

**FINANCIAL ASSISTANCE
FUNDING OPPORTUNITY ANNOUNCEMENT**



**U. S. Department of Energy
Office of Electricity Delivery and Energy Reliability
National Energy Technology Laboratory
Microgrid Research, Development, and System Design
Funding Opportunity Number: DE-FOA-0000997**

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**CFDA Number: 81.122 Electricity Delivery and Energy Reliability,
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NOTE: REGISTRATION/SUBMISSION REQUIREMENTS

Registration Requirements

There are several one-time actions you must complete in order to submit an application in response to this Announcement (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the System for Award Management (SAM), and register with Grants.gov). Applicants, who are not registered with SAM and Grants.gov, should allow at least 44 days to complete these requirements. It is suggested that the process be started as soon as possible.

Applicants must obtain a DUNS number. DUNS website:

<http://fedgov.dnb.com/webform>.

Applicants must register with the System for Award Management (SAM). SAM website:

<http://www.sam.gov/>.

If you had an active registration with the Central Contractor Registration (CCR) system, you should now have an active registration in SAM. More information about SAM registration for applicants is found at:

https://www.sam.gov/sam/transcript/Quick_Guide_for_Grants_Registrations_v1.7.pdf

Applicants must register with Grants.gov.

There are 3 steps to this process.

- 1) The Authorized Organizational Representative (AOR) must register at: <https://apply07.grants.gov/apply/OrcRegister> .
- 2) An email is sent to the E-Business (E-Biz) POC listed in SAM. The E-Biz POC must approve the AOR registration using their MPIN from their SAM registration.
- 3) AOR verifies that registration was completed at: http://grants.gov/applicants/applicant_profile.jsp.

More information about the above steps is provided at:

http://www.grants.gov/applicants/organization_registration.jsp.

Applicants must register with FedConnect to submit questions. FedConnect website:

www.fedconnect.net

Questions

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

Questions regarding the **content** of the announcement **must** be submitted through the FedConnect portal. You must register with FedConnect to respond as an interested party to submit questions, and to view responses to questions. It is recommended that you register as soon after release of the FOA as possible to have the benefit of all responses. DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Application Preparation and Submission

Applicants must download the application package, application forms and instructions, from Grants.gov. Grants.gov website: <http://www.grants.gov/>

(Additional instructions are provided in Section IV of this FOA.)

Where to Submit

Applications must be submitted through Grants.gov to be considered for award. You cannot submit an application through Grants.gov unless you are registered. Please read the registration requirements carefully and start the process immediately. Remember, you have to update your SAM registration annually. If you have any questions about your registration, you should contact the Grants.gov Helpdesk at 1-800-518-4726 to verify that you are still registered in Grants.gov.

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

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Section I - FUNDING OPPORTUNITY DESCRIPTION

A. SUMMARY

The United States (U.S.) Department of Energy (DOE) – National Energy Technology Laboratory (NETL), on behalf of the Office of Electricity Delivery and Energy Reliability (OE), is seeking applications for research and development (R&D) and testing of advanced commercial-grade microgrid controllers capable of managing/controlling microgrid systems consisting of between 1 and 10 megawatts (MW) of aggregated generation capacity. An overarching objective of this Funding Opportunity Announcement (FOA) is that the developed controllers will enable communities¹ in the United States to develop/design (and ultimately deploy) microgrid systems that will aid achievement of the DOE program targets as defined in Section I.B of this FOA and meeting specific objectives for energy resilience (including protection of critical infrastructure and public resources) as defined by the participating communities. While it is expected these objectives will vary depending on regional and other circumstances, the focus should be on strengthening the resilience of electrical infrastructure against adverse effects of future extreme weather phenomena and other unforeseen occurrences, so as to support efforts to prepare the nation for the impacts of climate change (as set forth in Executive Order 13653²) and the goal of “building stronger and safer communities and infrastructure” in accordance with the President’s Climate Action Plan³.

It is expected that controllers proposed under this FOA will be integral to operation of microgrid system designs/configurations that have between 1 and 10 megawatts (MW) of aggregated generation capacity. However, applications proposing development/testing of controllers capable of managing microgrid systems larger than 10 MW will also be considered. This FOA also encompasses testing of the commercial-grade microgrid controllers (developed during the planned effort) to validate that they are capable of managing and controlling the proposed microgrid systems, supporting achievement of the DOE program targets, and helping to accomplish the community-defined objectives for electricity system resiliency. In addition, Recipients of awards under this FOA are asked to collaborate with participating community(ies) in conducting a feasibility study for demonstration/deployment of the proposed microgrid system/controller.

The DOE anticipates awarding multiple cooperative agreements under this FOA, with up to \$1,200,000 in Federal funds available for each award. The period of performance for each agreement will be approximately two (2) years, including up to 18 months for research and development (R&D) and six (6) months of testing, data collection, and analysis of test results. Looking forward, DOE may consider issuing a future FOA to demonstrate microgrid system designs/controllers, including those developed under this effort.

¹ For the purpose of this FOA, a community is defined as a local city, town, village, county, or tribal government.

² Executive Order 13653 – Preparing the United States for the Impacts of Climate Change, available online: <http://www.gpo.gov/fdsys/pkg/FR-2013-11-06/pdf/2013-26785.pdf>

³ The President’s Climate Action Plan, available online: <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>

Recipients of awards issued under this announcement shall comply with requirements of applicable Federal, State, and local laws and regulations. Recipients must also adhere to DOE policy and guidance, and instructions in this FOA, unless relief has been granted by the DOE. The requirements of applicable Federal, State and local laws and regulations, DOE policy and guidance, and instructions in this FOA shall flow down from Recipients to sub-recipients (and other levels/tiers of the project team organization) to the extent necessary to ensure compliance with the requirements.

This FOA is issued in accordance with statutory authority provided by the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007 (EISA).

B. BACKGROUND INFORMATION

The term “microgrid,” in the context of this FOA, is defined as a group of interconnected loads and distributed energy resources (DER) within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid and can connect and disconnect from the grid, operate in grid-connected or island mode. The DOE Microgrid Program objectives were affirmed at an industry workshop in August 2011, and key R&D topics were identified in an ensuing workshop in July 2012.⁴ The DOE objectives, for expanding the deployment of commercial-scale microgrid systems, include the following specific performance targets:

- reducing outage time of critical loads by >98% at a cost comparable to non-integrated baseline solutions (such as an uninterruptable power supply [UPS] with backup generator),
- reducing emissions by >20%, and
- improving system energy efficiencies by >20%.

NOTE: While proof-of-concept testing of the microgrid systems and controllers developed during awards issued under this FOA is not required, applicants may choose to do so as part of the 6-month test period, or may demonstrate supporting achievement of the DOE targets via simulation/emulation testing or other industry acceptable methodology. Applicants should specify the option chosen and provide corresponding details in the test plan and feasibility study discussed later in this announcement.

For the purpose of this FOA, the DOE targets and their respective baselines are defined as follows:

>98% reduction in outage time of critical loads: Critical loads are defined by the customer, and electrical service to those loads must meet the stated DOE performance target. The outage time is customer dependent but, as a first approximation, can be equated with the average reliability of utility service, as measured and reported by the utility as a System

⁴ The 2012 DOE Microgrid Workshop Summary Report (September 2012), available at <http://energy.gov/oe/downloads/2012-doe-microgrid-workshop-summary-report-september-2012>, summarizes key R&D topics identified by workshop participants as needed to reach the DOE 2020 microgrid targets.

Average Interruption Duration Index (SAIDI).⁵ In support of achievement of this target, applicants must conduct testing to demonstrate (by simulation/modeling or other acceptable technique) that the outage time for critical loads within the proposed microgrid area would have been reduced by at least 98% if the proposed microgrid system had been actually deployed. For example, if the SAIDI for local utility service to critical loads encompassed by the proposed microgrid is 100 minutes/year, then the target performance value (for meeting the criteria of this FOA) is less than 2 minutes/year $[(1 - 0.98)*100]$. To complement this target, there are technical functional requirements (see Section I.C) that address expected microgrid performance during various operation scenarios (grid-connected, islanded, and the transition between these modes).

Comparable costs to non-integrated baseline solutions: The term “non-integrated baseline solution” refers to a new construction situation faced with the need to provide backup electrical supply to critical loads. For this scenario, a portion of total expected load would be considered as critical requiring a UPS, while the remainder can still function through short delays between the loss of utility service and starting a backup generator. The costs baseline of a UPS and backup generator, for comparison with the cost of the proposed microgrid, is calculated as the sum of the following five cost elements:

1. Capital costs for individual UPS (estimated in the range of \$1M per MW)
2. Capital costs for individual generators (estimated in the range of \$200k per MW)
3. Capital costs for automatic transfer switches (estimated in the range of \$10k per MW)
4. Installation and commissioning costs of the non-integrated baseline equipment
5. Operation and maintenance (O&M) costs for all equipment (varies, but is typically available from the manufacturers)

>20% reduction in emissions: The term “emissions” refers to annual marginal emissions of carbon dioxide (CO₂) which are associated with the combustion of fossil fuels. The emissions baseline is the total annual marginal emissions of CO₂ associated with serving both the electrical and thermal loads within the area to be supplied by the proposed microgrid. For purposes of this FOA, the baseline should be developed using marginal emissions rates,⁶ and include both emissions produced off-site (typically resulting from the generation, transmission, and distribution of electricity) and those generated on-site. Satisfactory accomplishment of this target would be demonstrated by testing (simulation) that produces results indicating that at least a 20% reduction in emissions, attributable to operation of the proposed microgrid, would have been achieved. For example, if the baseline annual marginal emissions for the proposed microgrid area is determined to be 100,000 kilograms (kg), then the estimated reduction related to microgrid operation should be at least 20,000 kg.

⁵ The definition and calculation of SAIDI is provided in Institute of Electrical and Electronic Engineers (IEEE) Standard 1366-2004, titled “IEEE Guide for Electric Power Distribution Reliability Indices”.

⁶ Appendix A in Section IX of this announcement provides annual average marginal CO₂ emission factors for electricity generation by hour of the day, separately for each NERC region of the US. Applicants may also use factors that vary by season, if appropriate, but must provide supporting documentation on the derivation or source of these alternate factors.

In other words, for this example the expected emissions should be less than 80,000 kg following deployment/operation of the proposed microgrid system.

>20% improvement in system energy efficiencies: Since microgrid architectures will enable integration of distributed renewable energy and combined heat and power (CHP) resources, the energy input by a utility to serve loads within the proposed microgrid is reduced, thus improving system energy efficiencies. In support of achievement of this target, applicants must conduct testing to demonstrate that the total utility-supplied electrical and thermal energy [including electricity and other fuel supplies, with all converted to source or primary British thermal units (BTU⁷)] after deployment of the proposed microgrid, is at least 20% less than that before microgrid implementation, with energy input of both used to serve the same loads year-round.

Note: The baseline case for the “emissions” and “system energy efficiencies” targets, i.e., before microgrid installation, involves no distributed generation, with utility provision of all electrical and thermal energy consumed by loads.

C. FUNDING OPPORTUNITY DESCRIPTION

The purpose of this FOA is to solicit research and development (R&D) and testing of advanced microgrid controllers that will allow communities in the United States to develop/design commercial-scale microgrid systems. It is hoped that, ultimately, these (and other efforts) will facilitate communities’ deployment of microgrid systems that enhance reliability, sustainability, and economic value by allowing achievement of their specific objectives for energy resilience; and help meet the DOE targets. Projects proposed in response to this FOA are to be conducted within the States, District, Territories, and tribal lands of the United States. Moreover, proposed designs should significantly advance microgrid deployments in keeping with the DOE targets, rather than merely presenting marginal improvement of existing commercial or previously demonstrated technology.

The following paragraphs outline the basic elements for a microgrid system and the fundamental technical functional requirements for microgrid controllers to be developed as part of this FOA, and describe the associated test plan for validating technical feasibility and economic performance of the proposed solution.

MICROGRID CONTROLLER TECHNICAL / FUNCTIONAL REQUIREMENTS

The term “microgrid controller” as used in this FOA refers to an advanced control system, potentially consisting of multiple components and subsystems, capable of sensing grid conditions, and monitoring and controlling the operation of a microgrid so as to maintain electricity delivery to critical loads during all microgrid operating modes (grid-connected, islanded, and transition between the two). A fundamental requirement is that the microgrid controller complies with the IEEE 1547TM ⁸series of interconnection standards, including any

⁷ For the purposes of this FOA, the conversion of electric energy to primary BTU is 11,480 BTU per kilowatt-hour (11,480 BTU/kW-hr.)

⁸ IEEE 1547TM Standard for Interconnecting Distributed Resources with Electric Power Systems

revisions or applicable emerging standards that may become available during the course of the proposed effort. In addition, the prototype controller shall be capable of dispatching microgrid assets; interfacing with external parties (e.g., aggregators, distribution utilities, market operators); and coordinating with grid protection schemes under all fault conditions (to ensure safeguarding of the system, equipment, and personnel).

Specifically, microgrid controllers developed under this FOA must (at a minimum) satisfy the following technical functional requirements for operating/managing a microgrid system.

C.1 Disconnection

While grid-connected, a microgrid must comply with the IEEE 1547™ Standards⁹ at the point of common coupling (PCC). The Standards are the current practice of most utilities in the U.S. At times, DER or an aggregated system (such as a microgrid) must disconnect from the area electric power system (EPS) (utility grid) based on established voltage and frequency ranges. Table 1 and Table 2 show the maximum islanding time criteria for different voltage and frequency ranges, respectively. The maximum islanding time in Tables 1 and 2 is interpreted as the maximum time between the start of the voltage or frequency range and microgrid islanding from the area EPS. Under this FOA, disconnection must be completed within the maximum islanding times specified in these Tables.

Table 1 - Microgrid islanding criteria based on voltage ranges

Voltage (V) range in per unit (pu)	Maximum islanding time in seconds (s)
$V < 0.5$	0.16
$0.5 \leq V < 0.8$	2.00
$1.1 \leq V < 1.2$	1.00
$V \geq 1.2$	0.16

Table 2 - Microgrid islanding criteria based on frequency ranges

Frequency (f) range in Hertz (Hz)	Maximum islanding time (s)
$f > 60.5$	0.16
$f < \{59.8-57.0\}$ (adjustable set point)	Adjustable 0.16 to 300
$f < 57.0$	0.16

⁹ *Ibid.*, Ref. 8

C.2 Resynchronization and Reconnection

Prior to reconnection of the microgrid system to an area EPS, monitoring should first indicate that the islanded microgrid is properly synchronized with the EPS. After an area EPS disturbance and subsequent microgrid islanding, reconnection shall not be initiated until the area EPS voltage is within Range B of the American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA) Standard C84.1-2006, Table 1,¹⁰ the phase angle difference is within the limits defined by IEEE 1547TM,¹¹ and the frequency range is between 59.3 Hz to 60.5 Hz.¹²

The interconnection device may delay reconnection for up to five minutes after the area EPS steady-state voltage and frequency are restored to the ranges identified above. If an unscheduled event triggered the disconnection from the area EPS, reconnection should be delayed until it is verified that the area EPS is stable. If multiple islands exist, a strategy may be adopted to intentionally stagger the return of the islands.

The microgrid must ensure that reconnection occurs when the frequency difference, voltage magnitude difference, and voltage phase angle difference between the area EPS and microgrid on either side of the microgrid switch are within the limits defined by IEEE 1547TM.¹³ For a microgrid with a rating between 1.5 and 10 megavolt-amperes (MVA), the reconnection requirements are shown in Table 3.

Table 3 - Microgrid reconnection requirements

Microgrid rating (MVA)	Frequency difference (Δf , Hz)	Voltage difference (ΔV , %)	Phase angle difference ($\Delta \theta$, °)
1.5-10	0.1	3	10

C.3 Steady-State Frequency Range, Voltage Range, and Power Quality

Depending on the nature of an area EPS, the ability of a grid-connected microgrid to affect the power quality inside the microgrid may be very limited. If the power quality supplied by the area EPS is insufficient for the critical loads, the microgrid may choose to island rather than attempt to improve power quality while grid connected. Therefore, this FOA only prescribes steady-state power quality requirements for islanded operations. These requirements could also be used as a condition to determine when to island.

An islanded microgrid in steady state operation must:

1. Maintain the frequency in the range $59.3 \text{ Hz} < f < 60.5 \text{ Hz}$ — a range consistent with the frequency range for an area EPS and suitable for most loads — barring customer-specific requirements that may override this range.

¹⁰ ANSI C84.1 – 2006: Electric power systems and equipment – voltage ratings (60 Hz)

¹¹ *Ibid.*, Ref. 8

¹² *Ibid.*, Ref. 8

¹³ *Ibid.*, Ref. 8

2. Maintain the voltage according to ANSI 84.1-2006 standards — specifically, the required voltage range for microgrid islanded steady-state operation is $0.95 \text{ pu} < V < 1.05 \text{ pu}$ at the PCC.
3. Maintain the power quality at the PCC in compliance with customer-specific requirements.

C.4 Protection

A microgrid has to provide adequate protection in both grid-connected and islanded states; however, the challenges differ in these two states. The development of microgrid protection requirements is guided by the following three general principles, in order of priority:

1. Prevent injury to personnel and ensure public safety.
2. Prevent or minimize equipment damage.
3. Minimize loss of load within the constraints of 1 and 2.

A grid-connected microgrid must be capable of meeting the following protection requirements:

1. An “external” fault (a fault on the area EPS side of the microgrid switch): The microgrid switch must open and interrupt the flow of fault current from the microgrid to the utility grid within 0.16 seconds of the fault occurrence, consistent with the islanding criteria. To enable the microgrid to continue operating as an island that at least serves critical loads, the operation of protective devices at the individual resources (primary or other) within the microgrid must be coordinated with the microgrid switch.
2. Disconnection from the utility grid because of utility protection operations: Operation or misoperation of utility protective equipment may leave the microgrid connected to loads and other distributed generation on the utility side of the microgrid switch that the utility is attempting to de-energize, or is expecting to be de-energized (i.e., the formation of an unintentional island beyond the boundaries of the microgrid). Under these conditions, the microgrid must prevent unintentional islands by opening the microgrid switch consistent with the requirement of IEEE 1547.2. The microgrid switch opening must be coordinated with any anti-islanding functions of the individual resources (primary or other) to enable the microgrid to continue operations as an island that at least serves critical loads.
3. An “internal” fault (a fault on the microgrid side of the microgrid switch): Internal faults will potentially draw large fault currents from the utility, through the microgrid switch, and to the fault. The microgrid must clear internal faults. The clearing of internal faults must be coordinated with the utility breaker and/or recloser operation to minimize the effect of the microgrid internal fault on other utility customers.

An islanded microgrid is only subject to internal faults, and, thus, must clear internal faults.

C.5 Dispatch

A microgrid controller is the unifying component that coordinates the operations of all resources and loads to ensure achievement of three fundamental microgrid objectives: 1) survivability, 2) economic operation, and 3) satisfactory environmental performance. Dispatch for microgrid survivability includes, but is not limited to:

1. While grid-connected, ensuring sufficient resources (e.g. generation and/or energy storage) are operating and available to support the microgrid's seamless transition to island mode.
2. While islanded, managing energy resources consistent with ensuring service to the microgrid critical loads for the duration of the islanded state.

Dispatch for economic operation may include, but is not limited to:

1. Optimization of the microgrid's energy consumption and generation against electric and natural gas tariffs.
2. Provision of services to the grid (area EPS), such as:
 - a. Energy,
 - b. Volt/VAR support,
 - c. Frequency regulation,
 - d. Spinning reserve,
 - e. Black start support, and
 - f. Demand response.

Dispatch for environmental performance includes reducing or limiting CO₂ emissions.

The microgrid controller must coordinate the operation of the microgrid resources consistent with the requirements of the foregoing dispatch objectives, including interaction with external entities when needed.

The resources and loads within an actual microgrid would likely be of different types, manufacture, etc. As such, applications submitted in response to this FOA are expected to reflect this "real world" environment as much as possible. Therefore, while preparing their application, applicants should keep in mind that a desired outcome, under this FOA, is the development of interoperable approaches that enable simplified system integration.

C.6 Enhanced Resilience

Due to its ability to continue operating when electricity delivered from a utility is disrupted, a microgrid is considered by the DOE and communities as a strategic asset to support the planning and implementation of resilient energy communities. Microgrids can improve the ability of communities to adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions caused by weather-related and other naturally occurring events. Specific improvements for resiliency in the face of such events are deemed community dependent; they

should be specified in each application as the community-defined resilience objectives for microgrid implementation.

The microgrid controller must be capable of managing microgrid resources to meet the community-defined resilience objectives during disruptive events, and providing sufficient information to distribution system operators to enable the communication of accurate information on operating conditions of the microgrid to communities, especially those responsible for critical loads.

D. MICROGRID SYSTEM DESIGN AND TEST PLAN

Each application submitted in response to this FOA must include a microgrid system design that incorporates the microgrid controller and a preliminary test plan. Involvement of the participating community(ies) in developing and completing the proposed microgrid system design is a must. At a minimum, the test plan must describe how the technical feasibility and economic performance of the controller functions (outlined in sections I.C.1 through I.C.6) will be validated through integrated testing that is appropriate for the proposed microgrid system design. These preliminary test plans will be reviewed by the DOE as part of the application evaluation process described later in this announcement. Some basic elements of such a test plan are also outlined later in this section. Instructions about formatting and page limits for the test plan document can be found in Section IV.3.B.

The DOE expects each applicant selected for an award to carry out the test plan to demonstrate technical feasibility and economic performance of the microgrid system design, verify the successful implementation/performance of the specified functionalities of their microgrid controller, validate that the proposed solution satisfies the resiliency objectives [as defined by the participating community(ies)], and will enable achievement of the DOE targets. It is anticipated that this testing will last approximately 6 months and should begin as soon as practicable, but should start not later than 18 months after an award is finalized.

Applicants may propose testing of their microgrid design and the corresponding controller developed during the project at a DOE national laboratory (in accordance with eligibility requirements of Section III). Applicants may also arrange to test their microgrid design and controller at a facility other than a DOE laboratory, or a “real world” environment. An applicant may propose whichever testing option is most convenient for their specific geographic location and other circumstances. Regardless of which option applicants select, testing of microgrid controllers will be observed and audited by a DOE Technical Advisory Group (TAG) to ensure consistency. The TAG consists of microgrid experts from various DOE national laboratories.

Applicants should also be aware that an updated (full/detailed) test plan (and associated budget, if applicable) shall be submitted for DOE review approximately 9 months after the start of an award. Deviations or modifications to the original preliminary test plan are to be noted and explained, and sent to the designated DOE Project Officer. The DOE will review this updated test plan and may suggest modifications as deemed necessary to ensure consistency in analyzing the performance of the proposed microgrid designs/controllers during actual testing. As part of a

go/no-go decision at the end of the 18-month R&D effort, DOE will review the final test plan, and if accepted, will release funding to the Recipient to conduct the actual tests.

At the conclusion of the R&D phase, applicants shall submit a complete report documenting all segments of the testing. All test data shall be provided to the DOE for independent analysis, and in order to help identify remaining research gaps/needs for potential follow-on research. Refer to Section VIII.D regarding labeling/designating proprietary data.

Some basic elements of a microgrid system design are described as follows, and should be used as a guide in preparing the proposed solution, the preliminary test plan and any subsequent updates.

D.1 - Location Characterization. Provide the geographic and electrical attributes of the proposed microgrid system. Briefly describe the locality/community; define the electrical boundaries of the proposed microgrid system and identify the loads (critical and noncritical), PCC(s), and available DER assets.

D.2 - Background. Provide a problem statement with background information about ideas currently being explored (by government/industry) for expanding microgrid implementation, and the impediments (technological, regulatory, etc.) to that expansion.

D.3 - Objectives. Provide specific performance objectives, as established by the collaborating community(ies), that the microgrid system is designed to accomplish. The objectives should include performance expectations relating to the DOE targets described in Section I.B, the functional requirements of Section I.C, and the resiliency metrics of importance to the participating community(ies).

D.4 - Solution. Describe the proposed microgrid design and involvement of the participating community(ies) in design completion, other solutions considered, the rationale for choosing the proposed solution, how the solution relates to the current technology and its likelihood of advancing future microgrid deployments to meet the defined objectives. The proposed microgrid configuration should be representative of an economically viable microgrid. Each applicant must provide a brief justification of the economic viability of their chosen configuration, and include descriptions of the following attributes, at a minimum:

1. The DER (type, capacity, availability) in the microgrid.
2. The microgrid electrical circuit including the locations of the DER, microgrid switch, critical and noncritical electrical loads, microgrid protection equipment, utility protection equipment, and the interface with the area EPS.
3. The locations and interconnections of any thermal loads served by the microgrid.
4. Electrical load profiles.
5. Thermal load profiles (if present).
6. Any tariffs needed to assess the microgrid's total cost of energy.
7. Data needed to assess the microgrid's CO₂ emissions relative to the base case (where all energy is imported by the microgrid).

D.5 - Preliminary Test Plan. Provide a test plan that, at a minimum, encompasses the following elements: test methodology and scenarios, and the planned technique for data gathering and analysis. Also include a budget breakdown that details projected costs for the major facets of the test plan.

Test Methods

Each applicant shall describe the methodology that will be used to test their microgrid design/controller. The description will include:

1. The test method(s)/protocols used to assess the microgrid controller performance against each of the functional requirements of Section I.C.1 through I.C.6, and the microgrid system design objectives (Section I.D.3).
2. A justification that the methods are adequate in scope, time resolution, and measurement resolution to accurately assess the performance of the microgrid controller against the functional requirements of Section I.C.1 through I.C.6 and the microgrid system design objectives (Section I.D.3).
3. A description of the facilities, equipment, and analysis tools used to perform the tests and subsequent analyses.

Test Scenarios

Each applicant shall describe the scenarios that will be used to test their microgrid controller in order to adequately assess the functional requirements of Section I.C.1 through I.C.6 and the microgrid system design objectives (Section I.D.3). The description will include:

1. A summary of the scenario(s).
2. A justification that the scenarios are suitable and of ample duration, contain relevant content, and are sufficiently diverse to cover as many real world situations as possible.
3. A description of the source and adequacy of any input data and test conditions used in each test scenario.

Data Gathering and Test Results

Applicants shall summarize the data to be gathered and expected results to be obtained from the testing. The description will include:

1. The scope and type(s) of data to be collected.
2. How, when and how often data will be collected.
3. How data/results will be analyzed to assess microgrid controller performance relative to the functional requirements of Section I.C.1 through I.C.6 and the microgrid system design objectives (Section I.D.3).

All drawings should be of professional quality, have an appropriate caption, and should be cited in the body of the microgrid design and testing plan.

E. APPLICATION REVIEW

Applications submitted in response to this FOA will be subject to an initial review followed by a comprehensive merit review. Initial review of applications will be conducted as specified in Section V.A.1. Applications that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration for an award.

The merit review involves a comprehensive evaluation of the information contained in the electronic application files submitted in response to this FOA. Applications submitted in response to this funding opportunity will be evaluated and scored in accordance with the following merit review criteria (see Section V.A.2. of this FOA for full description), and the corresponding weighting factors listed with each criterion:

- Criterion 1: Significance and Impact (Weight = 30%)
- Criterion 2: Technical Merit (Weight = 20%)
- Criterion 3: Microgrid System Design and Test Plan (Weight = 20%)
- Criterion 4: Project Plan (Weight = 15%)
- Criterion 5: Project Team (Weight = 15%)

While applicants should propose what they believe will accomplish the objectives of this FOA, following are some examples of concepts that should be addressed generally in an application and particularly in plans for conducting a feasibility study (required on selected projects as a final report deliverable) for demonstrating the proposed solution:

- Developing and implementing a deployment and commercialization plan with strong commitments from the participating community, utility and vendor/developer.
- Collaboration between the community, utility and vendor/developer, including such activities as developing support requirements and procedures, operating guides based on utilization of the system/control applications, and training materials.
- Establishing procedures to encourage/enable expanded demonstration/integration of the developed microgrid system and control applications into a utility's existing operations; e.g., interface with the SCADA and related Energy/Distribution/Outage Management Systems (EMS/DMS/OMS).
- Expanding demonstration of the developed systems/controls into a wider area, other communities, or other sites to include additional, diverse DER, other utilities or different interconnections.
- Developing a business plan for continued demonstration and/or expanded deployment and commercialization of the developed solution(s).

While determining the suitability of applications is not limited to the above illustrations, following are examples of attributes that would be considered as **not** well suited to accomplishing the goals of this announcement:

- Developing/demonstrating a solution/technology that would not be viable or valuable for future microgrid deployment/commercialization beyond that planned in response to this FOA.
- Utilizing funds from this announcement to purchase new equipment or pay for activities not related to the proposed work.
- Solely subsidizing a microgrid system and/or controller installation.

Section II – AWARD INFORMATION

A. TYPE OF AWARD INSTRUMENT

The DOE anticipates awarding cooperative agreements under this funding opportunity announcement. (See Section VI.B.2 for a Statement of Substantial Involvement).

B. ESTIMATED FUNDING

The DOE plans to provide a total of about \$7,000,000 for new awards selected under this announcement. Funding for all awards and future budget periods (if any) are contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.

C. MAXIMUM AND MINIMUM AWARD SIZE

Ceiling (i.e., maximum amount of DOE contribution for an individual award made under this announcement):

- Up to \$1,200,000 per project

Floor (i.e., the minimum amount of DOE share for an individual award made under this announcement):

- None

D. EXPECTED NUMBER OF AWARDS

The DOE anticipates making approximately six (6) awards.

E. ANTICIPATED AWARD SIZE

The DOE expects to contribute up to \$1,200,000 (DOE share) for each project selected for award under this announcement.

The Government reserves the right to fund the proposed DOE share, in whole or in part, any, all, or none of the applications submitted in response to this announcement and will award that number of financial assistance instruments that serves the public purpose and is in the best interest of the Government/DOE.

Applicants are required to provide a minimum cost share of 20 percent of total project costs*. (See Section III.B).

*The following formula may be used to determine the respective DOE and Applicant cost shares. Note that an Applicant may contribute more than the specified required cost share.

Total Project cost = DOE share (including FFRDCs) + Applicant cost share

F. PERIOD OF PERFORMANCE

The DOE anticipates making awards that have a single budget period (period of performance) lasting up to two (2) years (24 months). The overall period of performance includes up to eighteen (18) months of R&D and six (6) months of testing, data collection and analysis of test results.

All applications must include a go/no-go decision point at the scheduled conclusion of the R&D effort (approximately 18 months). The DOE will review each project that successfully completes the R&D portion (demonstrates, at a minimum, the technical functional requirements for the microgrid system) prior to authorizing continuation into the testing/analysis phase of the project.

G. TYPE OF APPLICATION

The DOE will accept only new applications under this announcement. Applicants should organize proposed work and associated budget estimates into a period of performance that clearly defines an R&D segment and a testing/analysis phase as described elsewhere in this FOA. Refer to Section IV for discussions on the level of detail required for describing the proposed work and corresponding budget estimate. As part of the work during the R&D phase, award Recipients will be required to update their work plan and budget to provide more in-depth details related to the planned testing of the proposed microgrid system and associated controller, and activities for data collection/analysis. In addition, each applicant should include description of a feasibility study for deploying and demonstrating the microgrid system/controller developed during the R&D phase.

Individuals, companies and/or teams may submit more than one application. However, each application must propose development of a distinct technological concept, have a different principal investigator/project director, and have its own unique title and approach. Refer to Section III for eligibility requirements.

Section III - ELIGIBILITY INFORMATION

General

While an integrated team approach is encouraged, applicant team members are subject to the eligibility criteria discussed in the following sections. Each applicant team should include, at a minimum, a technology product provider (manufacturer, vendor or commercialization entity); a technology developer [a university, a national laboratory (except as noted in Sections III.A and III.C), or other research institution]; and a U.S. community and its load serving entity or electric utility with jurisdiction. Other team members, such as a state energy agency and a regulatory body for electric utilities are highly desired. Applicants selected for award under this FOA will be expected to collaborate with the participating community(ies) in conducting a feasibility study for demonstration/deployment of the proposed microgrid system/controller, and to produce a sound commercialization plan for microgrid controllers that includes team member(s) with a track record of success in introducing like products to the market.

A. ELIGIBLE APPLICANTS

Eligibility for various types of entities to apply for funding under this FOA is discussed below.

1. Individuals

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

2. Domestic Entities

For-profit entities, educational institutions, and nonprofits that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply for funding as a prime Recipient or sub-recipient.

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

DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) and DOE Government-Operated Government-Owned laboratories (GOGOs) are eligible to apply for funding as a sub-recipient (team member), but are not eligible to apply as a prime Recipient. Refer to the guidelines of Section III.C. However, the following national laboratories are not permitted to participate as a sub-recipient (team member) since subject matter experts from these facilities are part of the DOE Technical Advisory Group and will be serving as reviewers/observers/auditors during various activities of projects selected under this FOA:

- Lawrence Berkeley National Laboratory (LBNL),
- Los Alamos National Laboratory (LANL),
- Oak Ridge National Laboratory (ORNL), and

- Sandia National Laboratory (Sandia).

Non-DOE/NNSA FFRDCs and non-DOE GOGOs are eligible to apply for funding as a sub-recipient, but are not eligible to apply as a prime Recipient.

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

NOTE: NETL is not considered eligible for award under this announcement and may not be proposed as a team member on another entity's application.

3. Foreign Entities

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding under this FOA.

Other than as provided in the "Individuals" or "Domestic Entities" sections above, all prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. If a foreign entity applies for funding as a prime Recipient, it must designate in the Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the prime Recipient. The Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate. Foreign entities may request a waiver of this requirement in the Application. See Section VIII for waiver request information. The DOE Contracting Officer has discretion to waive this requirement if he/she determines that it will further the purposes of this FOA and is otherwise in the interests of OE.

A foreign entity may receive funding as a sub-recipient.

4. Incorporated Consortia

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding as a prime Recipient or sub-recipient. For consortia incorporated (or otherwise formed) under the laws of a State or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated in foreign countries, please refer to the requirements in "Foreign Entities" above.

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

5. Unincorporated Consortia

Unincorporated consortia, which may include domestic and foreign entities, must designate one member of the consortium to serve as the prime Recipient/consortium representative. The prime Recipient/consortium representative must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. The eligibility of the consortium will be determined by the eligibility of the prime Recipient and/or consortium representative under Section III.A of

the FOA.

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

6. Nonprofit Organizations

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 sub-recipient.

B. COST SHARING

NOTE: Each application submitted in response to this FOA must include a minimum cost share of 20%. Applications proposing to provide less than the minimum required cost share will not be considered for award under this announcement.

To comply with established regulations, the Recipient cost share must be at least 20% of the total allowable costs for research and development projects (i.e., the sum of the Government share, including FFRDC contractor costs if applicable, and the Recipient share of allowable costs equals the total allowable cost of the project). Furthermore, this cost share must come from non-Federal sources unless otherwise allowed by law. (See 10 CFR 600 for the applicable cost sharing requirements).

Applications submitted for this FOA must contain a detailed estimate of the cash value including its basis and nature, (e.g., equipment, labor, facilities, cash, etc.), of all contributions provided to the project by each participant. Note that “cost-sharing” is not limited to cash investment. In-kind contributions (e.g., contribution of services or property; donated equipment, buildings, or land; donated supplies; or unrecovered indirect costs) incurred as part of the project may be considered as all or part of the cost share. The “cost-sharing” definition is contained in 10 CFR 600.30, 600.101, 600.123, 600.202, 600.224, 600.302, and 600.313.

Fee or profit will not be paid to Recipients of financial assistance awards. Fee or profit paid to any member of the proposing team having a substantial and direct interest in the adoption of the demonstration technology is unallowable. Additionally, foregone fee or profit by the applicant shall not be considered cost sharing under any resulting award. Reimbursement of actual costs will only include those costs that are allowable and allocable to the project as determined by the

DOE, in accordance with the applicable cost principles prescribed in 10 CFR 600.127, 600.222, 600.317, or 10 CFR 600.318.

C. OTHER ELIGIBILITY REQUIREMENTS

FFRDC Contractors

As previously mentioned, FFRDC contractors are not eligible for an award under this announcement. However, except for the DOE national laboratories mentioned in Part III.A.2, they may be proposed as a team member on another entity's application subject to the following guidelines:

Authorization for non-DOE/NNSA FFRDCs. The Federal agency sponsoring the FFRDC contractor must authorize in writing the use of the FFRDC contractor on the proposed project and this authorization must be submitted with the application. The use of the FFRDC contractor must be consistent with the contractor's authority under its award and must not place the FFRDC contractor in direct competition with the private sector.

Authorization for DOE/NNSA FFRDCs. The cognizant contracting officer for the FFRDC must authorize in writing the use of a DOE/NNSA FFRDC contractor on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization.

“Authorization is granted for the _____ Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, will not adversely impact execution of the DOE/NNSA assigned programs at the laboratory, and will not place the laboratory in direct competition with the domestic private sector.”

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

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

FFRDC Contractor Effort. The FFRDC contractor effort, in aggregate, shall not exceed 10 percent of the total allowable costs, including the applicant's and the FFRDC contractor's portions of the effort.

Responsibility. The applicant, if successful, will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues, including but not limited to, disputes and claims arising out of any agreement between the applicant and the FFRDC contractor.

D. PERFORMANCE OF WORK IN THE UNITED STATES

The Recipient agrees that 100 percent of the direct labor cost for the project (including sub-recipient labor) shall be incurred in the United States, unless the Recipient can demonstrate to the satisfaction of the Department of Energy that the United States economic interest will be better served through a greater percentage of the work being performed outside of the United States.

Applicants and prime Recipients may request a waiver of this requirement. Applicants must include a written waiver request in the Full Application. Prime Recipients must submit any waiver requests in writing to the DOE Contracting Officer for this FOA. The DOE Contracting Officer has discretion to waive this requirement if he/she determines that it will further the purposes of this FOA and is otherwise in the best interest of the Government. If you would like to request a waiver see Section VIII.

Section IV - APPLICATION AND SUBMISSION INFORMATION

A. ADDRESS TO REQUEST APPLICATION PACKAGE

Application forms and instructions are available at Grants.gov. To access these materials, go to <http://www.grants.gov>, select the “Applicants” tab, select "Apply for Grants," and then select "Download a Grant Application Package." Enter the Catalog of Federal Domestic Assistance (CFDA) and/or the funding opportunity number located on the cover of this announcement and then follow the prompts to download the application package.

Individuals, companies and/or teams may submit more than one application. However, each application must propose development of a distinct technological concept, and have its own unique title and approach.

B. LETTER OF INTENT AND PRE-APPLICATION

1. Letter of Intent

Letters of Intent are not required.

2. Pre-application

Pre-applications are not required.

C. CONTENT AND APPLICATION FORMS

Applicants must complete the mandatory forms and any applicable optional forms (e.g., Disclosure of Lobbying Activities (SF-LLL)) in accordance with the instructions on the forms and the additional instructions below. Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement.

1. SF 424 APPLICATION FOR FEDERAL ASSISTANCE

Complete this form first to populate data in other forms. Complete all required fields in accordance with the pop-up instructions on the form. The list of certifications and assurances referenced in Field 21 can be found on the DOE Financial Assistance Forms Page at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms> under Certifications and Assurances.

2. PROJECT/PERFORMANCE SITE LOCATION(S)

Indicate the primary site where the work will be performed. If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided.

Note that the Project/Performance Site Congressional District is entered in the format of the 2 digit state code followed by a dash and a 3 digit Congressional district code, for example VA-001. Hover over this field for additional instructions.

Use the Next Site button to expand the form to add additional Project/Performance Site Locations.

3. OTHER ATTACHMENTS FORM

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

3A. PROJECT SUMMARY/ABSTRACT

File Name: Summary-Abstract.pdf

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project (including methods to be employed), the potential impact of the project (i.e., benefits, outcomes), and sub-recipients/major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as the Department may make it available to the public after awards are made. The project summary must not exceed 2 pages when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) {single spaced} with font not smaller than 11 point.

3B. PROJECT NARRATIVE

File Name: Narrative.pdf

The project narrative **must not exceed 30 pages**, including cover page, table of contents, charts, graphs, maps, photographs, tables, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) {single spaced} with font not smaller than 11 point. **EVALUATORS WILL ONLY REVIEW THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE.** Do not include any Internet addresses (URLs) that provide information necessary to review the application, because the information contained in these sites will not be reviewed. See Section VIII.D for instructions on how to mark proprietary application information.

Appendices to the Project Narrative are to be utilized to validate information within the Project Narrative, as appropriate, and shall not be utilized as an extension for information requested to be addressed in the narrative. The font must not be smaller than 11 point. Information in the appendices **WILL NOT** count toward the **30 page limit** of the Project Narrative. Refer to Section IV.C.3D (titled APPENDICES TO PROJECT NARRATIVE) for descriptions of the types of documents to be included as appendices.

The project narrative **must** be prepared according to the following outline (format), and include:

[***** BEGINNING OF PROJECT NARRATIVE FORMAT *****]

NOTE: Applicants shall not identify the entire Project Narrative as proprietary and shall only identify those specific pages and lines that do indeed contain proprietary information.

- **Project Objectives:** This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.
- **Relevance and Outcomes/Impacts:** This section should explain the relevance of the effort to the objectives in the program announcement and the expected outcomes and/or impacts.
- **Merit Review Criterion Discussion:** The section should be formatted to address each of the merit review criterion and sub-criterion listed in Section V.A, including the criterion and its sub-criteria of the Microgrid System Design and Test Plan described below. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria. The DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH OF THE MERIT REVIEW CRITERION AND SUB-CRITERION. Applications that avoid substantial discussion of the requested information by utilization of references to other publications, Project Narrative appendices, and attachments outside the Project Narrative will be judged nonresponsive to the criterion.
- **Microgrid System Design and Test Plan:** This section should fully describe all key elements specified in Section I.D and address the merit review criteria and sub-criteria listed in Section V.A. The plan **must not** exceed 10 pages, including an index, charts, graphs, maps, photographs, tables, and other pictorial presentations, when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left, and right) {single spaced} with font not smaller than 11 point. The Microgrid System Design and Test Plan is a part of the Project Narrative and must be included within the 30-page Project Narrative page limit.
- **Roles of Participants:** For multi-organizational or multi-investigator projects, briefly describe the roles and the work to be performed by each participant/investigator, business agreements between the Applicant and participants, and how the various efforts will be integrated and managed. More detailed information is to be included as an appendix (see paragraphs titled *Multiple Principal Investigators (PIs) Appendix*, and *Senior/Key Personnel Appendix*, in Section IV.C.3D).
- **Project Performance Site:** Indicate the primary site where the work will be performed. If a portion of the work will be performed at any other sites, identify those sites, also. Include detailed information about proposed work sites as an appendix (refer to *Facilities and Other Resources Appendix* in Section IV.C.3D).

- **Equipment and Other Resources:** Provide a brief summary of major equipment planned to be acquired, and other resources available for use by the proposed project. For purposes of this FOA, “major” means having a fair market value in excess of \$5,000. More detailed information (size, type, capacity, function/purpose, etc.) is to be included as an appendix (see *Equipment Appendix* in Section IV.C.3D).
- **Statement of Project Objectives:** The Department of Energy's, National Energy Technology Laboratory uses a specific format for the Statement of Project Objectives (SOPO) in its awards. In announcements such as this one, where the Government does not provide a SOPO, the Applicant is to provide one in the following format, which the DOE will then use to generate a standalone document to be included in the award.

The Project Narrative must contain a single, detailed SOPO that addresses how the project objectives will be met. The SOPO must contain a clear, concise description of all activities to be completed during project performance and follow the structure discussed below. **Since the SOPO may be released to the public by the DOE in whole or in part after award, it shall not contain proprietary or confidential business information.**

The SOPO is generally not more than 5 pages in total for the proposed work. The SOPO is a part of the Project Narrative and must be included within the 30-page Project Narrative page limit.

Applicants shall prepare the SOPO according to the following format:

(Note that some titles and main tasks have been entered to form the framework of the SOPO. For each task, applicants should provide more details about planned work and can add subtasks under the main tasks, and other tasks as needed.)

***** BEGINNING OF DRAFT FORMAT FOR SOPO *****

TITLE OF WORK TO BE PERFORMED

(Insert the title of work to be performed. Be concise and descriptive.)

A. OBJECTIVES

Include one paragraph on the overall objective(s) of the proposed project. Also, include objective(s) for each major phase of planned work.

B. SCOPE OF WORK

This section should not exceed one-half page and should summarize the effort and approach to achieve the project objective(s).

C. TASKS TO BE PERFORMED

Tasks, concisely written, should be provided in a logical sequence and should be grouped into the phases of the project, as appropriate. This section provides a sample

framework and brief summary of the planned approach to this project. An outline of the Project Management Plan (referenced in Task 1.0 below and required to be submitted with your application) is provided later in this Section. It is expected that activities described in Tasks 3.0 through 5.0 will likely occur in parallel.

Task 1.0 - Project Management and Planning

(THIS TASK IS MANDATORY AND MUST ADDRESS THE FOLLOWING)

(Description: This Task shall include the necessary activities to ensure coordination and planning of the project with DOE/NETL and other project participants. These activities shall include, but are not limited to, the monitoring and controlling of project scope, cost, schedule, and risk, and the submission of required reports.

This task shall also include all work elements required to revise and maintain the Project Management Plan { PMP } and to manage and report on activities in accordance with the plan. A subtask should be included here that outlines a feasibility study for possible future deployment/demonstration of the microgrid system design/controller developed during the project, and updating the study as needed).

[Note: Successful Applicants shall revise the version of the Project Management Plan that is submitted with their applications by including details from the award negotiation process and through consultation with the Federal Project Officer. This Project Management Plan will be updated by the Applicant as the project progresses, and the Applicant must use this plan to report schedule and budget variances.]

Subtask 1.0.# (Title)
(Description:)

Task 2.0 – Environmental Questionnaire (EQ)

[Description: This task should discuss the proposed approach to achieve compliance with the National Environmental Protection Act (NEPA), including submission and approval of required documentation. This task also includes preparation of new (or update of previously submitted) environmental questionnaires to address changes in sites/locations that will be used for testing.]

Subtask 2.0.# - (Title)
(Description)

[Note: Applicants selected for award under this FOA are restricted from taking any action using Federal funds which would have an adverse effect on the environment or limits the choice of reasonable alternatives prior to DOE providing a NEPA determination regarding proposed projects.]

Task 3.0 – Advanced Microgrid Controller Research and Development

(Description: includes details of planned activities related to development of the proposed microgrid controller.)

Subtask 3.0.# (Title)
(Description)

Task 4.0 – Microgrid System Planning and Design
(Description: includes details of planned activities related to design of a microgrid configuration and integration of the proposed controller.

Subtask 4.0.# (Title)
(Description)

Task 5.0 - Test Preparations
(Description: includes work elements required to update the preliminary test plan (originally included with application documents), submit the plan for DOE review, and finalize the test plan with modifications based on DOE review comments. As part of this task, applicants should make necessary arrangements, prepare test equipment and methods needed for plan execution. The preliminary test plan shall be updated and submitted for DOE review within 9 months of award, with the final test plan resubmitted to DOE within 30 days of receipt of DOE review comments. It should be noted here that DOE funding for costs associated with testing of the proposed microgrid system and controller will not be authorized until DOE has reviewed and approved the proposed test plan.)

Subtask 5.0.# (Title)
(Description)

NOTE: Recipients shall not conduct activities related to testing of the microgrid design and controller prior to receiving written authorization from the DOE Contracting Officer.

Task 6.0 – Test Execution
(Description: Include how many and what tests will be performed, where and how they will be conducted, and expected results for each.)

Subtask 6.0.# (Title)

(Description)

Task 7.0 – Analysis and Results Reporting
(Description: This task/subtask should describe the planned approach for data collection and analysis, and reporting results. At a minimum, Recipients are expected to collect/accumulate 6 months of operational/performance data during the testing phase of the project. Recipients are expected to propose a data collection plan that describes metrics and includes parameters to be measured, reasoning for selection of identified parameters, methodology/technology employed to take measurements, data collection

methodology or automated system description, data reduction or manipulation required, and method and format to present data.)

Subtask 7.0.# (Title)
(Description)

(Optional) Task #.0 (Title)
(Description)

D. DELIVERABLES

The periodic, topical, and final reports shall be submitted in accordance with the "Federal Assistance Reporting Checklist" (included with the resulting award) and the instructions accompanying the checklist. In addition, the Recipient shall provide the deliverables listed below. [These reports shall also be identified within the text of the Statement of Project Objectives. See the following examples.]

1. Task 1.0 – An updated *Project Management Plan* shall be submitted within 30 days of award.
2. Subtask 1.0.# – A *Final Feasibility Study* shall be submitted in conjunction with the *Final Technical Report* for the project. The Study should be submitted as an appendix to the Final report, and follow the guidelines for labeling proprietary information (as needed).
3. Task 2.0 – Not less than 90 days prior to the planned start of testing activities, updated (or new) environmental questionnaires shall be submitted covering changes in proposed site(s), facilities/locations as needed.
4. Task 4.0 – A summary report describing the proposed microgrid shall be submitted not less than 90 days prior to the planned start of testing activities. This report should include a general description (including maps, drawings, etc.) of the microgrid location and rationale for selection; diagrams, schematics, etc. of the configuration, and discuss/depict relevant attributes [location, number, type and capacity of available energy assets, location of PCC(s), etc.]
5. Task 5.0 – An updated (full/detailed) test plan shall be submitted for DOE review no later than 9 months after the start of the award. The plan must include an in-depth description of the approach to the proposed testing of a commercial-scale microgrid system and explanation of expected results. The plan should also include a schedule of key events, baseline metrics and milestones, go/no-go decision criteria, and a comprehensive risk analysis that includes assessment of probability and impact, and addresses prevention and/or mitigation strategies. A final test plan is to be submitted to DOE within 30 days of receipt of DOE comments for the updated plan.
6. A *Final Technical Report* suitable for public dissemination shall be prepared in accordance with the Federal Assistance Reporting Checklist and Instructions and

submitted within 90 days after expiration of the award. This report must include a summary of the project activities including copies of the microgrid design/configuration, details of the testing and analysis of test results against meeting each technical functional requirement in Section I.C, the microgrid system design objectives (Section I.D.3) and each DOE target in Section I.B. All test data shall be provided to the DOE as attached files (appendix) to the *Final Technical Report*.

[Note: Documents/files containing test data are to be labeled as “proprietary” in accordance with the instructions found in Section VIII.D of this FOA, and submitted as a separate report titled “Appendices for Final Technical Report”.]

E. BRIEFINGS/TECHNICAL PRESENTATIONS

The Recipient shall prepare detailed briefings for presentation to the Project Officer at the Project Officer’s facility located in Pittsburgh, PA or Morgantown, WV; at the DOE facility in Washington, DC, or other mutually agreeable location to explain the plans, progress, and results of the technical effort. At a minimum, awards issued under this FOA are subject to the briefings described below.

Kickoff Briefing - Not more than 30 days after submission of the updated Project Management Plan, the Recipient shall prepare and present a project summary briefing as part of a Project Kickoff Meeting to be held at a location to be determined by the DOE.

Pre-Testing Briefing - No less than 90 days prior to the planned start of the testing phase, Recipients shall brief the DOE on the project results to date, and their plans for conducting the proposed tests. The DOE will consider the information from this briefing, as well as the content of deliverables submitted to date prior to authorizing performance of the planned tests.

Final Project Briefing - No less than 30 days prior to the end of the project, Recipients shall prepare and present a Final Project Briefing to the DOE on the results and accomplishments of the entire project.

Awards issued under this FOA are also subject to periodic DOE Peer Reviews, attendance/presenting at national/industry conferences, and a Reasonableness Review conducted by the DOE.

***** END OF DRAFT FORMAT FOR SOPO *****

[***** END OF PROJECT NARRATIVE FORMAT *****]

3C. PROJECT MANAGEMENT PLAN

File Name: PMP.pdf

The Project Management Plan (PMP) **should not exceed 10 pages**, and must be compiled

according to the following format. The PMP should include the following sections, with each section containing the information as described below:

***** START OF FORMAT FOR PROJECT MANAGEMENT PLAN *****

Title Page:

PROJECT MANAGEMENT PLAN
{Date Prepared}

SUBMITTED UNDER FUNDING OPPORTUNITY ANNOUNCEMENT

DE-FOA-0000997

“TITLE OF APPLICATION”

SUBMITTED BY

{Organization Name}
{Organization Address}
{City, State, Zip Code}

PRINCIPAL INVESTIGATOR

{Name}
{Phone Number}
{E-mail}

SUBMITTED TO

U.S. Department of Energy
Office of Electricity Delivery and Energy Reliability
National Energy Technology Laboratory

(End of Title Page)

I. Executive Summary: Provide a description of the project that includes the objective, project goals, and expected results. [For purposes of the application, this information is included in the document named PROJECT SUMMARY/ABSTRACT and the Project Narrative and should be simply copied to this document for completeness, so that the PMP is a stand-alone document.]

II. Risk Management: Provide a summary description of the proposed approach to identify, analyze, and respond to perceived risks associated with the proposed project. Project risk events are uncertain future events that, if realized, impact the success of the project. At a minimum, include the initial identification of significant technical,

resource, and management issues that have the potential to impede project progress and strategies to minimize impacts from those issues.

III. Organizational Breakdown Structure: Provide a project Organizational Breakdown Structure (OBS) describing lines of communication, management and reporting among team members along with a description of the organizational and individual roles, responsibilities, authorities, and task assignments for each project participant.

IV. Work Breakdown Structure: Provide a Work Breakdown Structure (WBS) indicating the resource requirements for each task or activity. Also include discussion of available resources to meet the labor, equipment, and material requirements as scheduled.

V. Microgrid Design and Testing Approach: Provide a summary discussion of the overall project approach, including a set of baselines and metrics to be used to measure and track project progress/performance. Provide a summary discussion of the proposed microgrid configuration and the plans for the microgrid system/controller testing. This discussion should include the option (modeling, simulation, etc.) chosen for testing and explain the rationale for the choice. As applicable, this summary should also briefly discuss the location (community, facility, etc.) identified for the test activities; DER assets available/participating in the selected microgrid area, test methodology (including baselines and metrics to be used to measure and track microgrid system design and controller performance); and a summary of communications and related activities that includes information on the mechanisms, messages, and methods that will be used to solicit participation in the testing activities.

VI. Milestone Log: Provide milestones for the project that include a title and planned completion date. Milestones should be quantitative and show progress toward achievement of project goals.

[Note: During the course of the project, the Recipient will report the Milestone Status as part of the required quarterly Progress Report as prescribed under Attachment 4, Reporting Requirements Checklist of the resulting Cooperative Agreement.

The Milestone Status will present actual performance in comparison with Milestone Log, and include:

- (1) the actual status and progress of the project,
- (2) specific progress made toward achieving the project's milestones, and
- (3) any proposed changes in the project's schedule required to complete milestones.]

VII. Funding and Costing Profile: Provide a table (the Project Funding Profile) that details the amount of government funding going to each project team member. Also provide a table (the Project Costing Profile) that illustrates a month-by-month breakdown of the planned expenditure of government funds for the entire project, and clearly identifies costs associated with proposed testing activities (as described in the Test Plan).

VIII. Project Timeline: Provide a timeline of the project (similar to a Gantt chart) broken down by each task and subtask, as described in the Statement of Project Objectives. The timeline should include a start date and end date for each task. The timeline should show interdependencies between tasks and include the milestones that are identified in the Milestone Log (described in paragraph VI above).

IX. Success Criteria at Decision Points: Provide success criteria for each decision point in the project, including go/no-go decision points; and the conclusions of key phases of the project. The success criteria should be objective and stated in terms of specific, measurable, and repeatable data. Usually, the success criteria pertain to desirable outcomes, results, and observations from the project.

[Note: As the first task in the Statement of Project Objectives, successful applicants will revise the version of the PMP submitted with their applications by including details from the award negotiation process. Recipients shall periodically update the PMP as the project progresses, and must use this plan to report schedule and budget variances.]

***** END OF DRAFT FORMAT FOR PROJECT MANAGEMENT PLAN *****

3D. APPENDICES TO PROJECT NARRATIVE - (the following appendices shall be submitted as *ONE all-encompassing file* entitled "Appendix.pdf" under Add Optional Other Attachment on the Other Attachments Form):

NOTE: The following appendices to the Project Narrative **will not count** in the Project Narrative page limitation.

- **Bibliography And References Appendix:** Provide a bibliography of any references cited in the Project Narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Applicants should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application. To reduce the number of files attached to your application, please provide the Bibliography and References Cited information as an appendix to your project narrative.

- **Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers Appendix:** Provide the following information in this section:
 - **Collaborators and Co-editors:** List in alphabetical order all persons, including their current organizational affiliation, who are, or who have been, collaborators or co-authors with you on a research project, book or book article, report, abstract, or paper during the 48 months preceding the submission of this application. Also, list any individuals who are currently, or have been, co-editors with you on a special issue of a journal, compendium, or conference proceedings during the 24 months preceding the submission of this application. If there are no collaborators

- or co-editors to report, state "None."
- Graduate and Postdoctoral Advisors and Advisees: List the names and current organizational affiliations of your graduate advisor(s) and principal postdoctoral sponsor(s) during the last 5 years. Also, list the names and current organizational affiliations of your graduate students and postdoctoral associates.
- **Roles of Participants Appendix:** For multi-organizational or multi-investigator projects, describe the roles and the work to be performed by each participant/investigator, business agreements between the applicant and participants, and how the various efforts will be integrated and managed.
- **Multiple Principal Investigators (PIs) Appendix:** The applicant, whether a single organization or team/partnership/consortium, must indicate if the project will include multiple PIs. This decision is solely the responsibility of the applicant. If multiple PIs will be designated, the application must identify the Contact PI/Project Coordinator and provide a "Coordination and Management Plan" that describes the organization structure of the project as it pertains to the designation of multiple PIs. This plan should, at a minimum, include:
 - process for making decisions on scientific/technical direction;
 - publications;
 - intellectual property issues;
 - communication plans;
 - procedures for resolving conflicts; and
 - PIs' roles and administrative, technical, and scientific responsibilities for the project.
- **Facilities And Other Resources Appendix:** Identify the facilities (e.g., office, laboratory, computer, etc.) to be used at each performance site listed and, if appropriate, indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Describe only those resources that are directly applicable to the proposed work. Provide any information describing the other resources available to the project such as machine and electronics shops. For each site, the following items should be addressed at a minimum: 1) street address of the proposed site (If a street address is not adequate to locate the site, provide additional location description such as latitude and longitude); 2) a brief description of the site and its surroundings (e.g., topography, geology, etc.); 3) access to transportation, utilities, or other amenities necessary to execute the project; 4) evidence of ownership or legal right to utilize the site for the duration of the project (e.g., deed or lease agreement) or plans to obtain legal rights to utilize the site for the duration of the project; and 5) any additional pertinent environmental information relevant to the execution of the project that has not been specifically addressed in the Environmental Questionnaire.
- **Equipment Appendix:** List major items of equipment already available for this project and, if appropriate, note the location and pertinent capabilities of each. For purposes of this FOA, "major" means equipment having a fair market value in excess of \$5,000. If you are proposing to acquire equipment, describe comparable equipment, if any, already at your organization and explain why it cannot be used.
- **Commitment Letters from Third Parties Contributing to Cost Sharing Appendix:**

At the time you submit your application, you must have a letter from each third party (i.e., a party other than the organization submitting the application) who will be contributing cost share. The letter must state that the third party is committed to providing a specific minimum dollar amount of cost sharing and must be signed by the person authorized to commit the expenditure of funds by the entity. In an appendix, you must identify the following information for each third party contributing to cost sharing: (1) the name of the organization; (2) the scope of the effort to be provided by referencing tasks within the Statement of Project Objectives; (3) the proposed dollar amount to be provided; (4) the amount as a percentage of the total project cost; and (5) the proposed cost sharing: cash, services, or property.

- **Collaboration/Participation Letter Appendix:** Eligible applicants shall provide a Collaboration/Participation Letter ensuring collaboration by technology vendor/developers, a minimum of one (1) U.S. community and its load serving entity or electric utility, and other project team members pursuant to the mandatory requirements outlined in Section I of this FOA. Letters must be signed by the person authorized to commit the prospective team partner to participation in the project and be provided in a PDF format.

- **Senior/Key Personnel Appendix:** Beginning with the Project Director/Principal Investigator(s) (PD/PI), provide a profile for each senior/key person proposed. A senior/key person is any individual who contributes in a substantive, measurable way to the scientific/technical development or execution of the project, whether or not a salary is proposed for this individual. SubRecipients and consultants must be included if they meet this definition. For each senior/key person provide:

Biographical Sketch: Complete a biographical sketch for each senior/key person and attach to the "Attach Biographical Sketch" field in each profile. The biographical information for each person must not exceed 2 pages when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and must include:

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

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

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

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

Synergistic Activities. List no more than 5 professional and scholarly activities related to the effort proposed.

Current and Pending Support. Provide a list of all current and pending support (both Federal and non-Federal) for the Project Director/Principal Investigator(s) and senior/key persons, including sub-recipients, for ongoing projects and pending applications. For each organization providing support, show the total award amount for the entire award period (including indirect costs) and the number of person-months per year to be devoted to the project by the senior/key person. Concurrent submission of an application to other organizations for simultaneous consideration will not prejudice its review.

Note: All appendices to the Project Narrative **shall be submitted in ONE FILE entitled “Appendix.pdf” under Add Optional Other Attachment on the Other Attachments Form.**

Please also attach the following files by clicking the “Add Optional Other Attachment” to attach:

3E. BUDGET FOR DOE FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTER (FFRDC) CONTRACTOR, IF APPLICABLE

File name: *FFRDCname.pdf*

If a DOE FFRDC contractor or DOE National Laboratory is to perform a portion of the work, you must provide a DOE Field Work Proposal in accordance with the requirements in DOE Order 412.1 Work Authorization System. This order and the DOE Field Work Proposal form are available at <https://www.directives.doe.gov/directives/current-directives/412.1-BOrder-a/view>. Use the FFRDC name as the file name (up to 10 letters) and attach by clicking the “Add Optional Other Attachment” button.

3F. ENVIRONMENTAL QUESTIONNAIRE

File name: EQ.pdf

Applicants must complete the environmental questionnaire at http://www.netl.doe.gov/business/forms/451_1-1-3.pdf for each performance site. Save the questionnaire(s) in a single file named "EQ.pdf" and click on “Add Optional Other Attachment” to attach.

Note: As soon as possible after being notified of selection for an award, successful applicants shall submit an updated EQ that reflects any changes (especially in proposed work locations) that may have occurred in the information that was included in the original questionnaire submitted with the application.

3G. SF 424 A EXCEL, BUDGET INFORMATION - NON-CONSTRUCTION PROGRAMS FILE

File name: SF424A.xls or.xlsx

Applicants must provide a separate budget for each year of support requested and a cumulative

budget for the total project period. Use the SF 424 A Excel, "Budget Information - Non Construction Programs" form on the DOE Financial Assistance Forms Page at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms> under DOE budget forms.

Applicants may request funds under any of the Object Class Categories as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (See Section IV.G). Save the information in a single file named "SF424A.xls or.xlsx," and click on "Add Optional Other Attachment" to attach.

3H. BUDGET JUSTIFICATION FILE

File name: RecipientBudgetJustification.xls or.xlsx

You must justify the costs proposed in each Object Class Category/Cost Classification category (e.g., identify key persons and personnel categories and the estimated costs for each person or category; provide a list of equipment and cost of each item; identify proposed subaward/consultant work and cost of each subaward/consultant; describe purpose of proposed travel, number of travelers, and number of travel days; list general categories of supplies and amount for each category; and provide any other information you wish to support your budget). Provide the name of your cognizant/oversight agency, if you have one, and the name and phone number of the individual responsible for negotiating your indirect rates. Also, see Section VIII.K for additional items that need to be factored into the budget.

Applicants shall use the modified Detailed Budget Justification form (OMB Number 1910-5162) provided as an attachment to this announcement and also embedded below. Save the information in a single file named "RecipientBudgetJustification.xls or.xlsx" and click on "Add Optional Other Attachment" to attach.



Detailed Budget
Justification.xlsx

Note: Budget Plan for Testing: Testing of microgrid systems/controllers (as described in the applicant's Microgrid System Design and Test Plan) must be entered as a separate, clearly identified budget item under the "Months 19 – 24 (6 month test period) category" in the Budget Justification form. This budget amount will only be authorized for expenditure upon DOE acceptance of the Recipient's final test plan (see Deliverables Section of the Statement of Project Objectives located in Section IV.C.3B).

SUBAWARD BUDGET FILE(S)

3I. SUBAWARD SF-424 A, IF APPLICABLE

File name: *Subawardeename424*.xls or.xlsx

Applicants must provide a separate budget (i.e., budget for each budget year and a cumulative

budget) for each subawardee that is expected to perform work estimated to be more than \$100,000 or 50 percent of the total work effort (whichever is less). Use the SF 424 A Excel for Non Construction Programs. The form is found on the DOE Financial Assistance Forms Page at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms> under DOE budget forms. Save each Subaward budget in a separate file. Use up to 10 letters of the subawardee's name (plus .xls or .xlsx) as the file name (e.g., ucla.xls or energyres.xls or .xlsx), and click on "Add Optional Other Attachment" to attach.

3J. SUBAWARD BUDGET JUSTIFICATION, IF APPLICABLE

File name: *Subawardeename*BudgetJustification.xls or .xlsx

Applicants must also provide a separate budget justification for each subawardee that is expected to perform work estimated to be more than \$100,000 or 50 percent of the total work effort (whichever is less). Use the modified Detailed Budget Justification form (OMB Number 1910-5162) provided as an attachment to this announcement and also embedded below. Save the information in a single file named “Subawardee_name BudgetJustification.xls or .xlsx” and click on “Add Optional Other Attachment” to attach.



Detailed Budget Justification.xlsx

4. DISCLOSURE OF LOBBYING ACTIVITIES: Standard Form LLL (SF-LLL)

If applicable, complete an SF-LLL form. Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, you must complete and submit Standard Form - LLL, “Disclosure Form to Report Lobbying.”

5. ADDITIONAL FILES, AS APPLICABLE

See Table below and Sections VIII.J through VIII.L for additional files that may need submitted with the application, as applicable.

SUMMARY OF REQUIRED FORMS AND FILES

All applications submitted in response to this FOA must include the following documents:

Name of Document	Format	File Name
SF-424 Application for Federal Assistance	Form	N/A
Project/Performance Site Location(s)	Form	N/A
Other Attachments Form - Attach the following	Form	

files to this form:		
3A. Project Summary/Abstract	PDF	Summary-Abstract.pdf
3B. Project Narrative File (Mandatory Other Attachment – maximum of 30 pages) – Page limit includes Statement of Project Objectives (~ 5 pages), and Microgrid System Design and Test Plan (not more than 10 pages)	PDF	Narrative.pdf
Other Attachments:		
3C. Project Management Plan (10 pages)	PDF	PMP.pdf
3D. Appendices: <ul style="list-style-type: none"> • Bibliography & References Cited • Identification of Potential Conflicts of Interest or Bias in Selection of Reviews • Roles of Participants • Multiple Principal Investigators • Facilities & Other Resources • Equipment • Commitment Letters from Third Parties Contributing to Cost Sharing • Collaboration/Participation Letters • Senior/Key Personnel 	PDF	Appendix.pdf
3E. Budget for DOE Federally Funded Research and Development Center (FFRDC) Contractor, if applicable	PDF	<i>FFRDCname.pdf</i>
3F. Environmental Questionnaire	PDF	EQ.pdf
3G. SF 424 A Excel, Budget Information – Non-Construction Programs File (include separate entry - Budget Plan for Testing)	Excel	SF424A.xls or xlsx
3H. Budget Justification File (Prime Applicant)	Excel	RecipientBudgetJustification.xls or xlsx
3I. Subaward SF 424 A Budget Files, if applicable	Excel	<i>Subawardeename424.xls</i> or xlsx
3J. Subaward Budget Justification, if applicable	Excel	<i>SubawardeenameBudgetJustification.xls</i> or xlsx
4. SF-LLL Disclosure of Lobbying Activities, if applicable	Form	N/A
5. Waiver Request- (a) Foreign Entities and (b) Performance of Work in the United States (If Applicable) – See Section VIII.J and VIII.L, as applicable	PDF	LeadOrganization_Waiver.pdf and/or PerformanceofWork_Waiver.pdf

5. Indirect Rate Agreement (If Applicable) – See Section VIII.K	PDF	RateAgreement.pdf
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D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS

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

- Indirect cost information.
- Other budget information.
- Updated Environmental Questionnaire.
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5).
- Representation of Limited Rights Data and Restricted Software, if applicable.

E. SUBMISSION DATES AND TIMES

1. Pre-application Due Date

Pre-applications are not required.

2. Application Due Date

Applications **MUST** be received by *April 28, 2014*, not later than *3:00:00 PM Eastern Time*. You are encouraged to transmit your application well before the deadline.

It is strongly recommended that application submission begin well in advance (at least 48 hours) of the FOA closing.

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

F. INTERGOVERNMENTAL REVIEW

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

G. FUNDING RESTRICTIONS

Funding for all awards and future budget periods are contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.

Cost Principles. Costs must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles referenced in 10 CFR 600. The cost principles for commercial organization are in FAR Part 31.

Pre-award Costs. Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, but after the date the project was selected by the DOE, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period. Pre-award costs are incurred at the applicant's risk. The DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

H. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS

1. Where to Submit

APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV TO BE CONSIDERED FOR AWARD.

Submit electronic applications through the "Apply for Grants" function at www.Grants.gov. If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726, or send an email to support@grants.gov.

2. Registration Process

One Time Registration Process

You must COMPLETE the one-time registration process (all steps) before you can submit your first application through Grants.gov (See http://www.grants.gov/applicants/get_registered.jsp). We recommend that you start this process at least six weeks before the application due date. It may take 44 days or more to complete the entire process. Use the Grants.gov Organizational Registration Checklists at <http://www.grants.gov/assets/OrganizationRegCheck.pdf> to guide you through the process. **IMPORTANT:** During the SAM registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner Identification Number" (MPIN). When you have completed the process, you should call the Grants.gov Helpdesk at 1-800-518-4726 to verify that you have completed the final step (i.e., Grants.gov registration).

3. Application Receipt Notices

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of four e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. The titles of the four e-mails are:

Number 1 - Grants.gov Submission Receipt Number

Number 2 - Grants.gov Submission Validation Receipt for Application Number

Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number

Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

Section V - APPLICATION REVIEW INFORMATION

Applications received by the DOE in response to this FOA will be subject to evaluation based on the criteria specified in Section V.A, and the process described in Section V.B. The process consists of an initial screening followed by a comprehensive merit review to select applicants for negotiation of awards (cooperative agreements).

A. CRITERIA

1. Initial Review Criteria

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the funding opportunity announcement has been submitted; (3) the proposed project is responsive to the objectives of the funding opportunity announcement; and (4) the Applicant Team meets the mandatory requirements set forth in Section III. Applications that fail to pass the initial review will not be forwarded for merit review and will be eliminated from further consideration.

2. Merit Review Criteria

Criterion 1: Significance and Impact (Weight = 30%)

- Significance, reasonableness and feasibility of the proposed technology/solution in aiding achievement of the DOE targets. Degree to which the proposed microgrid controller/system design would improve the reliability, efficiency, security, and resiliency of the nation's grid.
- Significance of the proposed development vs. existing practices – Extent to which the proposed project considers benefits in terms of anticipated performance improvements (technical, operational, and environmental aspects) and cost savings over present practices.
- Degree to which the proposed technology is broadly applicable and adaptable for microgrid applications in a cost effective manner.
- Degree to which the proposed microgrid system design is replicable and fosters or provides for continued, wide-spread adoption of commercial-scale microgrid systems.
- Soundness of the commercialization approach, including information on identification of potential markets and marketing strategies, and on projected penetration rates for the microgrid controller being developed/tested. Adequacy of the discussion regarding the viability and practicability of the proposed technology and/or solution in meeting the needs of the target market in a cost effective manner.

Criterion 2: Technical Merit (Weight = 20%)

- Extent to which the proposed project will support achieving the microgrid functions in Section I.C.1 through I.C.6.
- Degree of innovation towards improving the commercial viability of microgrid technology/solutions.

- Extent to which the proposed work is based on sound scientific and engineering principles.
- Validity of the approach and likelihood of success based on the level of maturity of the proposed technology/solutions.
- Adequacy and completeness of the approach to address interoperability and cyber security concerns associated with integration of the new technology/application into the existing environment.

Criterion 3: Microgrid System Design and Test Plan (Weight = 20%)

- Completeness of the microgrid system design in defining the problem and solution approach, and how the system design, once implemented, will adequately solve the problem.
- Appropriateness and completeness of the preliminary test plan including performance objectives; the criteria and requirements used in selecting test site(s), data collection/evaluation/analysis methodology, the delivery of project test data and information, how success will be measured/validated testing methods and scenarios; testing criteria; risk issues; test schedule; data collection; and evaluation/analysis of collected data and test results and how data/findings will be shared/disseminated.
- Adequacy of the test plan in providing appropriate baseline conditions that facilitate ready identification, measurement of progress, and comparison of expected and actual results.
- Validity of the test approach and methodology to validate implementation of the microgrid functions in Section I.C.1 through I.C.6 and meeting the specific performance objectives and targets in Section I.D.3.
- Adequacy of proposed test facilities and capabilities in carrying out all the proposed testing.

Criterion 4: Project Plan (Weight = 15%)

- Appropriateness of rationale, comprehensiveness and completeness of the Statement of Project Objectives (SOPO) in describing the proposed tasks.
- Comprehensiveness of the Project Management Plan (PMP) in explaining how the project will be managed to achieve stated objectives, including go/no-go decision criteria and risk assessment/mitigation plan. Adequacy of plans for conducting a feasibility study relating to possible future deployment/demonstration of the proposed solution.
- Adequacy, reasonableness, and soundness of the plan for coordinating, directing, and performing the proposed work, controlling project costs, and managing all project team members.
- Adequacy of the risk analysis to identify and mitigate potential risks or provide alternate solutions. Degree to which the methodology will be successful in identifying and overcoming the most challenging aspects of designing/deploying commercial-scale microgrid systems.
- Adequacy of the project timetable/schedule, task interdependencies, and milestones to successfully accomplish project objectives on time and within the proposed budget.

Criterion 5: Project Team (Weight = 15%)

- Completeness of the documentation describing the qualifications (credentials, capabilities, experience) of the proposed project team and key personnel regarding microgrid technology/applications.
- Degree to which the roles and responsibilities of the project team are clearly stated/defined.
- Suitability and adequacy of the proposed facilities to successfully test the developed technology/solution.
- Demonstrated level of corporate commitment to the proposed project as evidenced by letters of commitment and planned cost share contributions from all proposed team members.
- Demonstrated level of corporate commitment to commercialization of the proposed technology by providing convincing examples of the applicant's plans to commercialize the technology.

3. Other Criteria/Program Policy Factors

The Selection Official may also consider the following program policy factors in selecting projects for award:

1. It may be desirable to select for award a project or group of projects which represents a diversity of technical approaches and applications;
2. It may be desirable to support complementary and/or duplicative efforts or projects, which, when taken together, will best achieve the DOE program targets;
3. It may be desirable to select different kinds and sizes of organizations in order to provide a balanced programmatic effort and a variety of different technical perspectives;
4. It may be desirable to select project(s) of less technical merit than other project(s) if such a selection will optimize use of available funds by allowing more projects to be supported and not be detrimental to the overall objectives of the program; and
5. It may be desirable to select project(s) that reduce Federal investment and maximize corporate commitment as demonstrated by cost share levels that exceed the required minimum.

B. REVIEW AND SELECTION PROCESS

1. Merit Review

Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance." This guide is available at <http://energy.gov/management/office-management/operational-management/financial-assistance> under Financial Assistance Policy and Guidance.

Applications Subject to National Environmental Policy Act (NEPA) Review

This FOA requires applicants to submit Environmental Questionnaires (EQ) with their initial Applications for all projects. Based on this information, the NETL Environmental Compliance Division (ECD) will provide an appropriate NEPA determination.

All recommended applications will be provided to ECD so the requirements of 10 CFR 1021.216 (216 review) may be fulfilled. ECD will determine if an Environmental Critique and an Environmental Synopsis are required. Should any project(s) require an Environmental Assessment (EA) or Environmental Impact Statement (EIS), the requirement will be incorporated into the Statement of Project Objectives of the award.

2. Selection

The Selection Official will consider the merit review recommendation(s), program policy factors, and the amount of DOE funds available for issuing awards under this FOA.

3. Discussions and Award

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

C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES

The DOE anticipates notifying applicants selected for award in June, 2014 and subsequently making awards by no later than the end of September, 2014.

Section VI - AWARD ADMINISTRATION INFORMATION

A. AWARD NOTICES

1. Notice of Selection

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

Non-selected Notification

Organizations whose applications have not been selected will be advised as promptly as possible.

2. Notice of Award

An Assistance Agreement issued by the contracting officer is the authorizing award document. It normally includes either as an attachment or by reference: (1) Special Terms and Conditions; (2) Applicable program regulations, if any; (3) Application as approved by the DOE; (4) DOE assistance regulations at 10 CFR part 600, or, for Federal Demonstration Partnership (FDP) institutions, the FDP terms and conditions; (5) National Policy Assurances To Be Incorporated As Award Terms; (6) Budget Summary; and (7) Federal Assistance Reporting Checklist, which identifies the reporting requirements.

For grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR the Award also includes the Research Terms and Conditions located on the National Science Foundation (NSF) web site at <http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp>.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

1. Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR 600 (See: <http://www.eCFR.gov>). Grants and cooperative agreements made to universities, non-profits and other entities subject to Title 2 CFR are subject to the Research Terms and Conditions located on the NSF web site at <http://www.nsf.gov/bfa/dias/policy/rtc/index.jsp>.

DUNS AND SAM/CCR REQUIREMENTS

Additional administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR, Part 25 (See: <http://www.eCFR.gov>). Prime awardees must keep their data in the System for Award Management (SAM) at <http://www.sam.gov> current. SAM is the government-wide system that replaced the CCR. If you had an active registration in the CCR, you have an active registration in SAM. Subawardees at all tiers must obtain DUNS numbers and provide the DUNS number to the prime awardee before the subaward can be issued.

SUBAWARD AND EXECUTIVE REPORTING

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR, Part 170. (See: <http://www.eCFR.gov>). Prime awardees must register with the new FSRS database and report the required data on their first tier subawardees. Prime awardees must report the executive compensation for their own executives as part of their registration profile in the SAM.

2. Special Terms and Conditions and National Policy Requirements

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

<http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms> under Award Terms.

The National Policy Assurances To Be Incorporated As Award Terms are located at <http://www.nsf.gov/bfa/dias/policy/rte/appc.pdf> and at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms> under Award Terms.

Intellectual Property Provisions. The standard DOE financial assistance intellectual property provisions applicable to the various types of Recipients are located at:

<http://energy.gov/gc/standard-intellectual-property-ip-provisions-financial-assistance-awards>.

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

Equipment and Property. Disposition of property acquired under awards resulting from this FOA will be governed by the applicable sections of the DOE Financial Assistance Regulations (10 CFR 600).

Corporate Felony Conviction and Federal Tax Liability Representations

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

- (1) It is not a corporation that has been convicted (or had an officer or agent of such corporation acting on behalf of the corporation convicted) of a felony criminal violation under any Federal law within the preceding 24 months,
- (2) No officer or agent of the corporation have been convicted of a felony criminal violation for an offense arising out of actions for or on behalf of the corporation under Federal law in the past 24 months, and
- (3) It is not a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

For purposes of these representations the following definitions apply:

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

Statement of Substantial Involvement

There will be substantial involvement between the DOE and the Recipient during performance of the resultant cooperative agreement. Pursuant to 10 CFR 600.5(b) & (d), the DOE will share responsibility for the management, control, and direction of the Project, and has the right to intervene in the conduct and performance of project activities for programmatic reasons.

Sample substantial involvement language is included below but the DOE Contract Specialist and DOE Project Officer may negotiate the Statement of Substantial Involvement with the Recipient prior to award.

RECIPIENT'S RESPONSIBILITIES. Recipients are responsible for:

- Performing the activities supported by this award in accordance with the Statement of Project Objectives and Project Management Plan, including providing the required personnel, facilities, equipment, supplies, and services;
- Managing and controlling project activities, including coordinating any Federally Funded Research and Development Center (FFRDC) activities performed in the project, in accordance with established processes and procedures to ensure tasks and subtasks are completed within schedule and budget constraints defined by the current Project Management Plan;
- Implementing an approach to identify, analyze, and respond to project risks that is commensurate with the complexity of the project;
- Defining and revising approaches and plans, submitting the plans to the DOE for review, and incorporating DOE comments;
- Coordinating related project activities with external suppliers, including DOE M&O contractors, to ensure effective integration of all work elements;
- Attending periodic program review meetings/briefings and reporting project status;
- Submitting technical reports to the DOE for review and incorporating DOE comments; and;
- Presenting the project results at appropriate technical conferences or meetings as recommended by the DOE Project Officer.

DOE RESPONSIBILITIES. The DOE is responsible for:

- Reviewing in a timely manner project plans, including project management, testing and technology transfer plans, and recommending alternate approaches, if the plans do not address critical programmatic issues;
- Participating in project management planning activities, including risk analysis, to ensure

DOE's program requirements or limitations are considered in performance of the work elements;

- Conducting periodic program review meetings and site visits to ensure adequate progress and that the work accomplishes the program and project objectives;
- Recommending alternate approaches or shifting work emphasis, if needed;
- Monitor the work effort to ensure that project results address critical system and programmatic goals established by the DOE Office of Electricity (OE), in coordination with the DOE Microgrid Demonstration Program;
- Promoting and facilitating technology transfer activities, including disseminating program results through presentations and publications;
- Serving as scientific/technical liaison between awardees and other program or industry staff;
- Overseeing work performed by FFRDCs and other agencies (if applicable) in support of the project;
- Implementing revisions to the tasks performed by FFRDCs and other agencies, if needed and within available funding;
- Working to identify and provide guidance on any issues related to availability of Smart Grid technologies/supplies;
- Providing the Recipient with guidance on any cyber-security requirements that are necessary;
- Utilizing, as necessary, resources of the Technical Advisory Group (TAG) to assist in developing guidelines and criteria for testing microgrid system designs/controllers, observing/witnessing testing, auditing/analyzing test results, determining the appropriate data to be gathered and providing an overall programmatically consistent approach for technical, economic, and benefit analysis based on the gathered data. In support of this effort, the TAG and/or DOE Project Officer will be significantly involved to assist in:
 - Establishing project goals, metrics, and data requirements;
 - Determining specific data to be collected, frequency of collection, & method of collection;
 - Determining relevant approaches to use/analyze raw data;
 - Developing baseline metrics, costs and performance goals prior to demonstrating developed technologies and systems;
 - Determining testing and demonstration costs and performance expectations; and
 - Comparing cost and performance of microgrid testing area(s) before and after introduction of developed technologies and systems.

Foreign National Involvement

All applicants selected for an award resulting from this FOA may be required to provide information to the Department of Energy in order to facilitate our responsibilities associated with foreign national access to DOE sites, information, technologies, and equipment. Foreign national is defined as any person who was born outside the jurisdiction of the United States, is a citizen of a foreign government, and has not been naturalized under U.S. law. If the selected applicant, including sub-recipients/contractors, anticipates utilizing a foreign national person in the performance of an award, the selected applicant may be responsible for providing to the DOE representative specific information of the foreign national(s) to satisfy compliance with all

of the requirements for access approval.

C. REPORTING

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. The checklist is available at: <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms> under Award Forms.

Section VII - QUESTIONS/AGENCY CONTACTS

A. QUESTIONS

Questions regarding the content of the announcement must be submitted through the FedConnect portal. You must register with FedConnect to respond as an interested party to submit questions, and to view responses to questions. It is recommended that you register as soon after release of the FOA as possible to have the benefit of all responses. The DOE/NNSA will try to respond to a question within three (3) business days, unless a similar question and answer have already been posted on the website.

Questions and comments concerning this FOA shall be submitted not later than five (5) calendar days prior to the application due date. Questions submitted after that date may not allow the Government sufficient time to respond.

Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or support@grants.gov. The DOE/NNSA cannot answer these questions.

B. AGENCY CONTACT

Name: John Hatfield
E-mail: John.Hatfield@netl.doe.gov

As stated in paragraph A, questions must be submitted through FedConnect or to grants.gov, as appropriate, and shall **not** be submitted to the Agency Contact. If questions are submitted directly to the Agency Contact, he will advise the interested party to submit the question via the appropriate portal and will not respond to questions via email.

Section VIII - OTHER INFORMATION

A. MODIFICATIONS

Notices of any modifications to this announcement will be posted on Grants.gov and the FedConnect portal. You can receive an email when a modification or an announcement message is posted by registering with FedConnect as an interested party for this FOA. It is recommended that you register as soon after release of the FOA as possible to ensure you receive timely notice of any modifications or other announcements.

B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE

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

C. COMMITMENT OF PUBLIC FUNDS

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

Funding for all awards and future budget periods (if any) are contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority.

D. PROPRIETARY APPLICATION INFORMATION

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

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

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

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

Applicants shall not identify the entire Project Narrative as proprietary and shall only identify those specific pages and lines that do indeed contain proprietary information.

E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL

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

F. INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM

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

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

Program Covered Under Special Protected Data

Special Protected Data Statutes. This program is covered by a special protected data statute. The provisions of the statute provide for the protection from public disclosure, for a period of up to five (5) years from the development of the information, of data that would be trade secret, or commercial or financial information that is privileged or confidential, if the information had been obtained from a non-Federal party. Generally, the provision entitled Rights in Data Programs Covered Under Special Protected Data Statutes (10 CFR 600 Appendix A to Subpart D), would apply to an award made under this announcement. This provision will identify data or categories of data first produced in the performance of the award that will be made available to the public, notwithstanding the statutory authority to withhold data from public dissemination, and

will also identify data that will be recognized by the parties as protected data.

G. NOTICE OF RIGHT TO REQUEST PATENT WAIVER / CLASS PATENT WAIVER

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

The government will have certain statutory rights in an invention that is conceived or first actually reduced to practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. **Pursuant to 10 CFR Part 784, the DOE intends to execute a class patent waiver for awards issued under this announcement. Any entities other than a domestic small business or domestic nonprofit organization, which do not need to request a waiver, can elect to participate in the class waiver if they meet the requirements set forth in the waiver determination.** Under this determination, it will not be necessary for that entity to apply for an advance patent waiver.

Domestic Small Business Firms, and Nonprofit Organizations (including Universities): Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small business firms and nonprofit organizations may elect to retain title to their subject inventions subject to the provisions of the Bayh-Dole Act.

H. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES

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

I. CONFERENCE SPENDING

The Recipient shall not expend funds for the purpose of defraying the cost to the United States Government of a conference [described in subsection (c) of the Consolidated and Further Continuing Appropriations Act, 2013] that was more than \$20,000, or circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General or senior ethics official for any entity without an Inspector General, of the date, location, and

number of employees attending such conference that is not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded.

J. FOREIGN ENTITY WAIVER REQUEST

As set forth in Section III.A.3, all prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. If a foreign entity applies for funding as a prime Recipient, it must designate a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the prime Recipient.

To request a waiver for this requirement, the Applicant must submit a waiver request in the Application, which includes the following information: entity name, country (or state) of incorporation, description of the work to be performed by that entity, and the location where the work will be performed. If the applicant is seeking a waiver to have a foreign entity serve as the prime Recipient, the applicant must explain why it is necessary to have a foreign entity serve as the prime Recipient. Waiver requests should explain how the waiver would further the purposes of this FOA and otherwise serve the interests of the DOE. The Contracting Officer may require additional information before considering the waiver request. Save the Waiver Request(s) in a single file titled: "LeadOrganization_Waiver.pdf".

K. REQUIREMENTS FOR SELECTED APPLICANTS

Accounting System: If your application is selected for negotiation toward award, you should have an accounting system that meets government standards for recording and collecting costs. See 10 CFR 600.121, 10 CFR 600.220, or 10 CFR 600.311 for the applicable standards. If you have not had prior government awards or a recent accounting system review, the DOE may request that the Defense Contract Audit Agency (DCAA) or an independent auditor verify that the accounting system is acceptable. A resulting cooperative agreement may contain a Term and Condition that prohibits DOE reimbursement until the system is deemed acceptable.

Indirect Costs & Indirect Rates: Indirect costs are an acceptable cost component of an approved budget if they are adequately supported and properly allocated. Potential Recipients and major sub-recipients proposing indirect costs will need to demonstrate that the proposed indirect (e.g., overhead, G&A) rates were developed using a methodology acceptable for Government contracting, and in accordance with applicable Federal cost principles. If a current provisional indirect rate agreement has been issued by a Federal agency, that agreement should be provided with the Application as "RateAgreement.pdf" (see the table under "Summary of Required Forms/Files in Section IV above). The Recipient and major sub-recipients may be subject to an audit/review if an approved rate agreement is not available or an indirect rate audit has not been performed within the previous twelve months.

Compliance with the resultant Reporting Requirements Checklist requires the submission of an Annual Indirect Cost Proposal and Reconciliation. Potential Recipients and sub-recipients should be aware that this requirement mandates annual indirect cost reconciliations (i.e., Annual Indirect Cost Proposal) be prepared and submitted; this proposal is due within six (6) months of the Recipient and/or sub-recipient's fiscal year end. Since the Reporting Requirements Checklist instructions do not provide a format for this proposal, a suggested format can be found at <http://www.dcaa.mil/ice.htm>. This proposal is developed using the actual, allowable costs incurred by the Recipient during each fiscal year period. This is not a project-specific proposal; it must encompass the organization's entire business base (Government and commercial), and it must incorporate the total direct and indirect costs incurred to develop the actual indirect rates for each fiscal year. Because the proposal is not project-specific, the costs to prepare the proposal should be classified as indirect costs, part of the organization's indirect pool of expenses. If DOE is not the cognizant federal agency for negotiating and approving indirect rates, an informational copy of the proposal may be requested.

Annual Compliance Audits: If a for-profit entity is the Prime Recipient, an annual compliance audit performed by an independent auditor may be required. For additional information, please refer to 10 C.F.R. § 600.316 along with for-profit audit guidance documents posted under the "Coverage of Independent Audits" heading at <http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms>

If an educational institution, non-profit organization, or state/local government is a Prime Recipient or SubRecipient and has expended greater than \$500K of Federal funds in a respective fiscal year, then an A-133 audit is required. For additional information, please refer to OMB Circular A-133 link below.

<http://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a133/a133.pdf>

Applicants shall propose sufficient costs in the project budget to cover the costs associated with the annual audit.

Notice of Potential Disclosure Under Freedom of Information Act: Applicants are advised that identifying information regarding all applicants, including but not limited to applicant names and/or points of contact, may be subject to public disclosure under the Freedom of Information Act, whether or not such applicants are selected for negotiation of award.

L. PERFORMANCE OF WORK IN THE UNITED STATES WAIVER REQUEST

As set forth in Section III.D, 100 percent of the direct labor cost for the project (including sub-recipient labor) shall be incurred in the United States, unless the Recipient can demonstrate to the satisfaction of the Department of Energy that the United States economic interest will be better served through a greater percentage of the work being

performed outside of the United States.

To request a waiver for this requirement, the Applicant must submit a waiver request in the Full Application, which includes the following information: entity name, description of work to be performed outside the United States and the location where the work will be performed. Waiver requests should explain how the waiver would further the purposes of this FOA and otherwise serve the interests of the Department of Energy. The Contracting Officer may require additional information before considering the waiver request.

Save the Waiver Request(s) in a single file titled: "PerformanceofWork_Waiver.pdf"

Section IX - APPENDICES/REFERENCE MATERIAL

Appendix A – Tables of CO₂ Marginal Emissions Factors (MEF)

Tables A.1 through A.8 provide the CO₂ marginal emissions factors for the eight regional entities (RE)¹⁴ (except Alaska and Hawaii) as defined by the National Electric Reliability Council (NERC). For purposes of this FOA, the factors should be used to define annual marginal emissions baseline metrics based on existing conditions for the proposed microgrid area. The baseline values should then be compared to the results obtained after testing (simulated deployment) of the microgrid design/controller in order to measure the project’s progress in achieving the DOE program target of reducing emissions by at least 20 percent. Refer to Section I.B for additional information about this and the other DOE targets.

Data in the tables were obtained from:

Siler-Evans, K., Azevedo, I.L., Morgan, M.G., (2012). Marginal emissions factors for the US electricity system. Environmental Science & Technology, 46 (9), pp. 4742–4748

Table A.1: CO₂ MEFs for Florida Reliability Coordinating Council (FRCC)

Time Of Day	CO ₂ MEFs for the FRCC (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	489.7578283	583.1846234	529.8707165
2	496.0384031	614.9966116	543.9586935
3	553.8194306	514.1426777	537.0399389
4	565.4373937	508.9801242	555.7582046
5	567.1382456	478.5432457	543.1223193
6	571.6144499	499.9094146	506.3428052
7	540.5450544	437.3308477	530.8818317
8	602.832567	524.7800481	557.392074
9	554.3176289	543.4303678	524.3521462
10	527.2779398	542.6943458	518.6997834
11	451.882093	523.6583098	503.7343226
12	453.397147	529.5452222	469.659542
13	462.0752948	504.943731	483.8891023
14	484.1584678	552.4953683	492.1391502
15	471.8471916	557.0999206	492.0316204
16	458.7336713	492.5866932	457.5752528
17	394.2206803	495.1445969	474.1644607
18	371.4319615	476.6043254	525.1062425
19	468.3202262	519.9170165	525.9420505
20	519.7657876	554.7035204	517.4760611
21	513.3973024	573.9941388	510.7288862
22	503.196857	559.5827474	527.8946555
23	544.9343355	571.4313979	536.9019045
24	503.0321699	596.4642009	562.2362617

¹⁴ <http://www.nerc.com/AboutNERC/keyplayers/Pages/default.aspx>

Table A.2: CO₂ MEFs for Midwest Reliability Organization (MRO)

Time Of Day	CO ₂ MEFs for the MRO (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	949.2603366	915.6778797	916.1560825
2	958.5384286	888.1878269	906.9214817
3	939.6319605	886.7400492	890.7749046
4	918.3437342	815.2708595	884.5883938
5	890.5334321	852.3899965	874.9515884
6	861.2521742	857.9205008	902.175835
7	819.7662585	872.6419472	885.4473249
8	757.8410182	820.5986572	855.16714
9	700.0960087	846.223257	845.4467572
10	713.7009658	767.1648583	796.7400269
11	698.995446	713.0706049	809.0320636
12	695.3603667	774.6127032	802.3100236
13	691.2249789	816.9891266	820.6472392
14	702.29356	839.6611543	818.852958
15	740.4557515	802.3128536	808.5454558
16	744.6899295	711.6322271	794.793663
17	708.328796	861.4257459	864.9186703
18	683.2369058	813.0732945	871.8378252
19	700.1125271	770.0054756	868.1499603
20	687.5936283	766.1301	850.2546393
21	612.610035	685.0111468	849.1510607
22	665.2103863	698.2836528	881.3250625
23	833.5996528	861.8716096	893.2262866
24	907.7183259	870.7463307	905.0422653

Table A.3: CO₂ MEFs for Northeast Power Coordinating Council (NPCC)

Time Of Day	CO ₂ MEFs for the NPCC (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	474.097669	479.5895574	473.6949308
2	508.0805418	551.67075	516.1362388
3	522.1703381	606.5559421	528.5499232
4	522.1116853	528.7913177	515.2234815
5	499.3364535	512.9137896	450.2962883
6	472.9431401	490.0852341	447.1704348
7	485.9451751	530.9811501	454.3717181
8	502.5765911	492.9743472	463.4859363
9	499.7626829	506.269168	474.7481053
10	492.7920474	507.7623326	478.5590614
11	481.9126922	470.6192387	483.6338851
12	486.3566466	505.4360802	482.7239747
13	475.5982396	494.7655267	478.9177585
14	460.9558694	516.3780298	467.8372654
15	477.5639081	507.7284013	437.3390359
16	480.9160174	467.0643083	455.2013038
17	495.6534101	535.1270919	499.2537049
18	493.9570418	512.0223127	482.4213788
19	493.6605475	494.911667	506.9117758
20	514.1305527	480.925093	487.7086576
21	497.0697282	542.3367811	473.5352232
22	502.3445003	545.3106043	428.0366138
23	450.4628056	472.9770466	424.3194723
24	458.741971	477.4765245	453.4751338

Table A.4: CO₂ MEFs for Reliability First Corporation (RFC)

Time Of Day	CO ₂ MEFs for the RFC (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	770.1733306	789.6383443	794.2516398
2	802.611223	798.2272211	780.5154769
3	797.7512085	764.9222607	759.8083727
4	793.683537	728.0815697	744.772916
5	782.2647525	725.8432424	737.8991953
6	724.6484951	718.9534635	735.5059744
7	704.4243585	767.0488944	738.907716
8	690.3548878	735.5100436	719.6802812
9	657.0194597	756.2238704	695.0469362
10	647.5285339	725.3067583	690.0507112
11	642.0284294	718.0334136	690.5411771
12	620.6818542	731.6949688	693.4402802
13	633.1929381	730.2931359	726.3757844
14	635.0799411	738.9884588	699.2719878
15	670.5533871	710.4433474	733.0707947
16	696.8460138	701.9845443	736.0143113
17	649.8195202	723.0729964	711.8849158
18	648.0165875	755.5692024	728.0043864
19	635.9369171	765.6181459	744.4796894
20	667.9022863	685.7071156	723.3147192
21	636.563971	715.6791352	719.3493912
22	581.1606808	732.5175636	713.3205922
23	633.309156	794.2472163	755.8216519
24	694.8869092	807.3283554	804.3880512

Table A.5: CO₂ MEFs for SERC Reliability Corporation (SERC)

Time Of Day	CO ₂ MEFs for the SERC (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	710.8626776	783.9772073	795.2562686
2	778.2841412	779.2725916	773.751045
3	816.3585296	693.1539261	759.4726561
4	815.7207218	609.8793433	758.9575637
5	793.8917939	668.9971715	746.1069075
6	707.2719565	700.0597585	742.7330159
7	767.5503294	782.1926421	789.5324884
8	661.4673937	743.4266474	685.7942356
9	588.9091398	707.6687479	635.842708
10	573.976862	678.1998174	624.2638978
11	595.9651082	636.49311	620.4440607
12	608.7604984	660.7623766	644.9826715
13	619.528349	663.8632556	656.4206086
14	657.7114645	711.3722491	699.5916552
15	622.2942622	715.6694806	714.8627071
16	618.0476346	666.755812	708.5495506
17	598.9366636	697.405139	737.2823094
18	621.9027088	766.4208389	734.694514
19	659.62331	746.5329744	738.9981718
20	649.2602767	726.9029583	668.7647019
21	561.6740028	696.57513	627.1220245
22	463.0617592	645.2351137	592.8757685
23	512.3751247	727.2428648	618.5850866
24	625.3892538	804.2209042	730.105733

Table A.6: CO₂ MEFs for Southwest Power Pool, RE (SPP)

Time Of Day	CO ₂ MEFs for the SPP (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	665.4816276	704.9224807	755.1457668
2	765.4551097	741.426589	811.0907012
3	796.1953523	731.7552242	773.7647986
4	791.3480004	673.8037636	706.5567832
5	638.3068155	543.3500301	597.7014498
6	726.0443557	552.4482208	602.2344602
7	667.5193414	522.2574751	605.1136496
8	612.9359944	606.845087	665.1321283
9	488.8098507	566.4522993	576.4799773
10	483.3089681	560.9975257	532.7580526
11	510.2952657	551.6459616	529.8095852
12	518.7079374	578.3395794	546.4156813
13	510.9728798	603.0627082	555.9021369
14	525.1317793	621.2799659	572.686117
15	511.7949496	720.0850595	583.7746719
16	512.3797977	570.0741512	601.8130682
17	544.1493206	588.0941128	573.9770197
18	549.4326131	575.8130696	563.9316453
19	554.7612531	571.9939617	584.1357491
20	543.3194035	594.0729086	577.1830317
21	483.617145	570.0183464	551.1186129
22	449.5166553	586.9874672	569.325114
23	427.8758223	563.9749192	587.7093351
24	474.1971793	706.6413019	657.9311029

Table A.7: CO₂ MEFs for Texas Reliability Entity (TRE)

Time Of Day	CO ₂ MEFs for the TRE (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	544.9462172	588.2097498	584.8237741
2	577.0075143	636.451255	643.4630918
3	653.3216179	627.4311407	685.0513702
4	656.8009325	590.0170418	644.2602515
5	583.0266742	513.5201434	559.8427769
6	560.7063536	469.2135552	499.191521
7	627.5544101	502.8497219	594.2242799
8	522.2341779	532.8853058	599.0550752
9	480.7151292	507.8198385	548.3310363
10	473.7350841	497.3569426	490.6786314
11	466.8683441	488.8739718	497.7052064
12	446.8106309	508.5381876	490.8187438
13	451.4754708	530.5825975	489.8891677
14	443.5905651	558.2037385	479.3681633
15	455.311208	599.6938676	473.8010606
16	459.3249498	563.4876038	507.3451951
17	479.5766357	527.4192346	525.1704718
18	499.3458906	507.7774018	511.9303615
19	483.7987576	482.7104072	517.3829859
20	488.3776441	517.0243168	518.6518038
21	472.7069563	497.8160867	500.4339959
22	417.5508361	490.6667601	480.0715541
23	397.7349269	502.761821	526.0047154
24	477.7327285	559.9249622	545.9893019

Table A.8: CO₂ MEFs for Western Electricity Coordinating Council (WECC)

Time Of Day	CO ₂ MEFs for the WECC (kg/MWh)		
	Summer MEF	Winter MEF	Intermediate MEF
1	491.1468477	485.3380968	511.8178763
2	542.8153964	553.8537904	548.0235248
3	560.3899221	561.1084122	567.1042555
4	573.9076175	508.5499355	540.1620207
5	574.2826264	478.4704245	514.5971947
6	561.48384	477.8731108	491.4807225
7	486.0881379	450.9331126	477.658245
8	489.1628406	474.4007105	505.6467612
9	457.8115685	491.9149558	489.5757529
10	469.0047637	486.245452	482.3520576
11	477.7928146	523.0669821	473.1784891
12	472.0693189	516.1292293	484.5048382
13	501.2579103	485.0445681	513.8613686
14	505.1528492	518.9387382	498.5907542
15	521.923162	468.711431	511.2444394
16	529.0923843	464.2136427	481.7844342
17	523.4426387	470.5413096	493.4501158
18	501.8979559	466.2078022	486.4666685
19	484.7593691	528.0948694	499.9796369
20	509.3460753	491.7076351	512.8865309
21	486.2990319	491.444343	510.8986506
22	453.481795	478.059791	467.1602752
23	448.7298589	460.1679021	415.5428508
24	473.1187091	459.2230962	455.500962