

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



**RECIPIENT:** Iowa State University

**STATE:** IA

**PROJECT TITLE:** Leveraging a public-private partnership to address technical and socioeconomic factors of agrivoltaic systems

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002697	DE-EE-0010441	GFO-0010441-001	

**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.)

**A11 Technical advice and assistance to organizations**

Technical advice and planning assistance to international, national, state, and local organizations.

**B3.1 Site characterization and environmental monitoring**

Site characterization and environmental monitoring (including, but not limited to, siting, construction, modification, operation, and dismantlement and removal or otherwise proper closure (such as of a well) of characterization and monitoring devices, and siting, construction, and associated operation of a small-scale laboratory building or renovation of a room in an existing building for sample analysis). Such activities would be designed in conformance with applicable requirements and use best management practices to limit the potential effects of any resultant ground disturbance. Covered activities include, but are not limited to, site characterization and environmental monitoring under CERCLA and RCRA. (This class of actions excludes activities in aquatic environments. See B3.16 of this appendix for such activities.) Specific activities include, but are not limited to: (a) Geological, geophysical (such as gravity, magnetic, electrical, seismic, radar, and temperature gradient), geochemical, and engineering surveys and mapping, and the establishment of survey marks. Seismic techniques would not include large-scale reflection or refraction testing; (b) Installation and operation of field instruments (such as stream-gauging stations or flow-measuring devices, telemetry systems, geochemical monitoring tools, and geophysical exploration tools); (c) Drilling of wells for sampling or monitoring of groundwater or the vadose (unsaturated) zone, well logging, and installation of water-level recording devices in wells; (d) Aquifer and underground reservoir response testing; (e) Installation and operation of ambient air monitoring equipment; (f) Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and modification, use, and plugging of boreholes); (g) Sampling and characterization of water effluents, air emissions, or solid waste streams; (h) Installation and operation of meteorological towers and associated activities (such as assessment of potential wind energy resources); (i) Sampling of flora or fauna; and (j) Archeological, historic, and cultural resource identification in compliance with 36 CFR part 800 and 43 CFR part 7.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Iowa State University (ISU) (Ames, IA) to grow and manage fruit and vegetable crops as well as pollinator habitats in an agrivoltaic experimental site on the Alliant Solar Farm at ISU.

The proposed project would consist of three Budget Periods (BPs). The field site would occupy approximately 10 acres with four distinct photovoltaic (PV) panel configurations arrayed at different heights, and in fixed or single axis tracking configurations. In addition to field sampling, ISU would form an external Technical Advisory Committee (TAC) to hold both online and in person meetings and perform outreach and inclusion of underrepresented populations. Economic and budget analyses would also be carried out by ISU.

TAC interviews and outreach activities would be submitted to the cognizant Institutional Review Board (IRB) to determine if these activities are considered human subjects research and, if so, IRB approval in accordance with 10 CFR 745.103 would be obtained prior to initiating the proposed activities in the field.

The project team would conduct field sampling during all three BPs. A suite of well-established field sampling techniques would be used to collect data, and which would be amenable to large-scale deployment across multiple experimental units simultaneously. Proposed sampling methods include the following:

1. Vegetable Crop Management:
  - a. Three vegetable crops would be planted, some would be cultivated in the open field areas, and some would be cultivated under the PV system
  - b. Nutrients and drip irrigation would be developed and implemented
  - c. Pest management would be carried out
  - d. The team would gather data on growth development, yield, prevalence of insects and diseases, and overall produce quality
  - e. Produce would be harvested as ripening/maturity occurs
2. Fruit Crop Management:
  - a. Two perennial fruit crops would be planted, some would be cultivated in the open field areas, and some would be cultivated under the PV system
  - b. Weekly development would be tracked, and data such as fruit ripening, flowering, yield and quality would be collected
  - c. Produce would be harvested as ripening/maturity occurs
3. Soil Sampling:
  - a. Soil samples from plots within the agrivoltaic and open field areas would be collected
  - b. Five to six, 2-inch (in) soil cores would be taken and sent to a commercial testing lab
4. Pollinator and Plant Monitoring:
  - a. Provide native, perennial flowering vegetation and grass mixes
  - b. A grass control would be established, and vegetation would be kept at a height that does not interfere with PV panel function and would be mowed 10-15 times a year
  - c. Two pollinator mixes would be planted, with two different mowing schemes that evolve over three BPs
  - d. Herbicides or hand weeding may be used if needed
  - e. Floral abundance would be measured using three 0.5m<sup>2</sup> quadrants, and two sub-samples within each experimental unit would be taken on a monthly basis
  - f. Pollinators visiting each treatment would be measured using timed observations, with no take or capture within a second set of 0.5m<sup>2</sup> quadrants
5. Microclimate Measurement:
  - a. A total of six sensors would be distributed along the plot, at different heights
  - b. Three other sensors would also be implemented in a non-vegetation region between solar panels
  - c. Two sensor combinations would be installed at the non-vegetation region and at the agrivoltaic test site
  - d. Sensors would be maintained once a week
6. Power Production Measurement:
  - a. Electricity generated by the panels would be measured and variances due to vegetation would be explored
7. Beekeeping:
  - a. Four honeybee colonies would be housed at the agrivoltaic test site to measure bee response to the vegetation established
  - b. Honeybees would be a source of pollinators for the site
  - c. Colonies would be inspected biweekly
  - d. Pollen removal would be done using pollen traps (activated once a month for 24-hours) that would harmlessly remove pollen from returning honeybees
  - e. Honey harvested would be measured twice a year
  - f. Overwintering would take place at the ISU horticultural research farm

The proposed project would not involve the change in the use, mission, or operation of these facilities. DOE also conducted a review of potential issues related to other resources of concern and found no effects that would be expected to result from the proposed project activities.

The U.S. Fish and Wildlife Service Endangered Species Program website (IPaC) identifies several federally listed threatened or endangered species, including the Indiana Bat, Northern Long-eared Bat, Tricolored Bat, Western Prairie Fringed Orchid, and Monarch Butterfly which are believed to occur in the project area. Migratory bird species of conservation concern such as Bald Eagle, Bobolink, Chimney Swift, Franklin's Gull, Lesser Yellowlegs, and Red-headed Woodpecker as identified in IPaC, may be present seasonally within the project areas. However, because equipment installations would be temporary and limited to standard types of noninvasive surveying tools, award activities would result in negligible ground disturbance. DOE has determined that no adverse impacts to species of concern are to be expected as a result of the proposed activities at these locations.

There are no critical habitats within the project areas. DOE also conducted a review of potential issues related to other resources of concern such as prime farmland and found no effects that would be expected to result from the proposed project activities.

**NEPA PROVISION**

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

If during project work cultural or archaeological artifacts are encountered, the recipient shall stop the site-based activities immediately and inform the DOE Project Officer of the finding. A Class III: Intensive Cultural Resources Inventory shall be required prior to re-commencing project work.

Notes:

Solar Energy Technologies Office (SETO)  
NEPA review completed by Alex Colling on 7/18/2023.

**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:  Andrew Montano Date: 7/24/2023  
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