PMC-ND
(1.08.09.13)

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

RECIPIENT: Board of Regents of the University of Nebraska for the University of Nebraska-Lincoln **STATE:** NE

PROJECT TITLE : An Online Intelligent Prognostic Health Monitoring System for Wind Turbines

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000978	DE-EE0006802	GFO-0006802-001	

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.)
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 the University of Nebraska – Lincoln (UN) to design, fabricate and test a prognostic health monitoring system (PMHS) for wind turbines. The PMHS will include the design of small in size monitoring sensors to be mounted on or within existing turbines, including small (KW size) wind turbines and large (MW) size turbines. Information from the devices will be transmitted via existing internet connections to the UN lab where data will be analyzed.

UN would perform eleven tasks for this project. Tasks 1-5 would involve the design and validation of software and mathematical models which will aid in designing the vibration devices to be mounted within existing turbines and in analysis of the data which will be collected from these devices in. These tasks would be engineering and design tasks and would occur at the UN.

Tasks 6, 7 and 9 would involve the installation of vibration sensors and accelerometers on up to seven existing small scale wind turbines, and the analysis of data received from those devices. The devices to be installed would include a vibration sensing board approximately 6 square inches in size and a accelerometer tube approximately 2 inches long and ¾ of an inch in diameter. Devices would be installed within the nacelle of existing turbines. Data from the devices would be transmitted via internet to the UN lab through already existing communication devices within the nacelle of each turbine. All turbines all are on 45 foot tilt up towers which would be lowered with the use of a winch to access the turbine for installation. No new turbines would be installed for this project and no earth moving would be required.

Tasks 6, 7 and 9 would include installing and testing the vibration devices using the following seven existing small wind turbines:

- Diller-Odell Secondary School in Odell, NE
- Elkhorn Valley Schools, High School in Tilden, NE
- Papillion-La Vista High School in Papillion, NE
- Hastings High School in Hasting, NE
- Southeast Community College in Lincoln, NE
- Two turbines at the UNL Haskell Agricultural Laboratory in Concord, NE

Tasks 8 and 10 would include installation of three sets of sensors on General Electric (GE) MW scale turbines and the analysis of data received from those devices. In Task 8, UN would work with GE Global Research to identify 1.5 MW and/or 1.6 MW GE turbines located in the United States which would be experiencing different failure modes. UN would install sensors on these existing MW scale turbines. The first sensors would be current probes approximately

12 inches long and 0.1 inch in diameter, which would be clamped on to existing power cables. The second set of sensors would be voltage probes, which would be approximately 1 inch by 2 inches by 3 inches in size and would be installed in the terminal box or converter cabinet. The third set of sensors would be accelerometers which would be an approximately ¼ of an inch in size cube. Installation would also include the installation of a laptop computer on a mounting rack (approximately 1 foot by 1 foot by 2 feet) within the nacelle of the turbine. All equipment would be moved and installed with the use of a built in crane system within the turbine. Communication of data these devices to the UN lab would be done with previously existing internet communication systems within the turbines. No new turbines would be installed for this project and no earth moving would be required. Installation of sensors would not affect the operation of the turbines.

Task 11 is limited to project management and reporting.

No additional affects to resources or additional concerns were found to exist during this review.

Based on review of the project information and the above analysis, DOE has determined the research, development and testing activities would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined the proposed project is consistent with actions contained in DOE categorical exclusion A9 "information gathering, data analysis and computer modeling", B5.15 "small scale renewable energy research and development and pilot projects", and 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 you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

Wind Program
This NEPA determination doe not require a tailored NEPAS provision.
NEPA review completed by Roak parker on December 3, 2014.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 12/10/2014
NEPA Compliance Officer

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: _____ Date: _____
Field Office Manager