

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



RECIPIENT: Virginia Tech

STATE: VA

PROJECT TITLE: Fabrication of Fully Recyclable Wind Turbine Blades via Multi-Axis Additive Manufacturing

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002960	DE-EE0011007	GFO-0011007-001	GO11007

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 Virginia Polytechnic Institute and State University (Virginia Tech) to conduct 3D printing and testing of recyclable 3-meter representative wind turbine blades.

The award would be limited to intellectual and laboratory-scale activities. The proposed project activities include the design and fabrication of wholly thermoplastic composite material wind turbine blades, the use of robotic workcells for autonomous printing of wind turbine blades and the fabrication of 3D printed wind turbine blades, along with blade testing, and performance characterization. These activities are proposed to be conducted in three laboratory facilities at Virginia Tech in Blacksburg, Virginia. Conceptual design, evaluation and robotic arm testing would occur at the National Renewable Energy Lab (NREL) in Golden, Colorado. Conceptual design, consulting and related assessments and analyses would be conducted at TPI Composites, Inc. in Scottsdale, Arizona and Vestas North America in Portland, Oregon, would provide advice and technical expertise to guide project research and development.

Potential emissions at the Virginia Tech laboratories include heat from hot melt extrusion, polymer particles due to extrusion printing, and off-gasses from composite polymer materials. Potential emissions at NREL include heat from hot melt extrusion, polymer particles due to extrusion printing. These project locations are equipped with state-approved air handling systems designed to treat the relevant emissions and are not expected to add additional emissions at the sites.

The project aspects conducted at the Virginia Tech locations would involve the use and handling of various hazardous materials, including chemical reagents and industrial solvents, in a laboratory setting. All hazardous materials would be managed in accordance with federal, state, and local environmental regulations, including Virginia Tech Environmental Health and Safety guidelines. Existing Virginia Tech Environmental Health and Safety policies and procedures would be followed, including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. Additional policies and procedures would be implemented as necessary as new health and safety risks are identified. All activities proposed to occur at NREL and TPI Composites are currently supported at the facility and all existing safety procedures, policies, contingency plans, and work instructions would be followed during the execution of the project. None of the activities in the project are outside Vestas North America normal activities at their facilities and their efforts on this program would strictly be computational.

All project work would be performed at five existing, purpose-built facilities, with no modification of the existing facilities, ground disturbances, changes in use of facilities or outdoor equipment installations. No additional permits, licenses, or authorizations would be required. DOE does not anticipate any impacts to resources of concern due to the proposed award activities.

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.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Materials and Manufacturing Technologies Office
NEPA review completed by Chris Akios, 05/02/2024

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:  _____ Date: 5/2/2024
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