservation and economic recovery, in an expeditious manner.

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

- Reporting, tracking and segregation of incurred costs;
- Reporting on job creation and preservation;
- Publication of information on the Internet;
- Access to records by Inspectors General and the Government Accountability Office;
- Prohibition on use of funds for gambling establishments, aquariums, zoos, golf courses or swimming pools;
- Ensuring that iron, steel and manufactured goods are produced in the United States;
- Ensuring wage rates are comparable to those prevailing on projects of a similar character;
- Protecting whistleblowers and requiring prompt referral of evidence of a false claim to an appropriate inspector general; and
- Certification and Registration.

These special terms and conditions will be based on provisions included in Titles XV and XVI of the Act. The exact terms and conditions will be provided as soon as possible. The currently available Special Provisions are located at:

http://management.energy.gov/business_doe/business_forms.htm.

The Office of Management and Budget (OMB) has issued Initial Implementing Guidance for the Recovery Act. See [M-09-10, Initial Implementing Guidance for the American Recovery and Reinvestment Act of 2009](#). OMB will be issuing additional guidance concerning the Act in the near future. Applicants should consult the DOE website, www.energy.gov, the OMB website <http://www.whitehouse.gov/omb/>, and the Recovery website, www.recovery.gov, regularly to keep abreast of guidance and information as it evolves.

Recipients of funding appropriated by the Act shall comply with requirements of applicable Federal, State, and local laws, regulations, DOE policy and guidance, and instructions in this FOA, unless relief has been granted by DOE. Recipients shall flow down the requirements of applicable Federal, State and local laws, and regulations, DOE policy and guidance, and instructions in this FOA to subrecipients at any tier to the extent necessary to ensure the recipient's compliance with the requirements.

Be advised that Recovery Act funds can be used in conjunction with other funding, as necessary to complete projects, but tracking and reporting must be separate to meet the

reporting requirements of the Recovery Act and related OMB Guidance. Applicants for projects funded by sources other than the Recovery Act should plan to keep separate records for Recovery Act funds and to ensure those records comply with the requirements of the Act. Funding provided through the Recovery Act that is supplemental to an existing grant is one-time funding.

Applicants should begin planning activities for their first tier subawardees, including obtaining a DUNS number (or updating the existing DUNS record), and registering with the Central Contractor Registration (CCR). The extent to which subawardees will be required to register in CCR will be determined by OMB at a later date.

Background

The Geothermal Technologies Program (GTP) will facilitate research, development, and demonstration to establish Enhanced Geothermal Systems (EGS) as a major contributor for electricity generation.

GTP's key contribution to Department of Energy (DOE) Strategic Theme 1, Goal 1.1 (Energy Diversity) is to increase national energy options, reduce vulnerability to disruptions and increase flexibility of the market to meet U.S. needs. One way to accomplish this is to extract heat from hot, underground rock, an indigenous resource, and convert the heat to electricity. Enhanced Geothermal Systems are engineered reservoirs created to produce energy from geothermal resources deficient in water and/or permeability. DOE is seeking advanced technology to address key aspects of site selection and characterization, reservoir creation and validation, reservoir sustainability, and plant operation and management. The ultimate goal is to make large amounts of the earth's heat available for productive use at economic costs.

In fiscal year 2008 (FY08), DOE released a Funding Opportunity Announcement (FOA) for research, development and field demonstration of EGS next-generation technologies (the press release with selected awardees may be found at <http://www.energy.gov/6624.htm>). Subject to annual appropriations and successful completion of stage-gate reviews, DOE will provide up to \$43.1 million over four years to 21 awardees selected as a result of that FOA. With cost-share by the recipients, the public-private investments will be up to \$78 million. This FOA will continue DOE's partnership with the geothermal community on research, development, and analysis of EGS technologies. In addition to this FOA, DOE is issuing a parallel announcement for field demonstration of EGS technologies (DE-PS36-09GO99019) and recently closed a FOA for creation of a National Geothermal Database. DOE National Laboratories will also be assisting with EGS research, development and analysis.

EGS Analysis/Component Research and Development Description

Under this FOA, DOE is seeking advanced technology to address key aspects of engineered reservoir creation, management, and utilization identified in the GTP Multi-Year Research, Development, and Demonstration (MYRDD) plan¹ and in the results from a geothermal workshop held in Iceland in summer 2008². Projects are sought to develop innovative technology for cost-effective creation, management, and utilization of EGS in reservoir environments. **Projects will be evaluated based on their ability to advance technology**

¹ The GTP MYRDD plan may be found at <http://www1.eere.energy.gov/geothermal/plans.html>.

² The results of the Iceland workshop may be found at http://internationalgeothermal.org/Technical_Workshop/August_27.html.

toward the ultimate, specific target specifications listed below (where applicable). The rapid development and commercialization of these new technologies will be needed to drive the market development of engineered geothermal systems. Teaming between academia, industry, and National Laboratories/Federally Funded Research and Development Centers (FFRDCs) is encouraged.

Hydraulic stimulation of fractures is considered the primary means of creating functional EGS reservoirs at sites where the permeability of the rock is too limited to allow cost effective heat recovery. Supporting technological improvements and overall geothermal systems analysis to establish critical energy, environmental and economic baseline information are needed in the following topic areas, and specific target specifications are included where applicable:

1. **Air Cooling** – To develop a lab-based analysis of hybrid-water/air systems, examine the interaction of turbine design and cooling needs to optimize/minimize performance/costs, and examine the output variability of air cooling systems to identify areas of opportunity to improve performance.
2. **Drilling Systems** – To reduce the cost, while maintaining or increasing the rate of penetration and performance of drilling systems for use in hard rock in high temperature and pressure zones and deep wells.
 - **Target Specification** - Development of drilling technology capable of drilling three times faster than conventional rotary drilling with equipment durability greater than conventional equipment at depths up to 10,000 meters and temperatures up to 300° C.
3. **High Temperature Downhole Tools** – To develop tools capable of tolerating the extreme environment of supercritical reservoirs (374° C and 220 bar for pure water). These instruments may include but are not limited to: temperature and pressure sensors, flow meters, fluid samplers, inclination and direction sensors, acoustic instruments (high and low frequency), resistivity probes, natural gamma ray detectors, epithermal neutron scattering gauges, rock density gauges (gamma and sonic), casing monitoring devices (e.g. cement bond logs and casing collar locators), fluid conductivity, pH indicators and well dimension probes (caliper).
 - **Target Specification** - Development of tools and sensors for logging and monitoring wellbore conditions at depths of up to 10,000 meters and temperatures of up to 374° C.
4. **High-Temperature-High-Volume Lifting** – To define the well fluids lifting requirements criteria needed by the geothermal industry for the foreseeable future; review alternative lifting systems and their potential for development to meet industry requirements; and research, design, develop, test and demonstrate a well fluid lifting system which will provide lifting of well fluid to meet the foreseeable pressure, temperature and longevity needs of the EGS industry for the coming ten years.
 - **Target Specification** - Definition of requirements; review of alternative lifting systems; and the research, design, development, testing and demonstration of a well fluid lifting compatible with wellbores with diameters of 6 5/8” to 10 5/8” including deviated wellbores, providing up to 300 bar added pressure at flow rates of up to 80 kg/s, and operating without workover for a performance period of three or more years.

5. **High-Pressure-High-Volume Pumping** – To define the pressure, flow rate and temperature requirements criteria for both stimulating and circulating fluids needed by the geothermal industry for the foreseeable future; review alternative available and conceived surface pumping systems and their potential for development to meet industry requirements; and research, design, develop, test and demonstrate a pumping system for stimulating and for circulation to meet the foreseeable pressure, temperature and longevity needs of the EGS industry for the coming ten years.
6. **Zonal Isolation** – To isolate wellbore zones in high pressure and temperature environments in open (uncased) and cased holes using packers, expandable tubulars or other methods capable of providing zonal isolation.
 - **Target Specification** - Development of packers and associated tubular goods, valves, etc. capable of operating with differential pressures of 400 bar in wellbore diameters from 6 5/8” to 10 5/8”, both drillable and/or retrievable. For drillable hardware, the device should have an indefinite operating period. For retrievable hardware, the intent is to operate for greater than 14 days.
7. **Integrated Chemical, Thermal, Mechanical and Hydrological Modeling** – To design a geothermal reservoir modeling tool that integrates thermal, mechanical, hydrological and chemical modeling.
8. **Image Fluid Flow** – To accurately image fluid in created and/or pre-existing fractures so as to map flow through the reservoir.
 - **Target Specification** - Development of fluid flow imaging technology capable of imaging reservoir fluid flow through created and/or pre-existing fractures at depths of 1,000 to 10,000 meters using surface or wellbore sensors in rocks of various types and compositions.
9. **Induced Seismicity** – To identify causal mechanisms of induced seismicity and develop new and improved methods to use microearthquakes (MEQ) to image the physical properties of the reservoir and model the relationship between MEQ and injection and production.
10. **Geophysical Exploration Technologies** – To improve and advance geophysical exploration technologies (including remote sensing) or combinations of non-invasive exploration technologies that can identify potential geothermal resources that lack surface manifestations, and thereby enhance the effectiveness of resource discovery and placement of new power plants.
11. **Stimulation Prediction Models** – To develop and validate models to predict a reservoir’s response to stimulation and/or to quantitatively compare existing stimulation prediction models.
 - **Target Specification** - Development of stimulation prediction models capable of accurately predicting the location, spacing, orientation, and flow properties of created fractures.
12. **Geothermal Analysis** – To conduct geothermal systems analysis that develops or adapts geothermal lifecycle models (or other analytical models) to address **one** of the following subtopics (**address only one analysis subtopic per application**):

- Baseline systems cost
 - Installed capital cost for different market penetration levels
 - Impacts of specific technology improvements; potential employment, energy, and environment impact for Enhanced Geothermal Systems, conventional hydrothermal, low temperature geothermal, and coproduced fluids resulting in electric power production
 - Potential employment, energy, and environmental impacts for ground source heating and cooling and direct use applications.
13. **Smart Tracers** – To develop reservoir tracers to record physical conditions in the reservoir using nano-electronics technology for injection into geothermal reservoir and recovery at production wells.
- **Target Specification** - Development of nano-electronic tracers capable of being used at temperatures up to 300° C and providing information beyond well-to-well connectivity such as pressure, chemistry, or other physical conditions in the reservoir.
14. **Supercritical Carbon Dioxide/Reservoir Rock Chemical Interactions** – To develop a chemical model or modify an existing chemical model capable of modeling the chemical interactions between supercritical carbon dioxide and EGS reservoir rocks of various compositions in aqueous and non-aqueous environments.
- **Target Specification** - Chemical model capable of accurately predicting mineral dissolution and precipitation in geothermal reservoirs and mineral precipitation in surface facilities, with and without the presence of water in the reservoir rock assuming a development scenario of carbon dioxide injection to displace and remove reservoir water leading to an eventual anhydrous, carbon dioxide-filled geothermal reservoir.
15. **Temporary Sealing of Fractures** – To develop techniques to temporarily limit the inflow of formation fluids into the wellbore during drilling for better control of the drilling process.
- **Target Specification** - Development of non-damaging bridging agents that can handle pressure differences up to 35 bar and temperatures up to 300° C for periods up to 60 days and can be removed without impairing fracture productivity, with fracture openings from 2” to less than 1/16” wide.
16. **Tracers and Tracer Interpretation** – To adapt or develop reservoir tracers and/or tracer interpretation techniques capable of being used at temperatures up to 300° C that provide information beyond well-to-well connectivity such as fracture surface area or fracture spacing.
17. **Working Fluids for Binary Power Plants** – To identify non-azeotropic mixtures of working fluids for improved utilization of available energy in subcritical cycles; to characterize the composition and thermophysical and transport properties of those mixtures; to identify working fluids for supercritical cycles and trilateral cycles; and characterize the composition, thermophysical, and transport properties of those working fluids.
- **Target Specification** - Identification and characterization of binary power plant working fluids or mixtures of working fluids with potential for greater energy conversion efficiency than conventional working fluids

such as isobutane or refrigerants.

18. **Mineral Recovery from Geothermal Fluids** – To adapt, develop, and validate techniques for extracting valuable minerals from the fluid stream at geothermal applications; the targeted minerals should be extractable in commercial quantities from geothermal fluids located in the United States with the overall purpose of providing an additional revenue stream.
19. **High Temperature Cements** - Research, design, develop, test, and demonstrate a cement system for high temperature and stress conditions of an EGS wellbore. Define cement formulations needed by the geothermal industry for the successful placement of the cement for a long string of casing focusing on the prevention of premature set and having a strong seal at the shoe for stimulations that may be performed through the casing. While conventional geothermal wells experience large temperature rises during production, EGS wells experience large temperature drops at the bottom of the well during the stimulation process due to the cooling effect of the injected water. This temperature drop may be in the neighborhood of 350 °F. This unique problem causes significant stress and potential failure of the cement sheath if conventional cement systems are utilized.
 - **Target Specifications** - Development of a cement system to withstand extreme geothermal conditions
20. **Directional Drilling Systems** – To reduce the cost, while maintaining or increasing the rate of penetration and performance of directional drilling systems for use in EGS reservoirs. This includes the design and development of improved drilling fluids (to reduce frictional viscosity and remove cuttings), high-performance bottom-hole assemblies (e.g., collars, bent subs, drill bits), and downhole motors (to control wellbore orientation) that can operate reliably under high (up to 300 C) temperature conditions.
21. **High Temperature Downhole MWD Tools for Directional Drilling**– To develop MWD tools capable of tolerating the environment of EGS reservoirs (up to 300 C) to guide directional drilling operations and facilitate characterization of the geothermal rock mass/reservoir during drilling. These instruments may include: temperature and pressure sensors, inclination and direction sensors, acoustic instruments (high and low frequency), resistivity probes, natural gamma ray detectors, epithermal neutron scattering gauges, rock density gauges (gamma and sonic), fluid conductivity, pH indicators and well dimension probes (caliper). Telemetry methods to transmit data to the surface may also be investigated.
22. **Well Stimulation Technologies for Highly Deviated Wells**– To develop improved fracture stimulation methods for highly deviated wells in EGS reservoirs. This includes novel approaches to thermal- or hydro-fracturing of EGS reservoir intervals between horizontal wells. It includes the development of injection methods using fluids and proppants to create new fractures and open existing fractures, resulting in long-term enhancement of reservoir permeability. This activity also involves the design and development of packers, expandable tubulars or other methods capable of providing zonal isolation in high pressure and temperature environments in open (uncased) and cased holes. Methods to isolate or plug reservoir “short circuits” may also be investigated.

23. Fracture Characterization Technologies – To develop improved downhole and remote methods to characterize fractures in EGS. This includes prediction of fracture and stress orientation prior to drilling (needed to properly orient horizontal wells), determination of fracture location, spacing and orientation (while drilling), and determination of the location of open fractures (after stimulation) to identify the location of fluid flow pathways within the enhanced geothermal reservoir.

Applications with cost share above the minimum level required (see Part II.B) and student involvement from academic institutions may be given greater consideration.

A single Principal Investigator or organization may submit separate applications to multiple topic areas. **However, a single Principal Investigator or organization may not submit a single application that addresses multiple topic areas – i.e., address only one topic area per application. Similarly, applications to different subtopic areas within Topic Area 12 (Geothermal Analysis) must be submitted separately.** Therefore, applicants will be required to declare which topic area they are applying for within each application. Also, DOE reserves the right to make one award, multiple awards, or no awards in any given topic area.

PART II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

- DOE anticipates awarding grants and/or cooperative agreements under this program announcement (See Part VI.B.2 Statement of Substantial Involvement for cooperative agreements).

B. ESTIMATED FUNDING

- A total of \$56.0 million of ARRA funds is expected to be available for these new awards in FY 2009 and throughout the life of the awards made under this announcement.

C. MAXIMUM AND MINIMUM AWARD SIZE

- Ceiling (i.e., the maximum amount of DOE funds for an individual award made under this announcement):
 - \$5,000,000 for Topics 1-6, and 20-22
 - \$1,500,000 for Topics 7-12, and 23
 - \$3,000,000 for Topics 13-19
- Floor (i.e., the minimum amount of DOE funds for an individual award made under this announcement): None

D. EXPECTED NUMBER OF AWARDS

- DOE anticipates making 20-30 awards under this announcement.

E. PERIOD OF PERFORMANCE

- DOE anticipates making awards that will run from 1-3 years.

F. TYPE OF APPLICATION

- DOE will accept only new applications under this announcement (i.e., applications for

renewals of existing DOE funded projects will not be considered).

G. GENERAL INFORMATION

Awards under this FOA will be issued with funds appropriated by the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, (Recovery Act or Act). Be advised that special terms and conditions may apply to projects funded by the Act relating to:

- Reporting, tracking and segregation of incurred costs;
- Reporting on job creation and preservation;
- Publication of information on the Internet;
- Access to records by Inspectors General and the Government Accountability Office;
- Prohibition on use of funds for gambling establishments, aquariums, zoos, golf courses or swimming pools;
- Ensuring that iron, steel and manufactured goods are produced in the United States;
- Ensuring wage rates are comparable to those prevailing on projects of a similar character;
- Protecting whistleblowers and requiring prompt referral of evidence of a false claim to an appropriate inspector general; and
- Certification and Registration.

These special terms and conditions will be based on provisions included in Titles XV and XVI of the Act. The exact terms and conditions will be provided as soon as possible. The currently available Special Provisions are located at:

http://management.energy.gov/business_doe/business_forms.htm.

PART III - ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS

Domestic applicants are eligible to apply including institutions of higher education, non-profit entities (as described in section 501(c)(4) of the Internal Revenue Code of 1986), for-profit private entities, State/Local Governments, and Indian tribes.

DOE and non-DOE Federally Funded Research and Development Centers (FFRDCs), National Laboratories, and federal agencies will be allowed only as subrecipients to any of the previously mentioned entities. The FFRDC contractor effort, in aggregate, shall not exceed **20%** of the total estimated cost of the project, including the applicant's and the FFRDC contractor's portions of the effort.

Foreign participants will be allowed as subrecipients provided that:

- The foreign subrecipient's effort, in aggregate, shall not exceed 33% (1/3) of the total estimated budget which includes both the applicant's and the foreign subrecipient's portions of the effort.
- The foreign participant must provide at least 20% cost share for its own portion of the project.

B. COST SHARING

- Recipient cost share funds should be based on total project costs and must come from non-Federal sources unless otherwise allowed by law.

DOE is seeking applications providing a minimum cost share of 20% of the total project costs. However, applications with proposed cost share as low as 10% of the total project costs will be considered, using the Secretary of Energy's authority to reduce cost-share requirements under the Recovery Act. For Indian Tribes or Tribal Energy Resources Groups, cost share may be waived in full. **Applicants proposing cost share below 20% must provide a justification for their request in the Project Narrative Part IV.C.b.** The justification should explain why the applicant cannot cost share at the statutory level (20%) including specifics as to why the applicant is proposing at the lower level.

C. OTHER ELIGIBILITY REQUIREMENTS

- **Federally Funded Research and Development Center (FFRDC) Contractors**
FFRDC contractors are not eligible for an award under this announcement, but they may be proposed as a subrecipient and/or team member on another entity's application subject to the following guidelines:

Authorization for non-DOE FFRDCs. The Federal agency sponsoring the FFRDC contractor must authorize in writing the use of the FFRDC contractor on the proposed project and this authorization must be submitted with the application. The use of an FFRDC contractor must be consistent with the contractor's authority under its award.

Authorization for DOE FFRDCs. The cognizant contracting officer for the FFRDC must authorize in writing the use of a DOE FFRDC contractor 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, will not adversely impact execution of the DOE assigned programs at the laboratory and will not place the Laboratory in direct competition with the domestic private sector.”

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

Cost Share. The applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC contractor's portions of the effort.

FFRDC Contractor Effort:

The FFRDC contractor effort, in aggregate, shall not exceed **20%** of the total estimated cost of the project, including the applicant's and the FFRDC contractor's portions of the effort.

Responsibility. The applicant, if successful, 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 applicant and the FFRDC contractor.

D. MULTIPLE PRINCIPAL INVESTIGATORS

The assignment and use of multiple Principal Investigators (PIs) in projects awarded under this FOA is allowed. The applicant, whether a single organization or team/partnership/consortium, must however indicate in the application if the project will include multiple PI's. The decision to use multiple PIs for a project is the sole responsibility of the applicant. If multiple PI's will be designated, the application must identify in the application the Contact PI/Project Coordinator and provide a "Coordination and Management Plan" that describes the organization structure of the project as it pertains to the designation of multiple PI's. This plan should, at a minimum, include:

- Process for making decisions on scientific/technical direction
- Publications;
- Intellectual property issues;
- Communication plans'
- Procedures for resolving conflicts; and
- PI's roles and administrative, technical and scientific responsibilities for the project

PART IV – APPLICATION AND SUBMISSION INFORMATION

A. ADDRESS TO REQUEST APPLICATION PACKAGE

Application forms and instructions are available on-line at Grants.gov or FedConnect. To access these materials, go to one of the two following on-line portals:

- 1) Grants.gov – go to <http://www.grants.gov>, select "Apply for Grants," and then select "Download Application Package." Enter the CFDA (81.087) and/or the funding opportunity number (DE-PS36-09GO99018) and then follow the prompts to download the application package.
- 2) FedConnect – go to <https://www.fedconnect.net/FedConnect/>. The Adobe Application Package is provided as a separate attachment on FedConnect. In the Adobe Application Package that is provided as a separate attachment to this announcement in FedConnect, first attach your application documents within the Adobe Application Package. Then save the Adobe Application Package, and submit it via the FedConnect portal. **IMPORTANT: DO NOT use the "Save & Submit" button in the Adobe Application Package, since that button is only used when submitting an application in Grants.gov.** (Also see Section I of this Part below.)

Save the Adobe Application Package in a single file, using up to 10 letters of the Applicant's Organization Name as the file name (e.g., UCLA.pdf). If your organization is submitting more than one Application, you must identify an application number at the end of each file name (e.g., UCLA1.pdf).

B. ELECTRONIC AUTHORIZATION OF APPLICATIONS AND AWARD DOCUMENTS

Submission of an application and supplemental information under this funding opportunity

announcement by the applicant's authorized representative through electronic systems used by the Department of Energy, including FedConnect and Grants.gov, constitutes the applicant's approval and electronic signature.

Acknowledgement of award documents by the recipient's authorized representative through electronic systems used by the Department of Energy, specifically FedConnect, constitutes the recipient's acceptance of the terms and conditions of the award. Acknowledgement via FedConnect by the recipient's authorized representative constitutes the recipient's electronic signature.

C. LETTER OF INTENT AND PRE-APPLICATION

1. Letter of Intent

- Letters of Intent are not required.

2. Pre-application

- Pre-applications are not required.

D. CONTENT AND FORM OF APPLICATION

The Adobe Application Package is provided as a separate attachment to this Funding Opportunity Announcement in FedConnect.

Organizations with system-to-system capabilities with Grants.gov for their submissions may continue to use their systems, and their applications will be accepted in Grants.gov to be considered for award.

You must complete the mandatory forms and any applicable optional forms, in accordance with the instructions on the forms and the additional instructions below, as required by this FOA. Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement.

1. SF 424 - Application for Federal Assistance

Complete this form first to populate data in other forms. Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances referenced in Field 21 can be found at http://management.energy.gov/business_doe/business_forms.htm, under Certifications and Assurances.

2. Project Performance Site Locations

Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), location(s) in the blocks provided. **Note** that the Project/Performance Site Congressional District is entered in the format of the 2 digit state code followed by a dash and a 3 digit Congressional **district code, for example VA-001.**

3. Other Attachments Form

Submit the following files with your application and attach them to the Other Attachments Form. (To attach the Project Narrative, click on "Add Mandatory Other Attachment". To attach all other files, click on "Add Optional Other Attachment".)

a. Project Summary/Abstract File

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 (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information, as the Department may make it available to the public. The project summary must not exceed 1 page when printed using standard 8.5” by 11” paper with 1” margins (top, bottom, left and right), single-spaced, with font not smaller than 11 point. Save this information in a file named “Summary.pdf,” and click on “Add Optional Other Attachment” to attach.

b. Project Narrative File - Mandatory Other Attachment

The project narrative must not exceed 20 pages, including cover page, table of contents, charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right), single-spaced. EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE. The font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application. See Part VIII.D for instructions on how to mark proprietary application information. Save the information in a single file named “Project.pdf,” and click on “Add Mandatory Other Attachment” to attach.

The project narrative must include:

- Statement of Project Objectives (SOPO).
The SOPO must address how the project objectives will be met. It must contain a clear, concise description of all activities to be completed during the project performance and follow the requirements in the template. In the SOPO, describe the technical merit of the proposed project, and propose go/no-go decision points (with brief criteria) as specified in the Project Description in Part I. **The SOPO may be released to the public by DOE, in whole or in part, at any time. Therefore, it is required that it shall not contain proprietary or confidential business information.** For a suggested format, please refer to form PMC 134.1 (SOPO template) at the following link: https://www.eere-pmc.energy.gov/procurenet/FinancialAssistance/Forms/Procurenet/PMC134_1-SOPO.doc.
- Merit Review Criterion Discussion.
The section should be formatted to address each of the merit review criterion and sub-criterion listed in Part V.A below. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria. **Describe the current state of the art for the topic area and proposed improvement to that technology.** DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH OF

THE MERIT REVIEW CRITERION AND SUB-CRITERION.

- **American Recovery and Reinvestment Act of 2009, P.L. 111-5 (Recovery Act) Information:**
This section should address how the project will promote and enhance the objectives of the Recovery Act, especially job creation and/or preservation, and economic recovery in an expeditious manner. The response must include quantitative data supporting the number of jobs created and/or preserved, as well as data supporting any other direct economic recovery impacts attributable to the performance and conduct of the project.
- **Justification, if any, for reduced recipient cost share request (see Part III.B):**
Factors to be addressed when an Applicant requests DOE contributions in excess of the statutory level should include: (1) whether the additional DOE contribution is necessary to finance the project - that sufficient equity or debt financing is not readily available in the commercial markets; (2) whether the project's financial model requires the additional DOE contribution to be viable; and, (3) whether the additional contribution is necessary to achieve the objectives of the FOA.

The above listed components of your Project Narrative combined, must not exceed 20 pages, as specified above. Documents listed below may be included as clearly marked appendices to your Narrative and will not count towards the Project Narrative page limit. Please note that some of the required documents listed below may have their own page limits to which you must adhere.

c. Letters of Commitment

You must have a letter from each third party (i.e., a party other than the organization submitting the application) participating in the project and/or contributing cost sharing. The letter must state that the third party is committed to participating in the project and/or providing a specific minimum dollar amount of cost sharing. If providing cost share, identify the following information in the budget justification, for each third party contributing cost sharing: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed cost sharing – cash, services, or property. Letters of Commitment from parties participating in the project, exclusive of vendors, will be integral to the success of the project must be included as part of this Appendix to the Narrative. Letters of Commitment will not count towards the Project Narrative page limit. Save this information in a file named “Letters.pdf,” and click on “Add Optional Other Attachment” to attach.

d. Resume File

Provide a resume for each key person proposed, including subawardees and consultants if they meet the definition of key person. A key person is any individual who contributes in a substantive, measurable way to the execution of the project. Save all resumes in a single file named “resume.pdf” and click on “Add Optional Other Attachment” to attach. Each resume must not exceed 2

pages when printed on 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and should include the following information, if applicable:

Education and Training. Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.

Professional Experience: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

Publications. Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically.

Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

Synergistic Activities. List no more than 5 professional and scholarly activities related to the effort proposed. Provide a brief description of the activity and source of support (1/2 page per relevant activity).

Of the key personnel identified in this file, indicate the Principal Investigator(s) (PI). If multiple PI's are proposed, the applicant must provide the information indicated in Part III.D as part of this file.

The resume file does not have a page limitation. Save this information in a file named “Resume.pdf,” and click on “Add Optional Other Attachment” to attach.

e. Budget File

SF 424A Excel, Budget Information – Non-Construction Programs File

You must provide a cumulative budget for the total project period with Object Class category details and subtotals by proposed project Phase. **Budget periods should also correspond with proposed go/no-go decision points.** Use the SF 424A Excel, “Budget Information – Non Construction Programs” form on the Applicant and Recipient Page at

http://management.energy.gov/business_doe/business_forms.htm. You may request funds under any of the Object Class Categories as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (See PART IV.G). Save the information in a single Excel file named “SF424A.xls,” and click on “Add Optional Other Attachment” to attach.

f. Budget Justification File

You must justify the costs proposed in each Object Class Category/Cost Classification category (i.e., identify key persons and personnel categories and the estimated hourly costs/time commitments for each person or category; provide a list of equipment and cost of each item; identify proposed subaward/consultant

work and cost of each subaward/consultant; describe purpose of proposed travel, number of travelers and number of travel days; list general categories of supplies and amount for each category; and provide any other information needed to support your budget. Provide the name of your federal cognizant/oversight agency, if you have one, and the name and phone number of the individual responsible for negotiating your indirect rates. Budget justifications should also provide a cumulative budget for the total project period with Object Class category details and subtotals by proposed project Phase. **Budget periods should also correspond with proposed go/no-go decision points, as applicable.**

If cost share is required, you must have a letter from each third party contributing cost share (i.e., a party other than the organization submitting the application) stating that the third party is committed to providing a specific minimum dollar amount of cost share. In the budget justification, identify the following information for each third party contributing cost share: (1) the name of the organization; (2) the proposed dollar amount to be provided; (3) the amount as a percentage of the total project cost; and (4) the proposed type of cost share – cash, services, or property. By submitting your application, you are providing assurance that you have signed letters of commitment. Successful applicants will be required to submit these signed letters of commitment. Save the budget justification information in a single file named “Budget_Justification.pdf,” and click on “Add Optional Other Attachment” to attach.

g. American Recovery and Reinvestment Act of 2009, P.L. 111-5 (Recovery Act) Additional Budget Justification Information

Applications shall provide information which validates that all laborers and mechanics on projects funded directly by or assisted in whole or in part by and through funding appropriated by the Recovery Act are paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by Subchapter IV of Chapter 31 of Title 40, United States Code (Davis-Bacon Act). For guidance on how to comply with this provision, see <http://www.dol.gov/esa/whd/contracts/dbra.htm>. To satisfy this requirement, please provide a written assurance that you will comply with the Davis-Bacon Act, as identified above, with the signature of the authorized representative of your organization. Save the written assurance in a single file named “Davis-Bacon_Assurance.pdf” and click on “Add Optional Other Attachment” to attach.

h. Subaward Budget File(s)

You must provide a separate budget (i.e., a cumulative budget for the total project period with details by Phase) for each subawardee that is expected to perform work estimated to be more than \$100,000 or 50 percent of the total work effort (whichever is less). Use the SF 424A Excel for Non Construction Programs. These forms are found on the DOE Financial Assistance Forms Page at http://management.energy.gov/business_doe/business_forms.htm. Save each Subaward budget in a separate file. Save each Subaward budget in a separate file. Use up to 10 letters of the subawardee’s name plus “424.xls” as the file name (e.g., ucla424.xls or energyres424.xls). Click on “Add Optional Other Attachment” to attach each file.

A budget justification for the subaward budget is also required. The budget

justification must include the same justification information described in paragraph e. above.

i. Budget for Federally Funded Research and Development Center (FFRDC) Contractor File, if applicable

If an FFRDC contractor is to perform a portion of the work, you must provide a DOE Field Work Proposal in accordance with the requirements in DOE Order 412.1 Work Authorization System. This order and the DOE Field Work Proposal form are available at the following link:

<http://www.management.energy.gov/documents/o4121.pdf>. Use up to 10 letters of the FFRDC name (plus .pdf) as the file name (e.g., lanl.pdf or anl.pdf), and click on “Add Optional Other Attachment” to attach.

j. Authorization for non-DOE or DOE FFRDCs

Save the Authorization for non-DOE or DOE FFRDCs, as specified in Part III.C Other Eligibility Requirements, in a single file named “FFRDC_Auth.pdf” and click on “Add Optional Other Attachment” to attach. 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, will not adversely impact execution of the DOE assigned programs at the laboratory and will not place the Laboratory in direct competition with the domestic private sector.”

k. Project Management Plan (PMP)

The tasks and proposed go/no-go decision points listed in the PMP should correspond to those in the SOPO. In the PMP, include a time schedule for the accomplishment of the activities/tasks (**Gantt Chart**), the spending plan associated with the activities/tasks, and the expected dates for the release of outcomes. Applicants may use their own project management system to provide this information. Successful applicants must use this plan to report schedule and budget variances. Save this plan in a single file named “pmp.pdf” and click on “Add Optional Other Attachments” to attach.

l. SF-LLL Disclosure of Lobbying Activities

If applicable, complete the SF- LLL. Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, you must complete and submit Standard Form - LLL, "Disclosure Form to Report Lobbying." The form is available in the optional document box on the grant application package page of grants.gov.

Summary of Required Forms/Files

Your application must include the following documents:

Name of Document	Format	File Name
SF 424 - Application for Federal	PDF	See Instructions

Assistance		
Project Performance Site Locations	PDF	See Instructions
Other Attachments Form: Attach the following files to this form:	PDF	See Instructions
Project Summary/Abstract File	PDF	Summary.pdf
Project Narrative File, including Statement of Project Objectives and Merit Review Criterion Discussion.	PDF	Project.pdf
Letters of Commitment, if applicable (to be attached to Project Narrative)	PDF	Letters.pdf
Resume File	PDF	Resume.pdf
SF 424A Excel – Budget Information for Non-Construction Programs File	Excel	SF424A.xls
Budget Justification File	As applicable	See Instructions
Subaward Budget File(s), if applicable	Excel	See Instructions
Budget for Federally Funded Research and Development Center (FFRDC) Contractor File, if applicable.	PDF	See instructions
Authorization from cognizant Contracting Officer for FFRDC, if applicable.	PDF	FFRDC_Auth.pdf
Project Management Plan (PMP)	PDF	pmp.pdf
SF-LLL Disclosure of Lobbying Activities, if applicable	PDF	SF-LLL.pdf

E. SUBMISSIONS FROM SUCCESSFUL APPLICANTS

If selected for negotiation of an award, DOE reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to:

- Indirect cost information
- Other budget information
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Commitment Letter from Third Parties Contributing to Cost Sharing, if applicable
- Environmental Questionnaire
- Because Recovery Act funds apply to awards under this announcement, additional certification requirements will be required for state or local governments. The exact terms and conditions will be provided as soon as possible. The currently available Special Provisions are located at: http://management.energy.gov/business_doe/business_forms.htm.

F. SUBMISSION DATES AND TIMES

Pre-application Due Date

- Pre-applications are not required.

Application Due Date

- Applications must be received by **July 17, 2009**, 11:59 PM Eastern Time. You

are encouraged to transmit your application well before the deadline. The grants.gov Helpdesk is NOT available after 9:00 PM Eastern Time.

APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

G. INTERGOVERNMENTAL REVIEW

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

H. FUNDING RESTRICTIONS

Cost Principles. Costs must be allowable in accordance with the applicable Federal cost principles referenced in 10 CFR Part 600. The cost principles for commercial organizations are in **FAR Part 31**.

Pre-award Costs. Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR part 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

I. SUBMISSION AND REGISTRATION REQUIREMENTS

1. Where to Submit

APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV OR FEDCONNECT, VIA THIS ANNOUNCEMENT, TO BE CONSIDERED FOR AWARD. You cannot submit an application through Grants.gov unless you are registered in grants.gov. You cannot submit an application through FedConnect unless you are registered in FedConnect. Please read the registration requirements below carefully and start the process immediately.

FedConnect

Submit electronic applications through the FedConnect portal at www.FedConnect.net. Information regarding how to submit applications via Fed Connect can be found at https://www.fedconnect.net/FedConnect/PublicPages/FedConnect_Ready_Set_Go.pdf. Questions pertaining to the submission of applications through FedConnect should be directed by e-mail to support@FedConnect.net or by phone to FedConnect Support at 800-899-6665.

Grants.gov

Submit electronic applications through the “Apply for Grants” function at www.Grants.gov. If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 or send an email to support@grants.gov. A troubleshooting page is also available at http://www.grants.gov/help/trouble_tips.jsp.

Further, it is the responsibility of the applicant, prior to the Application due date and time, to verify successful transmission.

2. Registration Process Requirements

There are several one-time actions you must complete in order to submit an application through Grants.gov **or FedConnect**: 1) obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (<http://www.dnb.com/us/>); 2) register with the Central Contract Registry (CCR) <http://www.ccr.gov> ; 3) register with either Grants.gov and their credential provider **or with FedConnect**, depending on which portal you use to submit your application.

See http://www.grants.gov/applicants/get_registered.jsp. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/section3/OrganizationRegCheck.pdf> to guide you through the DUNS number, grants.gov and CCR registration process.

IMPORTANT: During the CCR registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner identification Number" (MPIN).

Applicants, who are not registered with CCR and Grants.gov, should allow at least 21 days to complete these requirements, as you must COMPLETE ALL STEPS of the one-time registration process before you can submit your first application through Grants.gov.

When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e. Grants.gov registration).

Microsoft Vista and Office 2007 Compatibility

Grants.gov is currently incompatible with both the new Microsoft (MS) Vista Operating System and the new Microsoft (MS) Office 2007 versions of Word, Excel, and Power Point. In order to create and submit your application to Grants.gov, you must find a computer with a previous version Microsoft Operating System, such as Windows XP.

If you attach a file created using MS Office 2007, you will not get an error message when you submit the application, and, your entire application will not be able to be processed or accepted at Grants.gov and will not reach DOE. Grants.gov can accept applications with attachments created in MS Office 2007 if the attachments are saved in the prior format. See the http://www.grants.gov/assets/Vista_and_office_07_Compatibility.pdf for detailed instructions on how to do this. A file created in MS Office 2007 can be identified by the "x" at the end of the file extension, for example "sample.docx" for a Word file. Contact Grants.gov at 1-800-518-4726 with any questions.

3. Questions

ALL Questions relating to the FedConnect registration process, system requirements, or the submittal process must be directed to FedConnect at 800-899-6665 or support@FedConnect.net.

ALL Questions relating to the **Grants.gov registration process**, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov.

Part VII.A. of this announcement explains how to submit other questions to the Department of Energy (DOE), relative to the content and requirements of this announcement.

PART V - APPLICATION REVIEW INFORMATION

A. REVIEW CRITERIA

1. Initial Review Criteria

- Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of this Funding Opportunity Announcement. If an application fails to meet these requirements, it may be deemed non-responsive and eliminated from full Merit Review.

2. Merit Review Criteria

Applications will be evaluated against the merit review criteria shown below.

Criterion 1: Technical Merit and Innovation

Weight: [30%]

- Applicability of the project to the GTP Multi-Year Research, Development, and Demonstration (MYRDD) plan
- Clearly states how the project supports the topic area target specifications (where applicable)
- Level of technical innovation of the proposed technology over the current state of the art
- Credibility as supported by engineering calculations and existing quantitative data
- **For Topic Area 12 (Geothermal Analysis) only:** Likelihood of identifying the possible economic, environmental, and employment impacts, barriers, and opportunities for geothermal systems with an emphasis on enhanced geothermal systems

Criterion 2: Project Research Plan

Weight: [30%]

- Adequacy and clarity of statement of project objectives (SOPO) including proposed go/no-go decision points at the end of each phase, tasks, responsibilities and goals
- Likelihood of achieving tasks within the SOPO through realistic milestones and logical task structure
- Adequacy and reasonableness of budget, spend plan, and schedule (Gantt Chart) for the proposed project

Criterion 3: Project Team, Equipment, and Facilities

Weight: [20%]

- Capabilities of applicant and participants to comprehensively address all aspects of the proposed project
- Adequacy of equipment, laboratory and demonstration facilities, analytic support, and other necessary resources (i.e., field testing, if applicable.) for performing the proposed project
- Level of participation by project participants as evidenced by letter(s) of commitment
- Adequacy of plan to validate/test the proposed technology

Criterion 4: Technology Transfer/Commercialization

Weight: [20%]

- Adequacy of plan to successfully introduce technology into the geothermal industry/marketplace, where appropriate (i.e., patenting, licensing, and business plan that will lead to commercialization success)
- Comprehensiveness and timeliness of information sharing (i.e., peer-reviewed publications; web-based information sharing, attendance/submission of papers at annual geothermal conferences/workshops; and technical presentations)
- **For Topic Area 12 (Geothermal Analysis) only:** Degree to which the final deliverable/analysis results will be communicated to geothermal stakeholders, policy makers, and other interested parties to aid in decision-making

3. Other Selection Factors

The selection official may consider the following program policy factors in the selection process:

- a. Technological diversity of projects
- b. Proposed recipient cost share above the minimum level required
- c. Degree of student (undergraduate through post-doctoral) involvement from academic institutions, and integration of research into course curriculum.
- d. Selection of Applications which promote and enhance the objectives of the American Recovery and Reinvestment Act of 2009, P.L. 111-5, especially job creation, and/or preservation and economic recovery in an expeditious manner

B. REVIEW AND SELECTION PROCESS

a. Merit Review

Applications that pass the initial review will undergo a merit review in accordance with the guidance provided in the “Department of Energy Merit Review Guide for Financial Assistance and Unsolicited Proposals.” This guide is at <http://www.management.energy.gov/documents/meritrev.pdf>.

It is very important that those documents, Project Abstract and Project Narrative file, that will be used during the Merit Review Process do not contain any Personally Identifiable Information as described in Appendix B.

b. Selection

The Selection Official may consider the merit review recommendation, program policy factors, and the amount of funds available.

c. Discussions and Award

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including, but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR part 600; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES

- DOE anticipates notifying applicants selected for negotiation of an award in September 2009 and making awards beginning in November 2009.

PART VI - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

1. Notice of Selection

DOE will notify the applicant selected for negotiation of an award. This notice of selection is not an authorization to begin performance. (See Part IV.G with respect to the allowability of pre-award costs.)

Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

2. Notice of Award

A Notice of Financial Assistance Award issued by the contracting officer is the authorizing award document. It normally includes, either as an attachment or by reference: (1) Special Terms and Conditions; (2) Applicable program regulations, if any; (3) Application as approved by DOE; (4) DOE assistance regulations at 10 CFR part 600; (5) National Policy Assurances; (6) Budget Summary; (7) Federal Assistance Reporting Checklist, which identifies the reporting requirements; and (8) Statement of Project Objectives.

For grants and cooperative agreements made to universities, non-profits and other entities subject to OMB Circular A-110, the Award also includes the Research Terms and Conditions and the DOE Agency Specific Requirements located at: <http://www.nsf.gov/bfa/dias/policy rtc/index.jsp>.

3. Electronic Authorization of Award Documents

Acknowledgement of award documents by the recipient's authorized representative through electronic systems used by the Department of Energy, specifically FedConnect, constitutes the recipient's acceptance of the terms and conditions of the award. Acknowledgement via FedConnect by the recipient's authorized representative constitutes the recipient's electronic signature.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

1. Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR part 600 (See: <http://ecfr.gpoaccess.gov>). Grants and cooperative agreements made to universities, non-profits and other entities subject to OMB Circular A-110, are subject to the Research Terms and Conditions and the DOE Agency Specific Requirements located at: <http://www.nsf.gov/bfa/dias/policy rtc/index.jsp>.

American Recovery and Reinvestment Act 2009 Award Administration Information: Special Provisions relating to work funded under American Recovery

and Reinvestment Act of 2009, Pub. L. 111-5 shall apply. (Special Provisions are located at: http://management.energy.gov/business_doe/business_forms.htm.) Also, the Office of Management and Budget may be promulgating additional provisions or modifying existing provisions. Those additions and modifications will be incorporated into the Special Provisions as they become available.

2. Special Terms and Conditions and National Policy Requirements

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at

http://management.energy.gov/business_doe/business_forms.htm. The National Policy Assurances To Be Incorporated As Award Terms are located at http://management.energy.gov/business_doe/1374.htm.

Special Provisions relating to work funded under American Recovery and Reinvestment Act of 2009, Pub. L. 111-5 shall apply. (Special Provisions are located at: http://management.energy.gov/business_doe/business_forms.htm.) Also, the Office of Management and Budget may be promulgating additional provisions or modifying existing provisions. Those additions and modifications will be incorporated into the Special Provisions as they become available.

3. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at

http://www.gc.doe.gov/financial_assistance_awards.htm.

4. Cooperative Agreements

For cooperative agreements, the award will include a Statement of Substantial Involvement such as the following: DOE's System Integration and technology specific resources at DOE FFRDC's (subject to conflict of interest considerations), universities, USGS, etc may be utilized to provide direction and analysis on projects, as appropriate to benefit the geothermal community. Specific DOE 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

C. REPORTING

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. The proposed Checklist for this program can be found at https://www.eere-pmc.energy.gov/procurenet/FinancialAssistance/Forms/DOE_Forms/DOEF4600_2.doc.

Additionally, awards made under this FOA may be subject to an Annual Peer Review, awardees may be asked to present paper(s) at annual geothermal conferences, and Decision Point Topical Reports may also be required for each proposed project phase.

Awards under this FOA will be issued with funds appropriated by the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, (Recovery Act or Act). Be advised that Recovery Act reporting requirements may apply to projects funded by the Act. The reporting requirements will be specified in the DOE F 4600.2 or other related Recovery Act guidance as they become available.

PART VII - QUESTIONS/AGENCY CONTACTS

A. QUESTIONS

Questions regarding the content of the announcement must be submitted through the “Submit Question” feature of the DOE Industry Interactive Procurement System (IIPS) at <http://e-center.doe.gov>. Locate the program announcement on IIPS and then click on the “Submit Question” button. Enter required information. You will receive an electronic notification that your question has been answered. DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website. Potential applicants are encouraged to read all posted Q&A prior to posting a new question.

For questions regarding the registration process, system requirements, how an application form works, or the submittal process, see Part IV.H.7, above.

B. AGENCY CONTACT(S)

Name: Pete Simon, Grants and Agreements Specialist
E-mail: FY09EGSResearch@go.doe.gov

All questions should be submitted through the “Submit Question” feature of IIPS. (See Section A of this Part, above.)

PART VIII - OTHER INFORMATION

A. MODIFICATIONS

Notices of any modifications to this announcement will be posted on Grants.gov, the DOE Industry Interactive Procurement System (IIPS), and FedConnect.

- On the IIPS website, you may receive an email when a modification or an announcement message is posted by joining the mailing list for this announcement through the link in IIPS.
- Through the FedConnect portal, you may receive an email when a modification or an announcement message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any modifications or other announcements. More information is available at <http://www.fedconnect.net> and <http://www.compusearch.com/products/fedconnect/fedconnect.asp>.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

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

C. COMMITMENT OF PUBLIC FUNDS

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

D. PROPRIETARY APPLICATION INFORMATION

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

“The data contained in pages _____ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government’s right to use or disclose data obtained without restriction from any source, including the applicant.”

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

“The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation.”

E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL

In conducting the merit review evaluation, 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. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

F. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM

Patent Rights. The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See “Notice of Right to Request Patent Waiver” in paragraph G below.)

Rights in Technical Data. Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE’s own needs or to insure the commercialization of technology developed under a DOE agreement.

G. NOTICE OF RIGHT TO REQUEST PATENT WAIVER

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

H. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES

Eligible activities under this program 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.

I. NOTICE OF RIGHT TO CONDUCT A REVIEW OF FINANCIAL CAPABILITY

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

J. NOTICE OF POTENTIAL DISCLOSURE UNDER FREEDOM OF INFORMATION ACT

Applicants are advised that identifying information regarding all applicants, including applicant names and/or points of contact, may be subject to public disclosure under the

Freedom of Information Act, whether or not such applicants are selected for negotiation of award.

APPENDICIES/REFERENCE MATERIAL

Appendix A – Definitions

“Amendment” means a revision to a Funding Opportunity Announcement

"Applicant" means the legal entity or individual signing the Application. This entity or individual may be one organization or a single entity representing a group of organizations (such as a Consortium) that has chosen to submit a single Application in response to a Funding Opportunity Announcement.

"Application" means the documentation submitted in response to a Funding Opportunity Announcement. NOTE: Application is referred to as Proposal in IIPS.

“Authorized Organization Representative (AOR)” is the person with assigned privileges who is authorized to submit grant applications through Grants.gov on behalf of an organization. The privileges are assigned by the organization’s E-Business Point of Contact designated in the CCR.

"Award" means the written documentation executed by a DOE Contracting Officer, after an Applicant is selected, which contains the negotiated terms and conditions for providing Financial Assistance to the Applicant. A Financial Assistance Award may be either a Grant or a Cooperative Agreement.

"Budget" means the cost expenditure plan submitted in the Application, including both the DOE contribution and the Applicant Cost Share.

"Consortium (plural consortia)" means the group of organizations or individuals that have chosen to submit a single Application in response to a Funding Opportunity Announcement.

"Contracting Officer" means the DOE official authorized to execute Awards on behalf of DOE and who is responsible for the business management and non-program aspects of the Financial Assistance process.

"Cooperative Agreement" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the Applicant during the performance of the contemplated activity.

"Cost Sharing" means the respective share of Total Project Costs to be contributed by the Applicant and by DOE. The percentage of Applicant Cost Share is to be applied to the Total Project Cost (i.e., the sum of Applicant plus DOE Cost Shares) rather than to the DOE contribution alone.

“Central Contractor Registry (CCR)” is the primary database which collects, validates, stores and disseminates data in support of agency missions. Funding Opportunity Announcements which require application submission through Grants.gov require that the organization first be registered in the CCR at <http://www.grants.gov/CCRRegister>.

“Credential Provider” is an organization that validates the electronic identity of an individual through electronic credentials, PINS, and passwords for Grants.gov. Funding Opportunity Announcements which require application submission through Grants.gov require that the individual applying on behalf of an organization first be registered with the Credential Provider at <https://apply.grants.gov/OrcRegister>.

“Data Universal Numbering System (DUNS) Number” is a unique nine-character identification number issued by Dun and Bradstreet (D&B). Organizations must have a DUNS number prior to registering in the CCR. Call 1-866-705-5711 to receive one free of charge. http://www.grants.gov/applicants/request_duns_number.jsp

“E-Business Point of Contact (POC)” is the individual who is designated as the Electronic Business Point of Contact in the CCR registration. This person is the sole authority of the organization with the capability of designating or revoking an individual’s ability to submit grant applications on behalf of their organization through Grants.gov.

“E-Find” is a Grants.gov webpage where you can search for Federal Funding Opportunities in FedGrants. <http://www.grants.gov/search/searchHome.do>

“Enhanced Geothermal Systems (EGS)” is defined as cost-effective methods of transforming geothermal resources that lack adequate water and/or rock permeability into functional hydrothermal reservoirs.

"Financial Assistance" means the transfer of money or property to an Applicant or Participant to accomplish a public purpose of support authorized by Federal statute through Grants or Cooperative Agreements and sub-awards. For DOE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

“Federally Funded Research and Development Center (FFRDC)” means a research laboratory as defined by Federal Acquisition Regulation 35.017.

“Funding Opportunity Announcement (FOA)” is a publicly available document by which a Federal agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds. Funding opportunity announcements may be known as program announcements, notices of funding availability, solicitations, or other names depending on the agency and type of program.

“Geothermal” refers to the stored thermal energy in, or heat produced from, the Earth’s interior.

“Geothermal Resources” are defined as geothermal conditions where the technology exists to use the stored thermal energy to either produce electricity or for direct use, e.g., space heating, district heating, snow melting, aquaculture, etc.

"Grant" means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and no Substantial Involvement is

anticipated between DOE and the Applicant during the performance of the contemplated activity.

“Grants.gov” is the “storefront” web portal which allows organizations to electronically find and apply for competitive grant opportunities from all Federal grant-making agencies. Grants.gov is THE single access point for over 900 grant programs offered by the 26 Federal grant-making agencies. <http://www.grants.gov>

“Hydrothermal Resources” are defined as those geothermal resources that contain sufficient heat, fluid and permeability to be commercially productive using existing drilling, reservoir engineering and power conversion technologies; are currently being produced.

“Industry Interactive Procurement System (IIPS)” is DOE’s Internet-based procurement system which allows access to DOE’s business opportunities database, allows user registration and submittal of Applications: <http://e-center.doe.gov/>.

"Key Personnel" means the individuals who will have significant roles in planning and implementing the proposed Project on the part of the Applicant and Participants, including FFRDCs.

“Marketing Partner Identification Number (MPIN)” is a very important password designated by your organization when registering in CCR. The E-Business Point of Contact will need the MPIN to login to Grants.gov to assign privileges to the individual(s) authorized to submit applications on behalf of your organization. The MPIN must have 9 digits containing at least one alpha character (must be in capital letters) and one number (no spaces or special characters permitted).

"Participant" for purposes of this Funding Opportunity Announcement only, means any entity, except the Applicant substantially involved in a Consortium, or other business arrangement (including all parties to the Application at any tier), responding to the Funding Opportunity Announcement.

“Packer” refers to a device that can be placed in the wellbore to block vertical fluid flow so as to isolate zones.

“Principal Investigator” refers to the technical point of contact/Project Manager for a specific project award.

"Project" means the set of activities described in an Application, State plan, or other document that is approved by DOE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

“Proposal” is the term used in IIPS meaning the documentation submitted in response to a Funding Opportunity Announcement. Also see Application.

“Recipient” means the organization, individual, or other entity that receives a Financial Assistance Award from DOE, is financially accountable for the use of any DOE funds or property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award.

"Selection" means the determination by the DOE Selection Official that negotiations take place for certain Projects with the intent of awarding a Financial Assistance instrument.

"Selection Official" means the DOE official designated to select Applications for negotiation toward Award under a subject Funding Opportunity Announcement.

"Substantial Involvement" means involvement on the part of the Government. DOE's involvement may include shared responsibility for the performance of the Project; providing technical assistance or guidance which the Applicant is to follow; and the right to intervene in the conduct or performance of the Project. Such involvement will be negotiated with each Applicant prior to signing any agreement.

"Total Project Cost" means all the funds to complete the effort proposed by the Applicant, including DOE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing.

Appendix B – Personally Identifiable Information

In responding to this Announcement, Applicants must ensure that Protected Personally Identifiable Information (PII) is not included in the following documents: Project Abstract, Project Narrative, Biographical Sketches, Budget or Budget Justification. These documents will be used by the Merit Review Committee in the review process to evaluate each application. PII is defined by the Office of Management and Budget (OMB) and DOE as:

Any information about an individual maintained by an agency, including but not limited to, education, financial transactions, medical history, and criminal or employment history and information that can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information that is linked or linkable to an individual.

This definition of PII can be further defined as: (1) Public PII and (2) Protected PII.

1. **Public PII:** PII found in public sources such as telephone books, public websites, business cards, university listing, etc. Public PII includes first and last name, address, work telephone number, email address, home telephone number, and general education credentials.
2. **Protected PII:** PII that requires enhanced protection. This information includes data that if compromised could cause harm to an individual such as identity theft.

Listed below are examples of Protected PII that Applicants must not include in the files listed above to be evaluated by the Merit Review Committee.

- Social Security Numbers in any form
- Place of Birth associated with an individual
- Date of Birth associated with an individual
- Mother's maiden name associated with an individual
- Biometric record associated with an individual
- Fingerprint
- Iris scan
- DNA
- Medical history information associated with an individual
- Medical conditions, including history of disease
- Metric information, e.g. weight, height, blood pressure
- Criminal history associated with an individual
- Employment history and other employment information associated with an individual
- Ratings
- Disciplinary actions
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual's performance appraisal
- Financial information associated with an individual
- Credit card numbers

- Bank account numbers
- Security clearance history or related information (not including actual clearances held)

Listed below are examples of Public PII that Applicants may include in the files listed above to be evaluated by the Merit Review Committee:

- Phone numbers (work, home, cell)
- Street addresses (work and personal)
- Email addresses (work and personal)
- Digital pictures
- Medical information pertaining to work status (i.e. individual A is out sick today)
- Medical information included in a health or safety report
- Employment information that is not PII even when associated with a name
- Resumes, unless they include a Social Security Number
- Present and past position titles and occupational series
- Present and past grades
- Present and past annual salary rates (including performance awards or bonuses, incentive awards, merit pay amount, Meritorious or Distinguished Executive Ranks, and allowances and differentials)
- Present and past duty stations and organization of assignment (includes room and phone numbers, organization designations, work email address, or other identifying information regarding buildings, room numbers, or places of employment)
- Position descriptions, identification of job elements, and those performance standards (but not actual performance appraisals) that the release of which would not interfere with law enforcement programs or severely inhibit agency effectiveness
- Security clearances held
- Written biographies (e.g. to be used in a program describing a speaker)
- Academic credentials
- Schools attended
- Major or area of study
- Personal information stored by individuals about themselves on their assigned workstation or laptop unless it contains a Social Security Number

Appendix C – Cost Share Information

The requirement for cost sharing included in Funding Opportunity Announcements (FOA) issued competitively by the Department of Energy (DOE) is either statutory, programmatic, or both. Certain federal statutes require a minimum cost share requirement, by either type of activities funded or by Program. This is known as statutory cost share. The Program may also, at its discretion, require a greater level of cost share than the statutory minimum, or require cost share when there is no minimum requirement, as it determines appropriate. This is called programmatic cost share.

Research and development (R&D) activities (other than R&D activities related to basic science) require Recipients (those receiving the financial assistance awards from DOE) to cost share at a minimum of 20% of total project costs. Demonstration and Deployment activities require Recipients to cost share at a minimum of 50% of total project costs. These statutory requirements are prescribed in Section 988 of the Environmental Policy Act (EPA) of 2005. Any waiver of this requirement must be approved by the Secretary of Energy.

When responding to a DOE FOA, an Applicant will have the opportunity to ask questions at the DOE IIPS website (<https://e-center.doe.gov/>). Specific questions as to the acceptability and allowability of intended cost share for a proposed project in response to a FOA may be posed at this site during the time period when the FOA is open for questions.

The regulations that govern Federal Financial Assistance for DOE are found at 10 Code of Federal Regulations (CFR) Part 600. Specifically, Section 600.313, “Cost sharing and matching” provides guidance on acceptable contributions toward cost share requirements, as well as guidance on the valuation and documentation of contributions, for “for profit” organizations. Below is a summary of these requirements as contained in the CFR. The full CFR section may be viewed using the following link: (<http://www.access.gpo.gov/nara/cfr/cfr-table-search.html>).

Acceptable contributions, including cash contributions and third party contributions, must be accepted as part of the recipient's cost sharing or matching if such contributions meet all of the following criteria:

- They are verifiable from the recipient's records.
- They are not included as contributions for any other federally-assisted project or program.
- They are necessary and reasonable for proper and efficient accomplishment of project or program objectives.
- They are allowable under 10 CFR 600.317.
- They are not paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing or matching.
- They are provided for in the approved budget.
- They conform to other provisions of this part, as applicable.

General examples of allowable cost share are shown below. It is up to the applicant to

ensure that the cost share proposed in response to this FOA is allowable under 10 CFR 600.313.

- Cash provided directly by the recipient, or a sub-recipient;
- State or local government funds provided to support the proposed project, which were not provided to the State by the federal Government;
- Employees' salaries included in the budget, if paid by the employer (recipient or sub-recipient), and not reimbursed by the federal funding of the project;
- Rental value of buildings or equipment necessary to the success of the proposed project and the value of which is included in the budget for the project;
- Monetary value of SOPO activities to be performed by a third party which are included in the project budget and will not be reimbursed by federal funds.