

PMC-ND
(1.08.09.13)

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

RECIPIENT: NC STATE UNIVERSITY

STATE: NC

PROJECT TITLE: PV Inverter Systems Enabled by Monolithically Integrated Silicon Carbide-Based Four Quadrant Power Switch

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001740	DE-EE0008345	GFO-0008345-001	GO8345

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), 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 North Carolina State University (NCSU) to design, develop, fabricate, and test a novel Power Conversion System (PCS), which would incorporate a 4-Quadrant Single Die Silicon carbide (SiC) Power Semiconductor Switch (4-QPS). NCSU would fabricate both 1kW and 10kW PV converter prototypes to assess the feasibility of these systems for residential and commercial applications, respectively. The project would be divided into three Budget Periods, with a Go/No-Go Decision Point between each period.

Proposed project activities would include computer modeling (e.g. simulation studies), requirements/specifications development, die design and fabrication (at 1.2 kV 10A and 1.2kV, 25A), custom package fabrication, PV integration, high-frequency magnetics development and fabrication (e.g. transformers and inductors), hardware testing, performance/reliability evaluation, and market analysis. All project activities would be carried out by NCSU in dedicated, laboratory facilities at the FREEDM Systems Center, on NCSU's main campus in Raleigh, NC. Fabrication of system components (e.g. dies, custom packages, and magnetics) would also be carried out by X-Fab (Lubbock, TX). X-Fab is a large, international firm that provides foundry services. All fabrication activities would be carried out in purpose-built facilities specializing in the work that would be conducted. No change in the use, mission, or operation of existing facilities would result from any of the proposed project activities.

Both NCSU and X-FAB have safety protocols in place in the facilities in which project work would be completed. Any potential risks or hazards would be mitigated by adherence to corporate safety policies and procedures. All relevant local, state, and Federal health, safety and environmental standards would be complied with throughout the project. No additional permits, licenses, or authorization would be required to perform the project activities under this award. The power converters developed as part of this award would be used for continued research upon completion of the project. All other project materials would be recycled and/or disposed of in accordance with local waste disposal standards.

Based on the review of the proposal, DOE has determined the proposal fits within the class of action(s) and the integral elements of Appendix B to Subpart D of 10 CFR 1021 outlined in the DOE categorical exclusion(s) selected above. DOE has also determined that: (1) there are no extraordinary circumstances (as defined by 10 CFR 1021.410(2)) related to the proposal that may affect the significance of the environmental effects of the proposal; (2) the proposal has not been segmented to meet the definition of a categorical exclusion; and (3) the proposal is not connected to other actions with potentially significant impacts, related to other proposals with cumulatively significant actions, or an improper interim action. This proposal is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If the Recipient intends to make changes to the scope or objective of this project, the Recipient is required to contact the Project Officer, identified in Block 15 of the Assistance Agreement before proceeding. The Recipient must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved. If the Recipient moves forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of a final NEPA decision, the Recipient is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Note to Specialist :

Solar Energy Technologies Office

This NEPA determination does not require a tailored NEPA Provision.

NEPA review completed by Jonathan Hartman, 07/27/2018

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____



Kristin Kerwin

NEPA Compliance Officer

Date: 7/27/2018

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

- ☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- ☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

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

Field Office Manager's Signature: _____

Field Office Manager

Date: _____