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(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION

RECIPIENT: Electric Power Research Institute, Inc. **STATE:** CA

PROJECT TITLE: SOLAr Critical infrastructure Energization system (SOLACE)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001987	DE-EE0008776	GFO-0008776-001	GO8776

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:
Description:

A9 Information gathering, analysis, and dissemination	Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
B3.6 Small-scale research and development, laboratory operations, and pilot projects	Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to the Electric Power Research Institute, Inc. (EPRI) to design, develop, and demonstrate a novel distributed solar photovoltaic (PV) microgrid system (SOLAr Critical infrastructure Energization (SOLACE)) with storage capabilities and enhanced grid control capabilities. The project would focus on the development of several system capabilities, including flexible energy pathways, distributed management systems (DMS), solar/storage inverter integration, advanced load control, and advanced cyber-security features. These capabilities would be integrated into the SOLACE platform and the platform would be field-tested using an existing electrical pathway between an existing battery energy storage system (BESS) and an emergency communications center (ECC). Residential homes in the area would also be fitted with small devices to control electricity usage as part of the field-testing activities. The overall goal of the system would be to act as a backup source of electricity to allow critical infrastructure (e.g. such as the ECC that would be tested as part of the pilot) to continue to run in the event of unforeseen grid failure.

The project would be completed over three Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP. BP1 would focus on development of the concept design, including solution architecture, system requirements, and component design. Proposed activities would include development of a Pre-Event T&D Resiliency Planning Assessment (PERPA) Method, emergency control system design, design and development of a Photovoltaic Synchronous Generator (PVSG) inverter concept, integration design development (e.g. integration of BESS and inverter), a cyber risk assessment, and development of protective controls/security requirements. BP2 would focus on solution implementation and validation through modeling and laboratory testing. Project activities would include PERPA validation via modeling and simulation, laboratory testing of PERPA model, DMS, and Control Hardware in the Loop (CHIL) using PV and storage, PVSG prototype inverter fabrication, decentralized control testing using grid forming inverters, and laboratory testing of cybersecurity measures. BP3 would consist of field installation, demonstration activities, and assessment of results. The SOLACE power system would be installed and commissioned at an existing electric utility using its distribution system within a residential area. Performance data would be collected and analyzed based on the system demonstration.

All project activities would be overseen and coordinated by EPRI. EPRI would also perform computer modeling, algorithm development, and data analysis at its headquarters in Palo Alto, CA, as well as laboratory testing of components and software at its laboratory facilities in Knoxville, TN. Yaskawa Solectria (Yaskawa) would develop, fabricate and test a novel inverter, for eventual use in a commercial version of the SOLACE power system. Schneider Electric would contribute to development of the DMS software, including installation, system configuration, data management, and use case testing, all of which would be performed at its DMS Solution Center in Houston, TX. Sandia National Laboratory (SNL) and the National Renewable Energy Laboratory (NREL) would perform data analysis and computer programing at their facilities in Albuquerque, NM and Golden, CO, respectively. Pecan Street Lab (Austin, TX) would provide data management services and would engage with homeowners at the residences that choose to participate in the field testing. Finally, Austin Energy (Austin, TX) would work with EPRI to carry out the field testing of the SOLACE power system. Austin Energy operates an existing storage site, with a 1.5 MW/2.5 MWh lithium-ion BESS, the ECC, and an electric distribution circuit providing power to these sites, as well as to the residences of the neighborhood in which the field demonstration would take place.

Yaskawa would develop a novel inverter with grid-forming capabilities, based on its existing, XGI 1500 inverter model. Development of the inverter would involve design modifications, to both the software and hardware of the existing platform. Yaskawa is a commercial manufacturer of solar inverters, and would perform all fabrication and testing of the new inverter at its laboratory/manufacturing facility in Lawrence, MA. Inverter development would involve software, circuit boards, power electronics components and associated equipment. All testing would be performed by properly trained employees utilizing personal protective equipment, and adhering to established procedures and protocols. The grid-forming inverter design at UT Austin involves high voltage testing, an electrical hazard. A high voltage lab testing and safety procedure is in place at the power electronics lab. Development of the inverter would not require any physical modifications to Yaskawa's existing facilities.

All installation/deployment activities would take place in the Mueller neighborhood, in Austin, TX. The primary focus of the field-testing would be to establish critical pathways between the BESS and ECC for the provision of electrical power during an emergency. Accordingly, the primary installation activities would involve upgrades and retrofits to the distribution pathways between these two locations. These upgrades would consist of modifications/replacement of existing electrical lines and the possible replacement of approximately 5-6 electrical switchgears. Existing switchgears, which currently need to be manually opened and closed, would be replaced with newer models with automated control capabilities. All of the electrical lines that form part of Austin Energy's distribution circuit would be accessed via existing ducts and access entry points that are regularly used to service the lines. No excavation work would be required for this work. When possible, the switchgears would be replaced with a model of the same dimensions as the existing switchgear, so that the work would only require the replacement of the existing box. It is possible though that in some cases, the concrete pad would have to be expanded in order to accommodate a large switchgear box. In either case, existing wiring would be used, and no changes would need to be made to the wiring below the foundations of the existing switchgears. No installation work would be performed at the BESS site or the ECC

Deployments at private residences within the Mueller neighborhood would be limited to minor installations within the households. These would consist of small devices (e.g. Wi-Fi thermostats and electric load controllers) which would enable remote control of electric loads. The purpose of these devices would be to test the ability of an electric utility to remotely manage electric usage at residences during an emergency situation in which power is temporarily provided by the BESS. In most cases, the homes in the Mueller neighborhood are all already equipped with the equipment necessary for this testing. However, in cases in which new devices would need to be installed, the work would be minimal and non-destructive in nature, consisting of the indoor installation of a controllable thermostat or similar device.

The Mueller neighborhood is a planned community that regularly participates in renewable energy/energy efficiency demonstration projects. Pecan Street regularly engages with community residences when conducting projects of this nature. Homeowners would be informed about the project and asked if they would like to participate. Participating residences would provide their consent to participate in the field testing and would be provided with information regarding the testing. Along the energization corridor, some of these residences would be without power during brief and announced times of testing. Austin Energy would coordinate with impacted customers by providing advance warning and minimizing the duration of the impact.

All installation/deployment activities would be performed by Austin Energy personnel, adhering to its established Hazard Communication program and health and safety guidelines. All Austin Energy facilities have incident response systems in place and emergency safety equipment (e.g. smoke detectors, fire suppression systems). The

Mueller Energy Storage System (e.g. the site where the BESS is housed) includes the monitoring of individual cell temperatures and abnormal voltages that would be remotely monitored in real-time using the SCADA system.

EPRI and all its project partners would adhere to all applicable Federal, state, and local health, safety, and environmental regulations when completing project activities.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assisstance agreement:

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

Notes:

Solar Energy Technologies Office
This NEPA determination does not require a tailored NEPA Provision. Include the standard laborator language in the NEPA term.
NEPA review completed by Jonathan Hartman, 07/02/2019

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 7/2/2019

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☑ Field Office Manager review not required
☐ Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____ Date: _____

Field Office Manager