

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT**



**ADVANCED RESEARCH PROJECTS AGENCY – ENERGY (ARPA-E)
U.S. DEPARTMENT OF ENERGY**

MONITOR FIELD TEST SITE PROGRAM

Announcement Type: **Modification 01** **Modification 02**
 Funding Opportunity No. DE-FOA-0001546
 CFDA Number 81.135

Funding Opportunity Announcement (FOA) Issue Date:	February 26, 2016
Deadline for Questions to ARPA-E-CO@hq.doe.gov:	5 PM ET, March 18, 2016
Submission Deadline for Full Applications:	5 PM ET, March 30, 2016 April 4, 2016
Submission Deadline for Replies to Reviewer Comments:	5 PM ET, April 13, 2016 April 22, 2016
Expected Date for Selection Notifications:	May 2016
Total Amount to Be Awarded	Approximately \$3 to 5 million, subject to the availability of appropriated funds.
Anticipated Awards	ARPA-E anticipates making one award under this FOA. ARPA-E may, at its discretion, issue no award.

- For eligibility criteria, see Section III.A of the FOA.
- For cost share requirements under this FOA, see Section III.B of the FOA.
- To apply to this FOA, Applicants must register with and submit application materials through ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/Registration.aspx>). For detailed guidance on using ARPA-E eXCHANGE, see Section IV.G.1 of the FOA.
- Applicants are responsible for meeting each submission deadline. Applicants are strongly encouraged to submit their applications at least 48 hours in advance of the submission deadline.
- ARPA-E will not review or consider noncompliant or nonresponsive applications. For detailed guidance on compliance and responsiveness criteria, see Sections III.C.1 and III.C.2 of the FOA.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

MODIFICATIONS

All modifications to the Funding Opportunity Announcement (FOA) are highlighted in yellow in the body of the FOA.

Mod. No.	Date	Description of Modifications
01	03/21/2016	<ul style="list-style-type: none">• Revised Submission Deadline for Full Applications to March 30, 2016, see Cover page and Required Documents Checklist.• Clarified Round 2 Field Testing conditions, see Sections 1.B and 1.C of the FOA.
02	03/29/2016	<ul style="list-style-type: none">• Revised Submission Deadline for Full Applications to April 4, 2016. Revised Submission Deadline for Responses to Reviewer Comments to April 22, 2016. See Cover page and Required Documents Checklist.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

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Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

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REQUIRED DOCUMENTS CHECKLIST

For an overview of the application process, see Section IV.A of the FOA.

For guidance regarding requisite application forms, see Section IV.B of the FOA.

For guidance regarding the content and form of Full Applications and Replies to Reviewer Comments, see Sections IV.C, and IV.D of the FOA.

SUBMISSION	COMPONENTS	OPTIONAL/ MANDATORY	FOA SECTION	DEADLINE
Full Application	<ul style="list-style-type: none"> • Each Applicant must submit a Technical Volume in Adobe PDF format by the stated deadline. Applicants may use the Technical Volume template available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov). The Technical Volume must include the following: <ul style="list-style-type: none"> ○ Executive Summary (1 page max.) ○ Sections 1-4 (25 pages max.) <ul style="list-style-type: none"> • 1. Team Capabilities • 2. Technical Approach • 3. Test Site • 4. Budget ○ Bibliographic References (no page limit) ○ Personal Qualification Summaries (each PQS limited to 3 pages in length, no cumulative page limit) ○ The Technical Volume must be accompanied by: <ul style="list-style-type: none"> ○ SF-424 (no page limit, Adobe PDF format); ○ Budget Justification Workbook/SF424A (no page limit, Microsoft Excel format) ○ Summary for Public Release (250 words max., Adobe PDF format); ○ Summary Slide (1 page limit, Microsoft PowerPoint format) – Applicants may use the Summary Slide template available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov); and ○ Completed and signed Business Assurances & Disclosures Form (no page limit, Adobe PDF format) -- Applicants may use the Business Assurances & Disclosures Form template available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov). 	Mandatory	IV.C	5 PM ET, March 30, 2016 April 4, 2016
Reply to Reviewer Comments	<ul style="list-style-type: none"> • Each Applicant may submit a Reply to Reviewer Comments in Adobe PDF format. This submission is optional. Applicants may use the Reply to Reviewer Comments template available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov). The Reply may include: <ul style="list-style-type: none"> ○ Up to 2 pages of text; and ○ Up to 1 page of images. 	Optional	IV.D	5 PM ET, April 13, 2016 April 22, 2016

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I. FUNDING OPPORTUNITY DESCRIPTION

A. AGENCY OVERVIEW

The Advanced Research Projects Agency – Energy (ARPA-E), an organization within the Department of Energy (DOE), is chartered by Congress in the America COMPETES Act of 2007 (P.L. 110-69), as amended by the America COMPETES Reauthorization Act of 2010 (P.L. 111-358) to:

- “(A) to enhance the economic and energy security of the United States through the development of energy technologies that result in—
- (i) reductions of imports of energy from foreign sources;
 - (ii) reductions of energy-related emissions, including greenhouse gases; and
 - (iii) improvement in the energy efficiency of all economic sectors; and
- (B) to ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.”

ARPA-E funds research on and the development of high-potential, high-impact energy technologies that are too early for private-sector investment. The agency focuses on technologies that can be meaningfully advanced with a modest investment over a defined period of time in order to catalyze the translation from scientific discovery to early-stage technology. For the latest news and information about ARPA-E, its programs and the research projects currently supported, see: <http://arpa-e.energy.gov/>.

ARPA-E funds transformational research. Existing energy technologies generally progress on established “learning curves” where refinements to a technology and the economies of scale that accrue as manufacturing and distribution develop drive down the cost/performance metric in a gradual fashion. This continual improvement of a technology is important to its increased commercial deployment and is appropriately the focus of the private sector or the applied technology offices within DOE. By contrast, ARPA-E supports transformative research that has the potential to create fundamentally new learning curves. ARPA-E technology projects typically start with cost/performance estimates well above the level of an incumbent technology. Given the high risk inherent in these projects, many will fail to progress, but some may succeed in generating a new learning curve with a projected cost/performance metric that is significantly lower than that of the incumbent technology.

ARPA-E funds technology with the potential to be disruptive in the marketplace. The mere creation of a new learning curve does not ensure market penetration. Rather, the ultimate value of a technology is determined by the marketplace, and impactful technologies ultimately become disruptive – that is, they are widely adopted and displace existing technologies from the marketplace or create entirely new markets. ARPA-E understands that definitive proof of market disruption takes time, particularly for energy technologies. Therefore, ARPA-E funds the development of technologies that, if technically successful, have the clear disruptive potential,

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e.g., by demonstrating capability for manufacturing at competitive cost and deployment at scale.

ARPA-E funds applied research and development. The Office of Management and Budget defines “applied research” as “systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met” and defines “development” as the “systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.”¹ Applicants interested in receiving financial assistance for basic research should contact the DOE’s Office of Science (<http://science.energy.gov/>). Office of Science national scientific user facilities (<http://science.energy.gov/user-facilities/>) are open to all researchers, including ARPA-E Applicants and Awardees. These facilities provide advanced tools of modern science including accelerators, colliders, supercomputers, light sources and neutron sources, as well as facilities for studying the nanoworld, the environment, and the atmosphere. Projects focused on the improvement of existing technology platforms along defined roadmaps may be appropriate for support through the DOE offices such as: the Office of Energy Efficiency and Renewable Energy (<http://www.eere.energy.gov/>), the Office of Fossil Energy (<http://fossil.energy.gov/>), the Office of Nuclear Energy (<http://nuclear.energy.gov/>), and the Office of Electricity Delivery and Energy Reliability (<http://energy.gov/oe/office-electricity-delivery-and-energy-reliability>).

B. PROGRAM OVERVIEW

ARPA-E’s MONITOR (Methane Observation Networks with Innovative Technology to Obtain Reductions) program is investing over \$30 million in technologies to accelerate the development of low-cost methane sensing systems that have the ability to quantify and locate fugitive methane emissions resulting from the production and transportation of natural gas. In order to evaluate the performance of each MONITOR technology with respect to quantifying and locating fugitive methane emissions, the MONITOR program seeks to develop a robust test site that simulates real-world natural gas wellpad conditions. Specifically, the MONITOR program aims to support operation of a multi-user field test site – including, if necessary, design and construction, of a new test site, or alteration of an existing test site - for use by MONITOR program Awardees.

Background

On December 16, 2014, ARPA-E announced project selections for the MONITOR program, which seeks to develop low-cost, high sensitivity systems that detect, quantify, and locate emissions associated with the production and transportation of natural gas.

¹ OMB Circular A-11
(http://www.whitehouse.gov/sites/default/files/omb/assets/a11_current_year/a11_2014.pdf), Section 84, p. 8.

The overarching goal of the program is to enable systems which meet the following performance targets, as set forth in the MONITOR Funding Opportunity Announcement (FOA)².

- Detecting a leak of 6 SCFH (1 ton/year) on a 10 m x 10 m wellpad, within a time period that will allow a 90% reduction of leakage, with a 90% confidence level;
- Validating the data so that the rate of “false positive” indications is no more than 1 per year; as an alternative to a binary indication of “leak” or “no leak”, the system can also choose to report the probability that a leak of a given size exists;
- Estimate mass flow rate of each leak, to within 20% error;
- Estimating the location of each leak to within 1 meter;
- Wirelessly communicate results to a remote receiver;
- Total system cost (amortized capital cost + operating cost) is less than \$3,000/year for basic functionality; additional cost is allowed for enhanced functionality.

Awardees were also permitted to propose systems with enhanced capabilities, which included methane selectivity, speciation capability, thermogenic/biogenic origin differentiation, continuous measurement, and enhanced stability. For nascent technologies not yet developed to the point of incorporation in a system, Awardees were permitted to propose partial solutions.

Innovative solutions across the technology spectrum were encouraged. As such, the selected MONITOR projects represent a diverse array of technical approaches to methane detection, including:

1. Distributed arrays of low-cost chemical sensors;
2. Laser-based remote sensing, including LIDAR and backscatter TDLAS approaches ;
3. Laser-based path sensors;
4. Laser-based point sensors;
5. Fiber optic sensors;
6. Distributed collection systems;
7. Advanced dispersion modeling;
8. Tomographic reconstruction approaches;
9. Imaging spectrometers; and
10. Mass spectrometry.

Further detail on the MONITOR program and individual projects is available here.³ Teams proposed a variety of operational concepts, including distributed arrays of low-cost sensors, single point sensors, and mobile sensors, to include UAS-mounted, truck-mounted, and person-portable solutions. Some of these technologies are capable of being deployed in multiple types of systems, while others are designed for one specific deployment method.

² FOA (DE-FOA-0001128) was issued on April 29, 2014, and can be found here: <https://arpa-e.foa.energy.gov/Default.aspx?Archive=1#Foaldb5487723-6c6b-40d6-8336-4031b8423e66>

³ <http://www.arpa-e.energy.gov/?q=arpa-e-programs/monitor>

ARPA-E has funded MONITOR project teams from April 2015 through April 2018. During this time, ARPA-E plans to provide financial support to Project Teams to validate technology performance under realistic conditions at the MONITOR Field Test Site. This field testing will provide a means to assess how the sensors and sensor systems perform in a realistic operating environment.

Pursuant to the program metrics established in the MONITOR Funding Opportunity Announcement (FOA), funded teams must be able to demonstrate their technologies at the MONITOR Field Test Site, as described below. Note that although the program metrics are structured around production wellpads, it is expected that the sensing technologies developed through MONITOR will have applications in all segments of the industry, including midstream and local distribution; as such, the test site should be able to accommodate technologies that could be deployed in various applications.

MONITOR Awardees are required to participate in two rounds of rigorous field testing:

- **Round 1 Field Testing** will be the first test in an outdoor environment. This will provide the initial opportunity to evaluate all of the sensing technologies in a side-by-side comparison under favorable, but realistic testing conditions. This round of testing will also provide an opportunity for the teams to demonstrate enhanced functionality of the sensors and systems.
- **Round 2 Field Testing** will be the final opportunity for teams to demonstrate that they have met the FOA goals and enhanced capability targets. The test conditions will be more challenging than for Round 1 Field Testing, with increased complexity on the site (e.g. more separators or other obstacles that disrupt the flow and varying emissions rates).

In addition, MONITOR Awardees may schedule ad hoc, voluntary tests beginning in the second year of the program. These ad hoc tests, scheduled individually with the MONITOR Field Test Site Awardee, will allow project teams to validate their technologies' performance outside of both the laboratory and program-mandated field tests. The general timeline below provides an anticipated schedule for field testing:

	2016						2017						2018																
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Site prep	█						█						█																
Ad-hoc	█						█						█																
Round 1	█						█						█																
Round 2	█						█						█																
Reporting	█						█						█																

Exclusive use of the testing site and its facilities by the MONITOR awardees is required during the two mandated field testing periods. Use of the site and its facilities is required on a non-interference basis at all other times during the anticipated Cooperative Agreement's period of performance.

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C. PROGRAM OBJECTIVES

ARPA-E is initiating the MONITOR Field Test Site program which will support the development of a simulated, but realistic natural gas test site for use by MONITOR Awardees. The test site will enable the evaluation of MONITOR methane sensors and detection systems under realistic use-case scenarios. Further, the data generated during the field tests will demonstrate the performance capabilities of the technologies and could be used by the MONITOR Awardees to accelerate the commercialization of their technologies.

Under the MONITOR Field Test Site program Awardee(s) will not develop new technologies, but rather will operate a field test site, including any needed design and construction. ARPA-E will determine which MONITOR technologies are tested at the Applicant's facility. Applicants should not propose specific technology vendors as partners in this program. Awardee will provide independent, unbiased data gathering, analysis and test services in this program. Awardee must also commit to, and the award will require, maintaining strict confidentiality regarding the technical details of the systems being tested and the results that are generated. Test data to be generated about individual MONITOR systems will only be provided to the specific MONITOR Awardee whose system is being tested and to ARPA-E. Awardee will not obtain rights or other intellectual property rights in testing results.

The Awardee in the MONITOR Field Test Site program will provide the following:

- Site design
 - The test site must be able to provide evaluation of MONITOR technologies on a simulated 10m x 10m wellpad, according the MONITOR FOA metrics.
 - It is additionally required that the Awardee providing testing for a larger, more realistic sized wellpad, such as a 20 m x 40 m space. Ideally, multiple test pads would be located in close proximity to facilitate rapid testing of multiple MONITOR technologies.
 - The test site must reflect a realistic and representative natural gas wellpad, including equipment (or representative equipment) such as wellheads, separators, storage tanks, vapor recovery units, compressor stations etc.
 - The test site must accommodate the types of leak detection technologies included in the MONITOR program. For instance, the site must be able to accommodate tests using handheld devices, fixed devices, and devices mounted to unmanned aircraft systems (UAS).
 - The site must be capable of performing controlled emissions releases that are representative of a range of possible wellpad leaks. Additional capabilities, such as simulating gathering pipelines, for example, would be beneficial but not required. To achieve this, it is expected that there will be a variety of leak locations (including height), time series flow rates, and gas mixture compositions. First, the leak locations must be chosen such that they represent realistic possibilities from which a common leak may emanate, such as from a

pneumatic valve or thief hatch. Applicants must have the ability to provide controlled leaks from close proximity to wellpad equipment, which will impact the turbulence and complexity of the dispersion of the methane gas plume. This is important because the MONITOR systems typically incorporate inverse dispersion models to locate leaks within 1 meter and quantify mass flow rates, as specified in the MONITOR FOA. Second, the flow rates and frequency of the simulated leaks must be representative of a range of types of leaks, such as from a pneumatic valve or a liquid unloading. Note that certain leaks are purposeful vents and occur with regularity on a wellpad, such as intermittent bleeding from pneumatic valves, while others are unwanted and unplanned events, such as leaving a thief hatch open. The test cases must be designed to simulate both purposeful vents and unplanned leaks. Third, the simulated leak test matrix must include a variety of gas mixtures to cover the range of chemicals that are common to natural gas production. For instance, Round 1 testing must include leaks that are pure methane and others that are a mixture of methane and ethane. In addition, some of the gas mixtures should include hydrogen sulfide, which is commonly produced with natural gas and could cause optical or chemical interference during the hydrocarbon measurements. Round 2 testing must include the same test matrix as in Round 1, but should also incorporate higher order hydrocarbons, such as propane and butane. This will help evaluate the enhanced capabilities of MONITOR technologies, as described in the MONITOR FOA.

- The site must be capable of initiating releases off of the wellpad that would potentially travel onto the wellpad; this is a common occurrence at production sites and will assess the ability of the MONITOR technology to discriminate between background methane levels, adjacent leaks, and leaks originating from the test site.
- Site operation and management
 - The Awardee will establish detailed test procedures and criteria based on the goals of the MONITOR program; if not currently available at the test site, design and construct a site with the necessary equipment to conduct controlled emissions releases; operate the test site safely and securely; accurately capture and record site data (validating measurements and MONITOR technology performance); and analyze and disseminate data and findings to ARPA-E and the relevant MONITOR Awardee.
 - The Awardee must be able to operate the site to meet the Round 1 and Round 2 Field Testing goals and timeline, as described in Section I.B. above. Round 1 will be the first test in an outdoor environment and will enable evaluation of the technologies under favorable, but realistic testing conditions. It will also provide an opportunity for the teams to demonstrate enhanced functionality capabilities, such as speciation of methane vs. ethane and continuous measurement. Round 2 will be the final opportunity for teams to demonstrate

that they have met the MONITOR FOA goals and enhanced capability targets. The test conditions will be more challenging, with increased complexity on the site (e.g. more separators or other obstacles that disrupt the flow) and varying emissions rates.

- Site location – The field test site should be reasonably accessible. MONITOR Awardees are located across the United States, and will need to fly in to use the site. The site also must be able to accommodate lawful use of unmanned aerial systems (UAS). Specifically, the field operator must provide a site that does not intrinsically limit the use of UAS (i.e. location in close proximity to a restricted and/or controlled air space), but the MONITOR Awardee teams will be responsible for the requisite authorizations to operate UASs.

D. PROJECT STRUCTURE

Tasks and Deliverables: The following table outlines key tasks and deliverables that ARPA-E anticipates will be completed during the duration of the project. Applicants may propose additional deliverables and/or a revised timeline, provided that the revisions are adequately explained and justified.

	Tasks	Deliverables
Preparation for Round 1 and ad hoc testing	<ul style="list-style-type: none"> • Identify existing test site, or an appropriate plot of land for the test site, ensuring that it can meet the Program Objectives in Section I.B. of the FOA. • If necessary and after ARPA-E approval, acquire land needed for the test site. • If necessary, create a custom design for the test site that will meet Round 1 and ad hoc testing objectives. • Define test matrix. • Define test protocols. • Develop plan to provide ad hoc testing for MONITOR Awardees. • If necessary, build test site. • Conduct Round 1 testing. • Share performance data with ARPA-E and applicable MONITOR Awardees. 	<ul style="list-style-type: none"> • Details of the potential plot of land for the test site, including a description of how it will enable all program objectives to be met (e.g. UAV testing). • Design and specifications for the test site, including BOM and engineering drawings. • Test matrix, including a table of leak location, time series flow rate, gas mixture composition, and any other significant test variables identified by the Applicants. • Test protocols, including start-up/shut-down procedure and timing and order of the test cases, and procedure for sharing performance data with ARPA-E and MONITOR Awardees. Testing protocols should have sufficient documentation to enable ARPA-E MONITOR Awardees to

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

		<p>use the document to prepare for the evaluation.</p> <ul style="list-style-type: none"> • Document describing a plan to provide ad hoc testing for MONITOR Awardees. • Test site ready/built and evaluated by ARPA-E. • Round 1 testing for all MONITOR Awardees completed. • Performance data delivered to ARPA-E and to the MONITOR team whose system was tested.
<p>Preparation for Round 2 and ad hoc testing</p>	<ul style="list-style-type: none"> • Design any hardware modifications that are needed to provide Round 2 testing. • Incorporate the test site modifications that are required for Round 2 testing. • Define test matrix. • Define test protocols. • Develop plan to provide ad hoc testing for MONITOR Awardees • Conduct Round 2 testing. • Share performance data with ARPA-E and applicable MONITOR Awardees. 	<ul style="list-style-type: none"> • Deliver modified designs and parts list to provide Round 2 testing. • Test site modifications implemented and evaluated by ARPA-E. • Test matrix, including a table of leak location, time series flow rate, gas mixture composition, and any other significant test variables identified by the Applicants. • Test protocols, including start-up/shut-down procedure and timing/order of the test cases, with sufficient documentation to enable use of the protocol by ARPA-E MONITOR Awardees to help them prepare for the evaluation. • Document describing a plan to provide ad hoc testing for MONITOR Awardees. • Round 2 testing for all MONITOR Awardees completed. • Performance data delivered to ARPA-E and to the MONITOR team whose system was tested.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

II. AWARD INFORMATION

A. AWARD OVERVIEW

ARPA-E expects to make approximately \$3 to 5 million available for a new award under this FOA, subject to the availability of appropriated funds. ARPA-E anticipates making one award under this FOA. ARPA-E may, at its discretion, issue no award.

The period of performance for the anticipated funding agreement may not exceed 30 months. ARPA-E expects the start date for funding agreement to be August 2016, or as negotiated.

B. ARPA-E FUNDING AGREEMENTS

ARPA-E generally uses Cooperative Agreements to provide financial and other support to Awardees

Cooperative Agreements involve the provision of financial or other support to accomplish a public purpose of support or stimulation authorized by Federal statute. Under Cooperative Agreements, the Government and Prime Recipients share responsibility for the direction of projects.

ARPA-E encourages Prime Recipients to review the Model Cooperative Agreement, which is available at <http://arpa-e.energy.gov/arpa-e-site-page/award-guidance>.

Any Federally Funded Research and Development Centers (FFRDC) involved as a member of a Project Team must provide the information requested in the “FFRDC Authorization” and “Field Work Proposal” sections of the Business Assurances & Disclosures Form, which is submitted with the Applicant’s Full Application.

When a FFRDC/DOE Lab (including the National Energy Technology Laboratory or NETL) is the *lead organization* for a Project Team, ARPA-E executes a funding agreement directly with the FFRDC/DOE Lab and a single, separate Cooperative Agreement with the rest of the Project Team. Notwithstanding the use of multiple agreements, the FFRDC/DOE Lab is the lead organization for the entire project, including all work performed by the FFRDC/DOE Lab and the rest of the Project Team.

When a FFRDC/DOE Lab is a *member* of a Project Team, ARPA-E executes a funding agreement directly with the FFRDC/DOE Lab and a single, separate Cooperative Agreement with the rest of the Project Team. Notwithstanding the use of multiple agreements, the Prime Recipient under the Cooperative Agreement is the lead organization for the entire project, including all work performed by the FFRDC/DOE Lab and the rest of the Project Team.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

Funding agreements with DOE/NNSA FFRDCs take the form of Work Authorizations issued to DOE/NNSA FFRDCs through the DOE/NNSA Field Work Proposal system for work performed under Department of Energy Management & Operation Contracts. Funding agreements with non-DOE/NNSA FFRDCs, GOGOs (including NETL), and Federal instrumentalities (e.g., Tennessee Valley Authority) will be consistent with the sponsoring agreement between the U.S. Government and the Laboratory. Any funding agreement with a FFRDC or GOGO will have similar terms and conditions as ARPA-E's Model Cooperative Agreement (<http://arpa-e.energy.gov/arpa-e-site-page/award-guidance>).

Non-DOE GOGOs and Federal agencies may be proposed to provide support to the project team members on an Applicant's project, through a Cooperative Research and Development Agreement (CRADA) or similar agreement.

C. STATEMENT OF SUBSTANTIAL INVOLVEMENT

ARPA-E is substantially involved in the direction of cooperative agreements from inception to completion. For the purposes of an ARPA-E project, substantial involvement means:

- Project Teams must adhere to ARPA-E's agency-specific and programmatic requirements.
- ARPA-E may intervene at any time in the conduct or performance of work under an award.
- ARPA-E does not limit its involvement to the administrative requirements of an award. Instead, ARPA-E has substantial involvement in the direction and redirection of the technical aspects of the project as a whole.
- During award negotiations, ARPA-E Program Directors and Prime Recipients mutually establish an aggressive schedule of quantitative milestones and deliverables that must be met every quarter. In addition, ARPA-E will negotiate and establish "Go/No-Go" milestones for each project. If the Prime Recipient fails to achieve any of the "Go/No-Go" milestones or technical milestones and deliverables, ARPA-E may – at its discretion - renegotiate the statement of project objectives or schedule of technical milestones and deliverables for the project. In the alternative, ARPA-E may suspend or terminate the award.
- ARPA-E may provide guidance and/or assistance to the Prime Recipient to accelerate the commercial deployment of ARPA-E-funded technologies. Guidance and assistance provided by ARPA-E may include coordination with other Government agencies and nonprofits to provide mentoring and networking opportunities for Prime Recipients. ARPA-E may also organize and sponsor events to educate Prime Recipients about key barriers to the deployment of their ARPA-E-funded technologies. In addition, ARPA-E may establish collaborations with private and public entities to provide continued support for the development and deployment of ARPA-E-funded technologies.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

III. ELIGIBILITY INFORMATION

A. ELIGIBLE APPLICANTS

1. INDIVIDUALS

U.S. citizens or permanent residents may apply for funding in their individual capacity as a Standalone Applicant,⁴ as the lead for a Project Team,⁵ or as a member of a Project Team. However, ARPA-E will only award funding to an entity formed by the Applicant.

2. DOMESTIC ENTITIES

For-profit entities, educational institutions, and nonprofits⁶ that are incorporated in the United States, including U.S. territories, are eligible to apply for funding as a Standalone Applicant, as the lead organization for a Project Team, or as a member of a Project Team.

FFRDCs/DOE Labs are eligible to apply for funding as the lead organization for a Project Team or as a member of a Project Team that includes institutions of higher education, companies, research foundations, or trade and industry research collaborations, but not as a Standalone Applicant.

State, local, and tribal government entities are eligible to apply for funding as a member of a Project Team, but not as a Standalone Applicant or as the lead organization for a Project Team.

Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a member of a Project Team, but not as a Standalone Applicant or as the lead organization for a Project Team.

FFRDCs/DOE Labs and GOGOs of any federal agency can apply for funding as a lead or team member, as provided above, if they can provide confidentiality to the test data to be generated.

3. FOREIGN ENTITIES

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding as Standalone Applicants, as the lead organization for a Project Team, or as a member of a Project Team. All

⁴ A Standalone Applicant is an Applicant that applies for funding on its own, not as part of a Project Team.

⁵ The term "Project Team" is used to mean any entity with multiple players working collaboratively and could encompass anything from an existing organization to an ad hoc teaming arrangement. A Project Team consists of the Prime Recipient, Subrecipients, and others performing or otherwise supporting work under an ARPA-E funding agreement.

⁶ Nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995 are not eligible to apply for funding as a Prime Recipient or Subrecipient.

work by foreign entities must be performed by subsidiaries or affiliates incorporated in the United States (including U.S. territories). The Applicant may request a waiver of this requirement in the Business Assurances & Disclosures Form, which is submitted with the Full Application. Please refer to the Business Assurances & Disclosures Form for guidance on the content and form of the request.

4. CONSORTIUM ENTITIES

Consortia, which may include domestic and foreign entities, must designate one member of the consortium as the consortium representative to the Project Team. The consortium representative must be incorporated in the United States. The eligibility of the consortium will be determined by reference to the eligibility of the consortium representative under Section III.A of the FOA. Each consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium entity must provide a written description of its internal governance structure and its internal rules to the Contracting Officer (ARPA-E-CO@hq.doe.gov).

Unincorporated consortia must provide the Contracting Officer with a collaboration agreement, commonly referred to as the articles of collaboration, which sets out the rights and responsibilities of each consortium member. This agreement binds the individual consortium members together and should discuss, among other things, the consortium's:

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

B. COST SHARING⁷

Applicants are bound by the cost share proposed in their Full Applications.

⁷ Please refer to Section VI.B.3-4 of the FOA for guidance on cost share payments and reporting.

1. BASE COST SHARE REQUIREMENT

ARPA-E generally uses Cooperative Agreements to provide financial and other support to Prime Recipients (see Section II.B.1 of the FOA). Under a Cooperative Agreement or Grant, the Prime Recipient must provide at least 20% of the Total Project Cost⁸ as cost share, except as provided in Sections III.B.2 or III.B.3 below.⁹

2. INCREASED COST SHARE REQUIREMENT

Large businesses are strongly encouraged to provide more than 20% of the Total Project Cost as cost share. ARPA-E may consider the amount of cost share proposed when selecting applications for award negotiations (see Section V.B.1 of the FOA).

3. REDUCED COST SHARE REQUIREMENT

ARPA-E has reduced the minimum cost share requirement for the following types of projects:

- A domestic educational institution or domestic nonprofit applying as a Standalone Applicant is required to provide at least 5% of the Total Project Cost as cost share.
- Small businesses – or consortia of small businesses - will provide 0% cost share from the outset of the project through the first 12 months of the project (hereinafter the “Cost Share Grace Period”).¹⁰ If the project is continued beyond the Cost Share Grace Period, then at least 10% of the Total Project Cost (including the costs incurred during the Cost Share Grace Period) will be required as cost share over the remaining period of performance.
- Project Teams where a small business is the lead organization and small businesses perform greater than or equal to 80%, but less than 100%, of the total work under the funding agreement (as measured by the Total Project Cost) the Project Team is entitled to the same cost share reduction and Cost Share Grace Period as provided above to Standalone small businesses or consortia of small businesses.¹¹

⁸ The Total Project Cost is the sum of the Prime Recipient share and the Federal Government share of total allowable costs. The Federal Government share generally includes costs incurred by GOGOs and FFRDCs.

⁹ Energy Policy Act of 2005, Pub.L. 109-58, sec. 988.

¹⁰ Small businesses are generally defined as domestically incorporated entities that meet the criteria established by the U.S. Small Business Administration’s (SBA) “Table of Small Business Size Standards Matched to North American Industry Classification System Codes” (NAICS) (<http://www.sba.gov/content/small-business-size-standards>). Applicants that are small businesses will be required to certify in the Business Assurances & Disclosures Form that their organization meets the SBA’s definition of a small business under at least one NAICS code.

¹¹ See the information provided in previous footnote.

- Project Teams composed exclusively of domestic educational institutions, domestic nonprofits, and/or FFRDCs/DOE Labs are required to provide at least 5% of the Total Project Cost as cost share.
- Project Teams where domestic educational institutions, domestic nonprofits, small businesses, and/or FFRDCs/DOE Labs perform greater than or equal to 80%, of the total work under the funding agreement (as measured by the Total Project Cost) are required to provide at least 10% of the Total Project Cost as cost share. However, any entity (such as a large business) receiving patent rights under a class waiver, or other patent waiver, that is part of a Project Team receiving this reduction must continue to meet the statutory minimum cost share requirement (20%) for its portion of the Total Project Cost.
- Projects that do not meet any of the above criteria are subject to the minimum cost share requirements described in Sections III.B.1 and III.B.2 of the FOA.

4. LEGAL RESPONSIBILITY

Although the cost share requirement applies to the Project Team as a whole, the funding agreement makes the Prime Recipient legally responsible for paying the entire cost share. The Prime Recipient's cost share obligation is expressed in the funding agreement as a static amount in U.S. dollars (cost share amount) and as a percentage of the Total Project Cost (cost share percentage). If the funding agreement is terminated prior to the end of the period of performance, the Prime Recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The Prime Recipient is solely responsible for managing cost share contributions by the Project Team and enforcing cost share obligations assumed by Project Team members in subawards or related agreements.

5. COST SHARE ALLOCATION

Each Project Team is free to determine how much each Project Team member will contribute towards the cost share requirement. The amount contributed by individual Project Team members may vary, as long as the cost share requirement for the project as a whole is met.

6. COST SHARE TYPES AND ALLOWABILITY

Every cost share contribution must be allowable under the applicable Federal cost principles, as described in Section IV.F.1 of the FOA.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind

contributions include but are not limited to personnel costs, indirect costs, facilities and administrative costs, rental value of buildings or equipment, and the value of a service, other resource, or third party in-kind contribution. Project Teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding or property was not provided to the state or local government by the Federal Government.

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

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

In addition, Project Teams may not use independent research and development (IR&D) funds¹² to meet their cost share obligations under cooperative agreements.

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

Cost share contributions must be specified in the project budget, verifiable from the Prime Recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants may wish to refer to 2 C.F.R. Parts 200 and 910, and 10 C.F.R Part 603 for additional guidance on cost sharing, specifically 2 C.F.R. §§ 200.306 and 910.130, and 10 C.F.R. §§ 603.525-555.

7. COST SHARE CONTRIBUTIONS BY FFRDCs AND GOGOS

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

¹² As defined in Federal Acquisition Regulation Subsection 31.205-18.

Because GOGOs/Federal Agencies are funded by the Federal Government, GOGOs/Federal Agencies may not provide cost share for the proposed project. However, the GOGO/Agency costs would be included in Total Project Costs for purposes of calculating the cost-sharing requirements of the Applicant.

8. COST SHARE VERIFICATION

Upon selection for award negotiations, Applicants are required to provide information and documentation regarding their cost share contributions. Please refer to Section VI.B.3 of the FOA for guidance on the requisite cost share information and documentation.

C. OTHER

1. COMPLIANT CRITERIA

Full Applications are deemed compliant if:

- The Applicant meets the eligibility requirements in Section III.A of the FOA;
- The Full Application complies with the content and form requirements in Section IV.C of the FOA; and
- The Applicant entered all required information, successfully uploaded all required documents, and clicked the “Submit” button in ARPA-E eXCHANGE by the deadline stated in the FOA.

ARPA-E will not review or consider noncompliant Full Applications, including Full Applications submitted through other means, Full Applications submitted after the applicable deadline, and incomplete Full Applications. A Full Application is incomplete if it does not include required information and documents, such as Forms SF-424 and SF-424A. ARPA-E will not extend the submission deadline for Applicants that fail to submit required information and documents due to server/connection congestion.

Replies to Reviewer Comments are deemed compliant if:

- The Applicant successfully uploaded all required documents to ARPA-E eXCHANGE by the deadline stated in the FOA.

ARPA-E will not review or consider noncompliant Replies to Reviewer Comments, including Replies submitted through other means and Replies submitted after the applicable deadline. ARPA-E will not extend the submission deadline for Applicants that fail to submit required information due to server/connection congestion. ARPA-E will review and consider each

compliant and responsive Full Application, even if no Reply is submitted or if the Reply is found to be noncompliant.

2. RESPONSIVENESS CRITERIA

ARPA-E performs a preliminary technical review of Full Applications.

The following types of submissions will be deemed nonresponsive and will not be reviewed or considered:

- Applications that fall outside the Program Objectives specified in Section I.C of the FOA.
- Applications that describe a field test site but do not propose a sound plan that allows ARPA-E to evaluate the submission and determine if it will meet the Program Objectives provided in Section I.C of the FOA.

3. LIMITATION ON NUMBER OF APPLICATIONS

ARPA-E is not limiting the number of applications that may be submitted by Applicants.

IV. APPLICATION AND SUBMISSION INFORMATION

A. APPLICATION PROCESS OVERVIEW

1. REGISTRATION IN ARPA-E eXCHANGE

The first step in applying to this FOA is registration in ARPA-E eXCHANGE, ARPA-E's online application portal. For detailed guidance on using ARPA-E eXCHANGE, please refer to Section IV.G.1 of the FOA and the "ARPA-E eXCHANGE User Guide" (<https://arpa-e-foa.energy.gov/Manuals.aspx>).

2. FULL APPLICATIONS

Applicants must submit a Full Application by the deadline stated in the FOA. Section IV.C of the FOA provides instructions on submitting a Full Application.

ARPA-E performs a preliminary review of Full Applications to determine whether they are compliant and responsive, as described in Section III.C of the FOA. ARPA-E reviews only compliant and responsive Full Applications.

3. REPLY TO REVIEWER COMMENTS

Once ARPA-E has completed its review of Full Applications, reviewer comments on compliant and responsive Full Applications are made available to Applicants via ARPA-E eXCHANGE.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

Applicants may submit an optional Reply to Reviewer Comments, which must be submitted by the deadline stated in the FOA. Section IV.D of the FOA provides instructions on submitting a Reply to Reviewer Comments.

ARPA-E performs a preliminary review of Replies to determine whether they are compliant, as described in Section III.C.1 of the FOA. ARPA-E will review and consider compliant Replies only. ARPA-E will review and consider each compliant and responsive Full Application, even if no Reply is submitted or if the Reply is found to be non-compliant.

4. PRE-SELECTION CLARIFICATIONS AND “DOWN-SELECT” PROCESS

Once ARPA-E completes its review of Full Applications and Replies to Reviewer Comments, it may, at the Contracting Officer’s discretion, conduct a pre-selection clarification process and/or perform a “down-select” of Full Applications. Through the pre-selection clarification process or down-select process, ARPA-E may obtain additional information from select Applicants through pre-selection meetings, webinars, videoconferences, conference calls, written correspondence, or site visits that can be used to make a final selection determination. ARPA-E will not reimburse Applicants for travel and other expenses relating to pre-selection meetings and site visits, nor will these costs be eligible for reimbursement as pre-award costs.

ARPA-E may select applications for funding and make awards without pre-selection meetings and site visits. Participation in a pre-selection meeting or site visit with ARPA-E does not signify that Applicants have been selected for award negotiations.

5. SELECTION FOR AWARD NEGOTIATIONS

ARPA-E carefully considers all of the information obtained through the application process and makes an independent assessment of each compliant and responsive Full Application based on the criteria and program policy factors in Sections V.A.1 and V.B.1 of the FOA. The Selection Official may select all or part of a Full Application for award negotiations. ARPA-E will enter into award negotiations only with the selected Applicant.

Applicants are promptly notified of ARPA-E’s selection determination.

B. APPLICATION FORMS

Required forms for Full Applications are available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>), including the SF-424 and Budget Justification Workbook/SF-424A. Applicants may use the templates available on ARPA-E eXCHANGE, including the template for the Technical Volume of the Full Application, the template for the Summary Slide, the template for the Summary for Public Release, the template for the Reply to Reviewer Comments, and the template for the Business Assurances & Disclosures Form. A sample response to the Business Assurances & Disclosures Form and a sample Summary Slide are also available on ARPA-E eXCHANGE.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

C. CONTENT AND FORM OF FULL APPLICATIONS

Full Applications must conform to the following formatting requirements:

- Each document must be submitted in the file format prescribed below.
- The Full Application must be written in English.
- All pages must be formatted to fit on 8-1/2 by 11 inch paper with margins not less than one inch on every side. Single space all text and use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures and tables).
- The ARPA-E assigned Control Number, the Lead Organization Name, and the Principal Investigator’s Last Name must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.

ARPA-E will not review or consider noncompliant and/or nonresponsive Full Applications (see Section III.C of the FOA).

Fillable Full Application template documents are available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>.

Full Applications must conform to the content requirements described below.

Component	Required Format	Description and Information
Technical Volume	PDF	The centerpiece of the Full Application. Provides a detailed description of the proposed project and Project Team. A Technical Volume template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).
SF-424	PDF	Application for Federal Assistance (https://arpa-e-foa.energy.gov). Applicants are responsible for ensuring that the proposed costs listed in eXCHANGE match those listed on forms SF-424 and SF-424A. Inconsistent submissions may impact ARPA-E’s final award determination.
Budget Justification Workbook/SF-424A	XLS	Budget Information – Non-Construction Programs (https://arpa-e-foa.energy.gov)
Summary for Public Release	PDF	Short summary of the proposed project. Intended for public release. A Summary for Public Release template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

Summary Slide	PPT	A four-panel project slide summarizing different aspects of the proposed project. A Summary Slide template is available on ARPA-E eXCHANGE (https://arpa-e-foa.energy.gov).
Business Assurances & Disclosures Form	PDF	Requires the Applicant to make responsibility disclosures and disclose potential conflicts of interest within the Project Team. Requires the Applicant to describe the additionality and risks associated with the proposed project, disclose applications for funding currently pending with Federal and non-Federal entities, and disclose funding from Federal and non-Federal entities for work in the same technology area as the proposed project. If the Applicant is a FFRDC, requires the Applicant to provide written authorization from the cognizant Federal agency and, if a DOE/NNSA FFRDC, a Field Work Proposal. Allows the Applicant to request a waiver or modification of the Performance of Work in the United States requirement. A Business Assurances & Disclosures Form template is available on ARPA-E eXCHANGE at https://arpa-e-foa.energy.gov . A sample response to the Business Assurances & Disclosures Form is also available on ARPA-E eXCHANGE.

ARPA-E provides detailed guidance on the content and form of each component below.

1. FIRST COMPONENT: TECHNICAL VOLUME

The Technical Volume must be submitted in Adobe PDF format. A Technical Volume template is available at <https://arpa-e-foa.energy.gov>. The Technical Volume must conform to the following content and form requirements, including maximum page lengths specified below. If Applicants exceed the maximum page lengths specified for each section indicated below, ARPA-E will review only the authorized number of pages and disregard any additional pages.

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. ARPA-E and reviewers may review primary research literature in order to evaluate applications. However, ARPA-E and reviewers are under no obligation to review cited sources (e.g., Internet websites).

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

PAGE LIMIT	SECTION	DESCRIPTION
1 page max.	EXECUTIVE SUMMARY	<p>Summarize the objective(s) and technical approach of the proposed effort at a technical level appropriate for scientific and engineering peers.</p> <p>INSTRUCTIONS:</p> <ol style="list-style-type: none"> (1) The Project Title should be brief and descriptive of the proposed test site. (2) Enter the estimated Total Project Cost in U.S. dollars and percentage cost share in parentheses. (3) Enter the Project Duration in months. (4) The Executive Summary shall not exceed 1 page in length (5) The Executive Summary may contain graphics, figures, or tables as needed to summarize the proposed test site.
Sections 1-4 25 pages max.	Section 1 TEAM CAPABILITIES	<p>Describe your team’s capabilities, experience, and assets (i.e., equipment and property) relevant to support operation of a multi-user field test site – including, if necessary, design, construction and commissioning of a new test site, or alteration of and existing test site - of the MONITOR field test site.</p> <p>1.1 Team Capabilities and Experience</p> <ul style="list-style-type: none"> • Describe the team members, their anticipated roles in the project, and their relevant experience. • Explain the objective(s) and performance characteristics of the proposed effort. <p>1.2 Assets</p> <ul style="list-style-type: none"> • Describe equipment and property that the team has access to – either through direct ownership, or potential partnerships and relationships. <p>INSTRUCTIONS:</p> <ol style="list-style-type: none"> (1) The Team Capabilities may include figures, tables, and graphics. (2) The suggested length of the Team Capabilities Section is 5 pages.
	Section 2 TECHNICAL APPROACH	<p>Describe your overarching technical approach to support operation of a multi-user field test site – including, if necessary, design, construction and commissioning of a new test site, or alteration of and existing test site that can test MONITOR-funded technologies under real-world conditions. This should include the ability to test against the program goals.</p> <p>2.1 Approach.</p> <ul style="list-style-type: none"> • Describe the overall technical approach, and discuss key design criteria given the range of technologies in the MONITOR portfolio— i.e. point sensors, open path sensors, long path sensors, UAVs, etc. • Describe key aspects and any risks for constructing the test site.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

		<ul style="list-style-type: none"> Describe your approach to site commissioning including functional/shake down testing, calibration, and personnel training. Describe your approach to operating the test site. Identify critical expanded test criteria (beyond the scope of the MONITOR program goals) and describe your approach to evaluating these criteria. Provide a description of how site data acquisition, storage, and analysis will be managed, and how data on team results will be managed. The description should include protocols and procedures for maintaining data confidentiality. FFRDCs/DOE Labs and GOGOs of any federal agency must provide assurance they can provide confidentiality to the test data to be generated. <p>INSTRUCTIONS:</p> <p>(1) The Technical Approach Section may include figures, tables, and graphics.</p> <p>(2) The suggested length of the Technical Approach Section is 10 pages.</p>														
	<p>Section 3 TEST SITE</p>	<p>Describe and discuss the proposed test site.</p> <p>3.1 Notional Test Site</p> <ul style="list-style-type: none"> Include a diagram of a notional test site. Describe the factors, considerations, and reasoning for your proposed design. <p>3.2 Geographic Location</p> <ul style="list-style-type: none"> Propose a geographic location for field testing. Discuss any access or ownership issues pertaining to the site and/or assets. Discuss any advantages or constraints of this location with respect to the variety of locations in which MONITOR-funded technologies may be deployed. Specify the proximity of any nearby commercial airports. Include a map of the location and nearby commercial airports. <p>INSTRUCTIONS:</p> <p>(1) This Section may include figures, tables, and graphics.</p> <p>(2) The suggested length of the Test Site Section is 5 pages.</p>														
	<p>Section 4 BUDGET</p>	<p>Indicate the budget, in US dollars, and provide a high-level budget summary, demonstrating that the budget is reasonable and appropriate for the proposed effort.</p> <p>4.1 Budget Breakdown.</p> <p>Provide in tabular form following the template give below, a breakdown of the project budget by entity and major task in US dollars.</p> <table border="1" data-bbox="573 1791 1448 1885"> <thead> <tr> <th>Task Name</th> <th>[Prime]</th> <th>[Sub #1]</th> <th>[Sub #2]</th> <th>[Sub #3]</th> <th>[Sub #4]</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>[Task #1]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Task Name	[Prime]	[Sub #1]	[Sub #2]	[Sub #3]	[Sub #4]	Total	[Task #1]						
Task Name	[Prime]	[Sub #1]	[Sub #2]	[Sub #3]	[Sub #4]	Total										
[Task #1]																

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

		<table border="1"> <tr> <td>[Task #2]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>[Task #3]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>[Task #4]</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Replace “Prime” with name of the primary (lead) entity and “Sub #n” with the name of the sub-recipient or sub-contractor entities, if applicable. Task names should clearly correspond to major tasks anticipated by the team to design, construct and operate the test site. Expand or contract the table as needed to add/subtract entities (columns) or tasks (rows).</p> <p>4.2 Budget Summary. Provide a high-level summary for the project by major budget category, including at least these three:</p> <ul style="list-style-type: none"> • Key Personnel and technical staff to be utilized (e.g., scientists, engineers, technicians, postdocs, graduate students, etc.) • Equipment • Materials and Supplies <p>4.3 Cost Share. Provide a description of the cost share by value of the contribution (in dollars) and percentage of the Total Project Cost (TPC):</p> <ul style="list-style-type: none"> • List each source of cost share, the type of contribution (cash or in-kind), the value of the contribution (in dollars), and the value as a percentage of TPC. • For all in-kind contributions, provide a detailed description of the contribution and its relevance to the project objectives <p>INSTRUCTIONS:</p> <p>(1) The Budget Section may include figures, tables, and graphics. (2) The suggested length of the Budget Section is 5 pages.</p>	[Task #2]							[Task #3]							[Task #4]							Total						
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No page limit	REFERENCES	<p>Provide a list of references appropriate to Sections 1-4.</p> <p>INSTRUCTIONS:</p> <p>(1) Only bibliographic information may be contained in the references. No additional text or commentary is allowed. (2) There is no page limit for the Bibliographic References Section, which is outside of the overall 25-page limit for Sections 1-4.</p>																												
Each PQS limited to 3 pages in length, no cumulative page limit	PERSONAL QUALIFICATION SUMMARIES	<p>A Personal Qualification Summary (PQS) is required for the PI and all other Key Personnel. Each PQS must include a description of the following only:</p> <ul style="list-style-type: none"> • Education and training • Employment history • Awards and honors 																												

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

		<ul style="list-style-type: none">• A list of no more than 10 peer-reviewed publications related to the proposed project• A list of no more than 10 other peer-reviewed publications demonstrating capabilities in the broad field• A list of no more than 10 non-peer-reviewed publications and patents demonstrating capabilities in the broad field <p>INSTRUCTIONS:</p> <p>(1) Each Personal Qualification Summary is limited to 3 pages in length and there is no page limit for this Section, which is outside of the 25-page limit for Sections 1-4.</p> <p>(2) Curriculum Vitae should not be submitted.</p>
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2. SECOND COMPONENT: SF-424

The signed SF-424 must be submitted in Adobe PDF format. This form is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>.

The SF-424 includes instructions for completing the form. Applicants are required to complete all required fields in accordance with the instructions.

Prime Recipients and Subrecipients are required to complete SF-LLL (Disclosure of Lobbying Activities), available at <http://www.whitehouse.gov/sites/default/files/omb/grants/sflllin.pdf>, if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with your application or funding agreement. The completed SF-LLL must be appended to the SF-424.

ARPA-E provides the following supplemental guidance on completing the SF-424:

- Each Project Team should submit only one SF-424 (i.e., a Subrecipient should not submit a separate SF-424).
- Assume a project start date of August 2016, or as negotiated.
- The list of certifications and assurances in Block 21 can be found at <http://energy.gov/management/downloads/certifications-and-assurances-use-sf-424>.
- The dates and dollar amounts on the SF-424 are for the entire period of performance (from the project start date to the project end date), not a portion thereof.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

- Applicants are responsible for ensuring that the proposed costs listed in eXCHANGE match those listed on forms SF-424 and SF-424A. Inconsistent submissions may impact ARPA-E's final award determination.

3. THIRD COMPONENT: BUDGET JUSTIFICATION WORKBOOK/SF-424A

Applicants are required to complete the Budget Justification Workbook/SF-424A Excel spreadsheet. This form is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>. Prime Recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the Prime Recipient and its Subrecipients and Contractors. The SF-424A form included with the Budget Justification Workbook will "auto-populate" as the Applicant enters information into the Workbook. Applicants should carefully read the "Instructions and Summary" tab provided within the Budget Justification Workbook.

Subrecipient information must be submitted as follows:

- Each Subrecipient incurring greater than or equal to 10% of the Total Project Cost must complete a separate Budget Justification workbook to justify its proposed budget. These worksheets must be inserted as additional sheets within in the Prime Recipient's Budget Justification.
- Subrecipients incurring less than 10% of the Total Project Cost are not required to complete a separate Budget Justification workbook. However, such Subrecipients are required to provide supporting documentation to justify their proposed budgets. At a minimum, the supporting documentation must show which tasks/subtasks are being performed, the purpose/need for the effort, and a sufficient basis for the estimated costs.

ARPA-E provides the following supplemental guidance on completing the Budget Justification Workbook/SF-424A:

- Applicants may request funds under the appropriate object class category tabs as long as the item and amount requested 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 described herein.
- For pricing purposes, assume a project start date of August 2016, or as negotiated.
- For more information, please refer to the ARPA-E Budget Justification Guidance document at <https://arpa-e-foa.energy.gov>.

4. FOURTH COMPONENT: SUMMARY FOR PUBLIC RELEASE

Applicants are required to provide a 250 word maximum Summary for Public Release. A Summary for Public Release template is available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>). The Summary for Public Release must be submitted in Adobe PDF format. This summary should not include any confidential, proprietary, or privileged information. The summary should be written for a lay audience (e.g., general public, media, Congress) using plain English.

250 Words	SUMMARY FOR PUBLIC RELEASE	Briefly describe the proposed effort, summarize its objective(s) and technical approach, describe its ability to achieve the “Program Objectives” (see Section I.C of the FOA), and indicate its potential impact on “ARPA-E Mission Areas” (see Section I.A of the FOA). The summary should be written at technical level suitable for a high-school science student and is designed for public release. INSTRUCTIONS: (1) The Summary for Public Release <u>shall not exceed 250 words and one paragraph</u> . (2) The Summary for Public Release <u>shall consist only of text</u> —no graphics, figures, or tables. (3) For applications selected for award negotiations, the Summary may be used as the basis for a public announcement by ARPA-E; therefore, <u>this Cover Page and Summary should not contain confidential or proprietary information</u> . See Section VIII.E of the FOA for additional information on marking confidential information
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5. FIFTH COMPONENT: SUMMARY SLIDE

Applicants are required to provide a single PowerPoint slide summarizing the proposed project. The slide must be submitted in Microsoft PowerPoint format. This slide will be used during ARPA-E’s evaluation of Full Applications. A summary slide template and a sample summary slide are available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>).

Summary Slides must conform to the content requirements described below:

- Team Capabilities;
 - Bullet points that describe the Team’s relevant capabilities, approach, and assets;
- A description of the Technical Approach;
 - Brief summary and key aspects of your technical approach to the design, construction, and operation of a site that can test MONITOR-funded technologies under real-world conditions;
 - Budget Estimate
- Any key illustrations – may include a diagram of the notional test site and/or a map showing the geographic location and nearby airports;

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

- The Key advantages of your approach and site;
- Project title and Principal Investigator information; and
- Requested ARPA-E funds and proposed Applicant cost share.

6. SIXTH COMPONENT: BUSINESS ASSURANCES & DISCLOSURES FORM

Applicants are required to provide the information requested in the Business Assurances & Disclosures Form. The information must be submitted in Adobe PDF format. A Business Assurances & Disclosures Form template is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>. A sample response to the Business Assurances & Disclosures Form is also available on ARPA-E eXCHANGE.

In particular, the Applicant is required to:

- Disclose conditions bearing on responsibility, such as criminal convictions and Federal tax liability;
- Disclose potential conflicts of interest within the Project Team;
- If the Applicant is a FFRDC, submit written authorization from the cognizant Federal agency; and
- If the Applicant is a DOE/NNSA FFRDC, submit a Field Work Proposal.

In addition, ARPA-E is required by statute to “accelerat[e] transformational technological advances in areas that industry is by itself not likely to undertake because of technical and financial uncertainty.”¹³ In accordance with ARPA-E’s statutory mandate, the Applicant is required to:

- Describe the additionality and risks associated with the proposed project;
- Disclose any applications for the same project or related work currently pending with any Federal or non-Federal entities; and
- Disclose all funding for work in the same technology area as the proposed project received from any Federal or non-Federal entity within the last 5 years.

¹³ America COMPETES Act, Pub. L. No. 110-69, § 5012 (2007), as amended (codified at 42 U.S.C. § 16538).

D. CONTENT AND FORM OF REPLIES TO REVIEWER COMMENTS

Written feedback on Full Applications is made available to Applicants before the submission deadline for Replies to Reviewer Comments. Applicants have a brief opportunity to prepare a short Reply to Reviewer Comments responding to one or more comments or supplementing their Full Application. A fillable Reply to Reviewer Comments template is available on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov>).

Replies to Reviewer Comments must conform to the following requirements:

- The Reply to Reviewer Comments must be submitted in Adobe PDF format.
- The Reply to Reviewer Comments must be written in English.
- All pages must be formatted to fit on 8-1/2 by 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 points or larger (except in figures and tables).
- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.

ARPA-E will not review or consider noncompliant Replies to Reviewer Comments (see Section III.C.1 of the FOA). ARPA-E will review and consider each compliant and responsive Full Application, even if no Reply is submitted or if the Reply is found to be noncompliant.

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

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages maximum	<ul style="list-style-type: none">• Applicants may respond to one or more reviewer comments or supplement their Full Application.
Images	1 page maximum	<ul style="list-style-type: none">• Applicants may provide graphs, charts, or other data to respond to reviewer comments or supplement their Full Application.

E. INTERGOVERNMENTAL REVIEW

This program is not subject to Executive Order 12372 (Intergovernmental Review of Federal Programs).

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

F. FUNDING RESTRICTIONS

1. ALLOWABLE COSTS

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles. ARPA-E has listed the Federal cost principles for different categories of Applicants at <http://arpa-e.energy.gov/arpa-e-site-page/post-award-guidance>.

2. PRE-AWARD COSTS

ARPA-E will not reimburse any pre-award costs incurred by Applicants before they are selected for award negotiations. Please refer to Section VI.A of the FOA for guidance on award notices.

Upon selection for award negotiations, Applicants may incur pre-award costs at their own risk, consistent with the requirements in 2 C.F.R. Part 200, as modified by 2 C.F.R. Part 910, and other Federal laws and regulations. ARPA-E generally does not accept budgets as submitted with the Full Application. Budgets are typically reworked during award negotiations. ARPA-E is under no obligation to reimburse pre-award costs if, for any reason, the Applicant does not receive an award or the award is made for a lesser amount than the Applicant expected, or if the costs incurred are not allowable, allocable, or reasonable.

Pre-award costs expected to exceed \$100,000 or incurred more than 90 days before the date of the Award require the written authorization of the ARPA-E Contracting Officer.

Please refer to the “Applicants’ Guide to ARPA-E Award Negotiations” (http://arpa-e.energy.gov/sites/default/files/Award_Negotiations_Guide%20%20March%202015.pdf) for additional guidance on pre-award costs.

3. PATENT COSTS

Notwithstanding the instructions included within the application materials at ARPA-E 110 (titled “Budget Justification Guidance”) pp.8-9 and ARPA-E 111 (titled “Budget Justification Workbook – SF-424A”) Tab h, ARPA-E does not require the Prime Recipient to undertake the Technology Transfer and Outreach activities described therein. Accordingly, Applicants should not propose and ARPA-E will not allow costs incurred for these activities under the anticipated award. Moreover, ARPA-E will not allow costs incurred for the filing of patent applications under the cooperative agreement resulting from this FOA.

4. CONSTRUCTION

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

5. FOREIGN TRAVEL

ARPA-E generally does not fund projects that involve foreign travel. Recipients are required to obtain written authorization from the Contracting Officer before incurring any foreign travel costs and provide trip reports with their reimbursement requests.

6. PERFORMANCE OF WORK IN THE UNITED STATES

ARPA-E strongly encourages interdisciplinary and cross-sectoral collaboration spanning organizational boundaries. Such collaboration enables the achievement of scientific and technological outcomes that were previously viewed as extremely difficult, if not impossible.

ARPA-E requires all work under ARPA-E funding agreements to be performed in the United States – i.e., Prime Recipients must expend 100% of the Total Project Cost in the United States. However, Applicants may request a waiver of this requirement where their project would materially benefit from, or otherwise requires, certain work to be performed overseas.

Applicants seeking a waiver of this requirement are required to include an explicit request in the responses to the information requested in the Business Assurances & Disclosures Form, . Such waivers are granted where there is a demonstrated need, as determined by ARPA-E.

7. PURCHASE OF NEW EQUIPMENT

All equipment purchased under ARPA-E funding agreements must be made or manufactured in the United States, to the maximum extent practicable. This requirement does not apply to used or leased equipment. The Prime Recipients are required to notify the ARPA-E Contracting Officer reasonably in advance of purchasing any equipment that is not made or manufactured in the United States with an acquisition cost of \$25,000 or more per unit. The ARPA-E Contracting Officer will provide consent to purchase or reject within 30 calendar days of receipt of the Recipient's notification.

8. LOBBYING

Prime Recipients and Subrecipients may not use any Federal funds, directly or indirectly, to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. § 1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

Prime Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (<http://www.whitehouse.gov/sites/default/files/omb/grants/sfillin.pdf>) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

- An officer or employee of any Federal agency,
- A Member of Congress,
- An officer or employee of Congress, or
- An employee of a Member of Congress.

9. CONFERENCE SPENDING

Prime Recipients and Subrecipients may not use any Federal funds to:

- Defray the cost to the United States Government of a conference held by any Executive branch department, agency, board, commission, or office which is not directly and programmatically related to the purpose for which their ARPA-E award is made and for which the cost to the United States Government is more than \$20,000; or
- To circumvent the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such a conference.

G. OTHER SUBMISSION REQUIREMENTS

1. USE OF ARPA-E eXCHANGE

To apply to this FOA, Applicants must register with ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/Registration.aspx>). Full Applications and Replies to Reviewer Comments must be submitted through ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/login.aspx>). ARPA-E will not review or consider applications submitted through other means (e.g., fax, hand delivery, email, postal mail). For detailed guidance on using ARPA-E eXCHANGE, please refer to the “ARPA-E eXCHANGE User Guide” (<https://arpa-e-foa.energy.gov/Manuals.aspx>).

Upon creating an application submission in ARPA-E eXCHANGE, Applicants will be assigned a Control Number. If the Applicant creates more than one application submission, a different Control Number will be assigned for each application.

Once logged in to ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/login.aspx>), Applicants may access their submissions by clicking the “My Submissions” link in the navigation on the left side of the page. Every application that the Applicant has submitted to ARPA-E and the

corresponding Control Number is displayed on that page. If the Applicant submits more than one application to a particular FOA, a different Control Number is shown for each application.

Applicants are responsible for meeting each submission deadline in ARPA-E eXCHANGE. **Applicants are strongly encouraged to submit their applications at least 48 hours in advance of the submission deadline.** Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), Applicants should allow at least 1 hour to submit a Full Application. In addition, Applicants should allow at least 15 minutes to submit a Reply to Reviewer Comments. Once the application is submitted in ARPA-E eXCHANGE, Applicants may revise or update their application until the expiration of the applicable deadline.

Applicants should not wait until the last minute to begin the submission process. During the final hours before the submission deadline, Applicants may experience server/connection congestion that prevents them from completing the necessary steps in ARPA-E eXCHANGE to submit their applications. **ARPA-E will not extend the submission deadline for Applicants that fail to submit required information and documents due to server/connection congestion.**

ARPA-E will not review or consider incomplete applications and applications received after the deadline stated in the FOA. Such applications will be deemed noncompliant (see Section III.C.1 of the FOA). The following errors could cause an application to be deemed “incomplete” and thus noncompliant:

- Failing to comply with the content and form requirements in Section IV of the FOA;
- Failing to enter required information in ARPA-E eXCHANGE;
- Failing to upload required document(s) to ARPA-E eXCHANGE;
- Uploading the wrong document(s) or application(s) to ARPA-E eXCHANGE; and
- Uploading the same document twice, but labeling it as different documents. (In the latter scenario, the Applicant failed to submit a required document.)

ARPA-E urges Applicants to carefully review their applications and to allow sufficient time for the submission of required information and documents.

V. APPLICATION REVIEW INFORMATION

A. CRITERIA

ARPA-E performs a preliminary review of Full Applications to determine whether they are compliant and responsive. ARPA-E also performs a preliminary review of Replies to Reviewer Comments to determine whether they are compliant. (See Section III.C of the FOA)

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

ARPA-E considers a mix of quantitative and qualitative criteria in determining whether to select a Full Application for award negotiations.

1. CRITERIA FOR FULL APPLICATIONS

Full Applications are evaluated based on the following criteria:

(1) *Technical Approach* (60%) - This criterion involves consideration of the following :

- Overall technical approach given the range of technologies included in the MONITOR award portfolio,
- Approach to operating the site, including design and construction (if necessary), and commissioning,
- Approach to test matrix and protocol development to meet the Program Objectives stated in Section I.B,
- Approach to scheduling use of the site, including providing required and ad hoc testing for MONITOR Awardees,
- Approach to site data acquisition, storage, and analysis, and
- Approach to management of testing data and results

(2) *Management Approach* (40%) - This criterion involves consideration of the following :

- Understanding of MONITOR recipients' test program needs,
- Team capabilities and experience, including experience with and expertise in
 - Natural gas industry operations, in particular wellpad production; and
 - Emissions measurement techniques for fugitive emissions
- Existing or available assets and equipment, and
- Location and layout of the proposed test site

Submissions will not be evaluated against each other since they are not submitted in accordance with a common work statement.

2. CRITERIA FOR REPLIES TO REVIEWER COMMENTS

ARPA-E has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are evaluated as an extension of the Full Application.

B. REVIEW AND SELECTION PROCESS

1. PROGRAM POLICY FACTORS

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

- I. **ARPA-E Portfolio Balance.** Project balances ARPA-E portfolio in one or more of the following areas:
 - a. Diversity (including gender) of technical personnel in the proposed Project Team;
 - b. Technological diversity;
 - c. Organizational diversity;
 - d. Geographic diversity;
 - e. Technical or commercialization risk; or
 - f. Stage of technology development.

- II. **Relevance to ARPA-E Mission Advancement.** Project contributes to one or more of ARPA-E's key statutory goals:
 - a. Reduction of US dependence on foreign energy sources;
 - b. Stimulation of domestic manufacturing;
 - c. Reduction of energy-related emissions;
 - d. Increase in U.S. energy efficiency;
 - e. Enhancement of U.S. economic and energy security; or
 - f. Promotion of U.S. advanced energy technologies competitiveness.

- III. **Synergy of Public and Private Efforts.**
 - a. Avoids duplication and overlap with other publicly or privately funded projects;
 - b. Promotes increased coordination with nongovernmental entities for demonstration of technologies and research applications to facilitate technology transfer; or
 - c. Increases unique research collaborations.

- IV. **High-Leveraging of Federal Funds.** Project leverages Federal funds to optimize advancement of programmatic goals by proposing cost share above the required minimum or otherwise accessing scarce or unique resources.

- V. **High Project Impact Relative to Project Cost.**

2. ARPA-E REVIEWERS

By submitting an application to ARPA-E, Applicants consent to ARPA-E's use of Federal employees, contractors, and experts from educational institutions, nonprofits, industry, and governmental and intergovernmental entities as reviewers. ARPA-E selects reviewers based on

their knowledge and understanding of the relevant field and application, their experience and skills, and their ability to provide constructive feedback on applications.

ARPA-E requires all reviewers to complete a Conflict-of-Interest Certification and Nondisclosure Agreement through which they disclose their knowledge of any actual or apparent conflicts and agree to safeguard confidential information contained in Full Applications and Replies to Reviewer Comments. In addition, ARPA-E trains its reviewers in proper evaluation techniques and procedures.

Applicants are not permitted to nominate reviewers for their applications. Applicants may contact the Contracting Officer by email (ARPA-E-CO@hq.doe.gov) if they have knowledge of a potential conflict of interest or a reasonable belief that a potential conflict exists.

3. ARPA-E SUPPORT CONTRACTOR

ARPA-E utilizes contractors to assist with the evaluation of applications and project management. To avoid actual and apparent conflicts of interest, ARPA-E prohibits its support contractors from submitting or participating in the preparation of applications to ARPA-E.

By submitting an application to ARPA-E, Applicants represent that they are not performing support contractor services for ARPA-E in any capacity and did not obtain the assistance of ARPA-E's support contractor to prepare the application. ARPA-E will not consider any applications that are submitted by or prepared with the assistance of its support contractors.

C. ANTICIPATED ANNOUNCEMENT AND AWARD DATES

ARPA-E expects to announce the selection for negotiation in approximately May 2016 and to execute a funding agreement in approximately August 2016.

VI. AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

1. REJECTED SUBMISSIONS

Noncompliant and nonresponsive Full Applications are rejected by the Contracting Officer and are not reviewed or considered. The Contracting Officer sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in ARPA-E eXCHANGE. The notification letter states the basis upon which the Full Application was rejected.

2. FULL APPLICATION NOTIFICATIONS

ARPA-E promptly notifies Applicants of its determination. ARPA-E sends a notification letter by email to the technical and administrative points of contact designated by the Applicant in ARPA-E eXCHANGE. The notification letter may inform the Applicant that its Full Application was selected for award negotiations, or not selected. Alternatively, ARPA-E may notify one or more Applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

Written feedback on Full Applications is made available to Applicants before the submission deadline for Replies to Reviewer Comments. By providing feedback, ARPA-E intends to guide the further development of the proposed technology and to provide a brief opportunity to respond to reviewer comments.

a. SUCCESSFUL APPLICANTS

ARPA-E has discretion to select all or part of a proposed project for negotiation of an award. A notification letter selecting a Full Application for award negotiations does not authorize the Applicant to commence performance of the project. **ARPA-E selects Full Applications for award negotiations, not for award.** Applicants do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement. ARPA-E may terminate award negotiations at any time for any reason.

Please refer to Section IV.F.2 of the FOA for guidance on pre-award costs. Please also refer to the “Applicants’ Guide to ARPA-E Award Negotiations” (http://www.arpa-e.energy.gov/sites/default/files/documents/files/Award_Negotiations_Guide081613.pdf) for guidance on the award negotiation process.

b. POSTPONED SELECTION DETERMINATIONS

A notification letter postponing a final selection determination until a later date does not authorize the Applicant to commence performance of the project. ARPA-E may ultimately determine to select or not select the Full Application for award negotiations.

Please refer to Section IV.F.2 of the FOA for guidance on pre-award costs.

c. UNSUCCESSFUL APPLICANTS

By not selecting a Full Application, ARPA-E intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. ARPA-E hopes that unsuccessful Applicants will submit innovative ideas and concepts for future FOAs.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

The following administrative and national policy requirements apply to Prime Recipients. The Prime Recipient is the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues, including but not limited to disputes and claims arising out of any agreement between the Prime Recipient and a FFRDC contractor. Prime Recipients are required to flow down these requirements to their Subrecipients through subawards or related agreements.

1. DUNS NUMBER AND SAM, FSRS, AND FEDCONNECT REGISTRATIONS

Prime Recipients and Subrecipients are required to obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number at <http://fedgov.dnb.com/webform> and to register with the System for Award Management (SAM) at <https://www.sam.gov/portal/public/SAM/>.

Prime Recipients and Subrecipients should commence this process as soon as possible in order to expedite the execution of a funding agreement. Obtaining a DUNS number and registering with SAM could take several weeks.

Prime Recipients are also required to register with the Federal Funding Accountability and Transparency Act Subaward Reporting System (FSRS) at <https://www.fsrs.gov/>.¹⁴ Prime Recipients are required to report to FSRS the names and total compensation of each of the Prime Recipient's five most highly compensated executives and the names and total compensation of each Subrecipient's five most highly compensated executives. Please refer to <https://www.fsrs.gov/> for guidance on reporting requirements.

ARPA-E may not execute a funding agreement with the Prime Recipient until it has obtained a DUNS number and completed its SAM and FSRS registrations. In addition, the Prime Recipient may not execute subawards with Subrecipients until they obtain a DUNS number and complete their SAM registration. Prime Recipients and Subrecipients are required to keep their SAM and FSRS data current throughout the duration of the project.

Finally, Prime Recipients are required to register with FedConnect in order to receive notification that their funding agreement has been executed by the Contracting Officer and to obtain a copy of the executed funding agreement. Please refer to <https://www.fedconnect.net/FedConnect/> for registration instructions.

2. NATIONAL POLICY ASSURANCES

Project Teams, including Prime Recipients and Subrecipients, are required to comply with the National Policy Assurances attached to their funding agreement. Please refer to ARPA-E's Model Cooperative Agreement (<http://arpa->

¹⁵ The Federal Funding Accountability and Transparency Act, P.L. 109-282, 31 U.S.C. 6101 note.

e.energy.gov/FundingAgreements/CooperativeAgreements.aspx) for guidance on the National Policy Assurances.

3. PROOF OF COST SHARE COMMITMENT AND ALLOWABILITY

Upon selection for award negotiations, the Prime Recipient must confirm in writing that the proposed cost share contribution is allowable in accordance with applicable Federal cost principles.

The Prime Recipient is also required to provide cost share commitment letters from Subrecipients or third parties that are providing cost share, whether cash or in-kind. Each Subrecipient or third party that is contributing cost share must provide a letter on appropriate letterhead that is signed by an authorized corporate representative. Please refer to the “Applicants’ Guide to ARPA-E Award Negotiations” (http://www.arpa-e.energy.gov/sites/default/files/documents/files/Award_Negotiations_Guide081613.pdf) for guidance on the contents of cost share commitment letters.

4. COST SHARE PAYMENTS¹⁵

All proposed cost share contributions must be reviewed in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

The Prime Recipient is required to pay the “Cost Share” amount as a percentage of the total project costs in each invoice period for the duration of the period of performance. Small Businesses see Section III.B.3 of the FOA.

Please refer to the “Applicants’ Guide to ARPA-E Award Negotiations” (http://www.arpa-e.energy.gov/sites/default/files/documents/files/Award_Negotiations_Guide081613.pdf) for additional guidance on cost share payment requirements.

ARPA-E may deny reimbursement requests, in whole or in part, or modify or terminate funding agreements where Prime Recipients (or Project Teams) fail to comply with ARPA-E’s cost share payment requirements.

5. ENVIRONMENTAL IMPACT QUESTIONNAIRE

By law, ARPA-E is required to evaluate the potential environmental impact of projects that it is considering for funding. In particular, ARPA-E must determine before funding a project whether the project qualifies for a categorical exclusion under 10 C.F.R. § 1021.410 or whether it requires further environmental review (i.e., an environmental assessment or an environmental impact statement).

¹⁵ Please refer to Section III.B of the FOA for guidance on cost share requirements.

To facilitate and expedite ARPA-E's environmental review, Prime Recipients are required to complete an Environmental Impact Questionnaire during award negotiations. This form is available on ARPA-E eXCHANGE at <https://arpa-e-foa.energy.gov>. The Environmental Impact Questionnaire is due within 21 calendar days of the selection announcement.

6. DATA MANAGEMENT PLAN

Normally all ARPA-E Awardees are required, post-award, to submit a Data Management Plan (DMP) that addresses how data generated in the course of the work performed under an ARPA-E award will be preserved and, as appropriate, shared publicly. Data generated under this project will be protected as "Protected Data" and, therefore, will not be publicly shared during the "Protected Data" five (5) year protection period. Because any digital data will be at least five (5) years old when it is no longer considered "Protected Data", the effort to release such data will exceed any potential impact or value of the actual release. If any data generated under this award is published, an effort will be made to also release any related digital data that is not "Protected Data" to the public at the time of publication. The DMP will be in accordance with the requirements set forth in ARPA-E's soon-to-be revised "Applicant Guide to Award Negotiations" available at the following website: <http://arpa-e.energy.gov/?q=arpa-e-site-page/pre-award-guidance>.

7. U.S. MANUFACTURING REQUIREMENT

ARPA-E requires products embodying or produced through the use of subject inventions (i.e., inventions conceived or first actually reduced to practice under ARPA-E funding agreements) to be substantially manufactured in the United States by Project Teams and their licensees, as described below. The Applicant may request a modification or waiver of the U.S. Manufacturing Requirement.

a. SMALL BUSINESSES

Small businesses (including Small Business Concerns) that are Prime Recipients or Subrecipients under ARPA-E funding agreements are required to substantially manufacture the following products in the United States for any use or sale in the United States: (1) products embodying subject inventions, and (2) products produced through the use of subject invention(s).¹⁶ This requirement does not apply to products that are manufactured for use or sale outside the U.S. A.

Small businesses must apply the same U.S. Manufacturing requirements to their assignees, licensees, and entities acquiring a controlling interest in the small business. Small businesses

¹⁶ Small businesses are generally defined as domestically incorporated entities that meet the criteria established by the U.S. Small Business Administration's "Table of Small Business Size Standards Matched to North American Industry Classification System Codes" (<http://www.sba.gov/content/small-business-size-standards>).

must require their assignees and entities acquiring a controlling interest in the small business to apply the same U.S. Manufacturing requirements to their licensees.

b. LARGE BUSINESSES AND FOREIGN ENTITIES

Large businesses and foreign entities that are Prime Recipients or Subrecipients under ARPA-E funding agreements are required to substantially manufacture the following products in the United States: (1) products embodying subject inventions, and (2) products produced through the use of subject invention(s).¹⁷ This requirement applies to products that are manufactured for use or sale in the United States and outside the United States.

Large businesses and foreign entities must apply the same U.S. Manufacturing requirements to their assignees, licensees, and entities acquiring a controlling interest in the large business or foreign entity. Large businesses and foreign entities must require their assignees and entities acquiring a controlling interest in the large business or foreign entity to apply the same U.S. Manufacturing requirements to their licensees.

c. EDUCATIONAL INSTITUTIONS AND NONPROFITS

Domestic educational institutions and nonprofits that are Prime Recipients or Subrecipients under ARPA-E funding agreements must require their exclusive licensees to substantially manufacture the following products in the United States for any use or sale in the United States: (1) articles embodying subject inventions, and (2) articles produced through the use of subject invention(s). This requirement does not apply to articles that are manufactured for use or sale overseas.

Educational institutions and nonprofits must require their assignees to apply the same U.S. Manufacturing requirements to their exclusive licensees.

These U.S. Manufacturing requirements do not apply to nonexclusive licensees.

d. FFRDC/DOE Labs and State and Local Government Entities

FFRDCs/DOE Labs that are GOCOs and state and local government entities are subject to the same U.S. Manufacturing requirements as domestic educational institutions and nonprofits. GOGOs are subject to the requirements in 37 CFR § 404.5(a) (2).

¹⁷ Large businesses are generally defined as domestically incorporated entities that do not meet the criteria established by the U.S. Small Business Administration's "Table of Small Business Size Standards Matched to North American Industry Classification System Codes" (<http://www.sba.gov/content/small-business-size-standards>).

8. CORPORATE FELONY CONVICTIONS AND FEDERAL TAX LIABILITY

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

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

9. APPLICANT RISK ANALYSIS

If selected for award negotiations, ARPA-E may evaluate the risks posed by the Applicant using the criteria set forth at 2 CFR §200.205(c), subparagraphs (1) through (4). ARPA-E may require special award terms and conditions depending upon results of the risk analysis.

10. RECIPIENT INTEGRITY AND PERFORMANCE MATTERS

Prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold (presently \$150,000), ARPA-E is required to review and consider any information about Applicants that is contained in the Office of Management and Budget's designated integrity and performance system accessible through SAM (currently the Federal Awardee Performance and Integrity Information System or FAPIIS) (41 U.S.C. § 2313 and 2 C.F.R. 200.205).

Applicants may review information in FAPIIS and comment on any information about itself that a Federal awarding agency previously entered into FAPIIS.

ARPA-E will consider any written comments provided by Applicants during award negotiations, in addition to the other information in FAPIIS, in making a judgment about an Applicant's integrity, business ethics, and record of performance under Federal awards when reviewing potential risk posed by Applicants as described in 2 C.F.R. §200.205.

DOE will consider any written comments by the Applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the Applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by Applicants as described in §200.205 Federal awarding agency review of risk posed by Applicants.

11. NONDISCLOSURE AND CONFIDENTIALITY AGREEMENTS REPRESENTATIONS

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

- (1) **It does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contractors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.
- (2) **It does not and will not** use any Federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:
 - a. *“These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.”*
 - b. The limitation above shall not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.
 - c. Notwithstanding provision listed in paragraph (a), a nondisclosure confidentiality policy form or agreement that is to be executed by a person connected with the conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States Government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States Government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosure to congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

C. REPORTING

Recipients are required to submit periodic, detailed reports on technical, financial, and other aspects of the project, as described in Attachment 4 to ARPA-E's Model Cooperative Agreement (<http://arpa-e.energy.gov/arpa-e-site-page/award-guidance>).

VII. AGENCY CONTACTS

A. COMMUNICATIONS WITH ARPA-E

Upon the issuance of a FOA, only the Contracting Officer may communicate with Applicants. ARPA-E personnel and our support contractors are prohibited from communicating (in writing or otherwise) with Applicants regarding the FOA. This "quiet period" remains in effect until ARPA-E's public announcement of its project selections.

During the "quiet period," Applicants are required to submit all questions regarding this FOA to ARPA-E-CO@hq.doe.gov. Questions and Answers (Q&As) about ARPA-E and the FOA are available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, please send an email with the FOA name and number in the subject line to ARPA-E-CO@hq.doe.gov. Due to the volume of questions received, ARPA-E will only answer pertinent questions that have not yet been answered and posted at the above link.

- ARPA-E will post responses on a weekly basis to any questions that are received. ARPA-E may re-phrase questions or consolidate similar questions for administrative purposes.
- ARPA-E will cease to accept questions approximately 5 business days in advance of each submission deadline. Responses to questions received before the cutoff will be posted approximately one business day in advance of the submission deadline. ARPA-E may re-phrase questions or consolidate similar questions for administrative purposes.
- Responses are posted to "Questions and Answers" on ARPA-E's website (<http://arpa-e.energy.gov/faq>).

Applicants may submit questions regarding ARPA-E eXCHANGE, ARPA-E's online application portal, to ExchangeHelp@hq.doe.gov. ARPA-E will promptly respond to emails that raise legitimate, technical issues with ARPA-E eXCHANGE. ARPA-E will refer any questions regarding the FOA to ARPA-E-CO@hq.doe.gov.

ARPA-E will not accept or respond to communications received by other means (e.g., fax, telephone, mail, hand delivery). Emails sent to other email addresses will be disregarded.

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

During the “quiet period,” only the Contracting Officer may authorize communications between ARPA-E personnel and Applicants. The Contracting Officer may communicate with Applicants as necessary and appropriate. As described in Section IV.A of the FOA, the Contracting Officer may arrange pre-selection meetings and/or site visits during the “quiet period.”

B. DEBRIEFINGS

ARPA-E does not offer or provide debriefings. ARPA-E provides Applicants with reviewer comments on Full Applications before the submission deadline for Replies to Reviewer Comments.

VIII. OTHER INFORMATION

A. FOAs AND FOA MODIFICATIONS

FOAs are posted on ARPA-E eXCHANGE (<https://arpa-e-foa.energy.gov/>), Grants.gov (<http://www.grants.gov/>), and FedConnect (<https://www.fedconnect.net/FedConnect/>). Any modifications to the FOA are also posted to these websites. You can receive an e-mail when a modification is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon as possible after release of the FOA to ensure that you receive timely notice of any modifications or other announcements. More information is available at <https://www.fedconnect.net>.

B. OBLIGATION OF PUBLIC FUNDS

The Contracting Officer is the only individual who can make awards on behalf of ARPA-E or obligate ARPA-E to the expenditure of public funds. A commitment or obligation by any individual other than the Contracting Officer, either explicit or implied, is invalid.

ARPA-E awards may not be transferred, assigned, or assumed without the prior written consent of a Contracting Officer.

C. REQUIREMENT FOR FULL AND COMPLETE DISCLOSURE

Applicants are required to make a full and complete disclosure of the information requested in the Business Assurances & Disclosures Form. Disclosure of the requested information is mandatory. Any failure to make a full and complete disclosure of the requested information may result in:

- The rejection of a Full Application and/or Reply to Reviewer Comments;
- The termination of award negotiations;

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

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

D. RETENTION OF SUBMISSIONS

ARPA-E expects to retain copies of all Full Applications, Replies to Reviewer Comments, and other submissions. No submissions will be returned. By applying to ARPA-E for funding, Applicants consent to ARPA-E's retention of their submissions.

E. MARKING OF CONFIDENTIAL INFORMATION

ARPA-E will use data and other information contained in Full Applications and Replies to Reviewer Comments strictly for evaluation purposes.

Full Applications, Replies to Reviewer Comments, and other submissions containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

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

Notice of Restriction on Disclosure and Use of Data:

Pages [___] of this document may contain confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.

The header and footer of every page that contains confidential, proprietary, or privileged information must be marked as follows: "Contains Confidential, Proprietary, or Privileged Information Exempt from Public Disclosure." In addition, every line and paragraph containing

proprietary, privileged, or trade secret information must be clearly marked with double brackets or highlighting.

F. TITLE TO SUBJECT INVENTIONS

Ownership of subject inventions is governed pursuant to the authorities listed below. Typically, either by operation of law or under the authority of a patent waiver, Prime Recipients and Subrecipients may elect to retain title to their subject inventions under ARPA-E funding agreements.

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses, educational institutions, and nonprofits may elect to retain title to their subject inventions. If they elect to retain title, they must file a patent application in a timely fashion.
- All other parties: The Federal Non Nuclear Energy Act of 1974, 42. U.S.C. 5908, provides that the Government obtains title to new inventions unless a waiver is granted (*see below*).
- Class Waiver: Under 42 U.S.C. § 5908, title to subject inventions vests in the U.S. Government and large businesses and foreign entities do not have the automatic right to elect to retain title to subject inventions. However, ARPA-E typically issues “class patent waivers” under which large businesses and foreign entities that meet certain stated requirements, such as cost sharing of at least 20% may elect to retain title to their subject inventions. If a large business or foreign entity elects to retain title to its subject invention, it must file a patent application in a timely fashion. If the class waiver does not apply, a party may request a waiver in accordance with 10 C.F.R. §784.
- GOGOs are subject to the requirements of 37 CFR Part 501.

G. GOVERNMENT RIGHTS IN SUBJECT INVENTIONS

Where Prime Recipients and Subrecipients retain title to subject inventions, the U.S. Government retains certain rights.

1. GOVERNMENT USE LICENSE

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

2. MARCH-IN RIGHTS

The U.S. Government retains march-in rights with respect to all subject inventions. Through “march-in rights,” the Government may require a Prime Recipient or Subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention. In addition, the Government may grant licenses for use of the subject invention when Prime Recipients, Subrecipients, or their assignees and exclusive licensees refuse to do so.

The U.S. Government may exercise its march-in rights if it determines that such action is necessary under any of the four following conditions:

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

3. U.S. MANUFACTURING REQUIREMENT

ARPA-E requires that awards address whether products embodying or produced through the use of subject inventions (i.e., inventions conceived or first actually reduced to practice under ARPA-E funding agreements) are to be substantially manufactured in the United States by Project Teams and their licensees. The requirement varies depending upon whether an Awardee is a small business, University or other type of Awardee. The Applicant may request a modification or waiver of the U.S. Manufacturing Requirement.

H. RIGHTS IN TECHNICAL DATA

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

- Background or “Limited Rights Data”: The U.S. Government will not normally require delivery of technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

- **Generated Data:** The U.S. Government normally retains very broad rights in technical data produced under Government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, all test data generated under this ARPA-E award will be required to be protected from public disclosure for up to five years in accordance with provisions that will be set forth in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

I. PROTECTED PERSONALLY IDENTIFIABLE INFORMATION

Applicants may not include any Protected Personally Identifiable Information (Protected PII) in their submissions to ARPA-E. Protected PII is defined as 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 their submissions.

- 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;
- 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; and
- Security clearance history or related information (not including actual clearances held).

J. USE OF THE TEST SITE BY NON-MONITOR AWARDEES

On a case-by-case basis, ARPA-E will evaluate any request from the MONITOR Field Test Site program Awardee for use of the test site by non-MONITOR Awardees (“third parties”). Use by

Questions about this FOA? Check the Frequently Asked Questions available at <http://arpa-e.energy.gov/faq>. For questions that have not already been answered, email ARPA-E-CO@hq.doe.gov (with FOA name and number in subject line); see FOA Sec. VII.A. Problems with ARPA-E eXCHANGE? Email ExchangeHelp@hq.doe.gov (with FOA name and number in subject line).

third parties is subject to without prior written approval from the ARPA-E Contracting Officer. Any written approval will address potential charges to third parties to use the test site, including any fee to the MONITOR Field Test Site program Awardee and any reimbursement to ARPA-E.

IX. GLOSSARY

Applicant: The entity that submits the application to ARPA-E. In the case of a Project Team, the Applicant is the lead organization listed on the application.

Application: The entire submission received by ARPA-E, including the Full Application and Reply to Reviewer Comments.

ARPA-E: is the Advanced Research Projects Agency – Energy, an agency within the U.S. Department of Energy.

Cost Sharing: is the portion of project costs from non-Federal sources that are borne by the Prime Recipient (or non-Federal third parties on behalf of the Prime Recipient), rather than by the Federal Government.

Deliverable: A deliverable is the quantifiable goods or services that will be provided upon the successful completion of a project task or sub-task.

DOE: U.S. Department of Energy.

DOE/NNSA: U.S. Department of Energy/National Nuclear Security Administration

FFRDCs: Federally Funded Research and Development Centers.

FOA: Funding Opportunity Announcement.

GOCOs: U.S. Government Owned, Contractor Operated laboratories.

GOGOs: U.S. Government Owned, Government Operated laboratories.

Milestone: A milestone is the tangible, observable measurement that will be provided upon the successful completion of a project task or sub-task.

Prime Recipient: The signatory to the funding agreement with ARPA-E.

PI: Principal Investigator.

Project Team: A Project Team consists of the Prime Recipient, Subrecipients, and others performing inventive supportive work that is part of an ARPA-E project.

Standalone Applicant: An Applicant that applies for funding on its own, not as part of a Project Team.

Subject Invention: Any invention conceived or first actually reduced to practice under an ARPA-E funding agreement.

Task: A task is an operation or segment of the work plan that requires both effort and resources. Each task (or sub-task) is connected to the overall objective of the project, via the achievement of a milestone or a deliverable.

Total Project Cost: The sum of the Prime Recipient share and the Federal Government share of total allowable costs. The Federal Government share generally includes costs incurred by GOGOs, FFRDCs, and GOCOs.