

PMC-ND
(1.08.09.13)

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

**RECIPIENT:** University of Oklahoma**STATE:** OK

PROJECT TITLE: Protection and Restoration Solutions to Reliable and Resilient Integration of Grid-Connected Photovoltaic Installations and Distributed Energy Resources: Design, Testbed, Proof of Work, and Impact Studies

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001987	DE-EE0008772	GFO-0008772-001	

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.

B5.15 Small-scale renewable energy research and development and pilot projects Small-scale renewable energy research and development projects and small-scale pilot projects, provided that the projects are located within a previously disturbed or developed area. Covered actions would be in accordance with applicable requirements (such as local land use and zoning requirements) in the proposed project area and would incorporate appropriate control technologies and best management practices.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to the University of Oklahoma (OU) to design, develop, and test smart grid protection technologies for improved power system resiliency in the presence of high penetration of solar photovoltaic (SPV) systems, and to establish a new cyber-physical simulation testbed for the study of distributed energy resource (DER) systems.

Proposed project activities would include: desktop data analysis, computer modeling, software simulation, and algorithm design; laboratory-scale research and development (R&D) to integrate the developed protection software with associated hardware (voltage, current power sensing, measurement, and control devices); the assembly of electric and electronic components into a power grid hardware-in-loop testbed facility, and; several short duration (less than 4-6 hours) field tests of the prototype software on real-world electrical grids. A consortium of various subrecipients, detailed below, would collaborate with OU to complete the proposed activities.

Computer-based analysis, modeling, simulations, and design activities would be performed by OU (Norman, OK) in addition to subrecipients North Dakota State University (NDSU; Fargo, ND), Oklahoma State University (Stillwater, OK), and the University of California at Irvine (Irvine, CA).

Laboratory R&D as well as the establishment of a new testbed facility would take place at OU. A low power platform consisting of resistors, capacitors, and conductors would be assembled in-lab at the School of Electrical and Computer Engineering and used to study electromagnetic transients in electric circuits and develop sensing, measurement, and protection methods. A cyber-physical simulation testbed for studying the effectiveness of various protection schemes would be installed and operated inside a former naval research/training facility that has been re-dedicated for university laboratory research. This work would involve the establishment of a control room, IT communications and networking infrastructure, as well as the physical construction of the testbed system components in order to mimic a mid-power, small-scale power distribution grid. The onsite system would be integrated with a number of virtual resources, such as the transmission fault simulations developed at NDSU. For the purposes of the proposed project, OU facility management would perform building upgrades including new flooring, security barriers, ventilation, and additional power supply outlets. Proposed modifications to this existing university-owned facility do not include any new construction, demolition, or ground-disturbing activities outside of the previously developed complex. Project work would remain consistent with prior use of this facility for instructional/research purposes.

Proposed laboratory/testbed R&D would involve the use and handling of electric devices including voltage sources up to 480 volts and currents up to 30 amps. All such handling would occur within a properly enclosed and secured environment. Testbed devices and systems would be built and operated by authorized personnel in accordance with applicable safety codes and reliability standards. At the conclusion of the proposed project, equipment and materials would be reused for future research and/or eventually decommissioned following standard policies and procedures for the retirement of electric energy systems.

Field testing of the developed software systems would occur at the National Renewable Energy Laboratory (NREL; Golden, CO) in addition to a utility power distribution grid owned and operated by industrial partner Oklahoma Gas & Electric Company (OG&E). Two or three experiments would be conducted at NREL's research facilities. Three or four field tests would be performed on the OG&E grid, with the assistance of OG&E engineers at their system management facilities or substations. At this time, the specific location on the OG&E grid where the proposed field testing would occur has not been identified; however, it is likely that the OG&E research center would ultimately be selected as it is connected to both a neighborhood distribution grid and the OG&E Mustang 5 MW solar farm (Oklahoma City, OK). No change in the use, mission, or operation of existing facilities would arise out of this effort. Field testing would not involve any ground-breaking activities, physical modifications to existing infrastructure, or the installation of new equipment beyond the possible establishment of communication antennas or laying out fiber optics cables if the existing communication channels or bandwidths are not adequate to host the prototype software. Such work would have a minor and temporary footprint at a previously developed, fully permitted and interconnected OG&E facility; therefore, no adverse impacts to sensitive resources are expected as a result of the proposed field testing activities regardless of specific location on the OG&E utility grid.

Any work proposed to be conducted at a DOE laboratory may be subject to additional NEPA review by the cognizant DOE NEPA Compliance Officer for the specific DOE laboratory prior to initiating such work. Further, any work conducted at a DOE laboratory must meet the laboratory's health and safety requirements.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance 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 DOE lab language in the NEPA provision.

NEPA review completed by Whitney Doss, 7/9/2019

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: _____


NEPA Compliance Officer

Date: 7/9/2019

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: _____

Field Office Manager

Date: _____