

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



RECIPIENT: Terabase Energy

STATE: CA

PROJECT TITLE : Autonomous Control System for PV Table Delivery and Placement

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002243	DE-EE0009326	GFO-0009326-002	GO9326

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.
- B3.11 Outdoor tests and experiments on materials and equipment components** Outdoor tests and experiments for the development, quality assurance, or reliability of materials and equipment (including, but not limited to, weapon system components) under controlled conditions. Covered actions include, but are not limited to, burn tests (such as tests of electric cable fire resistance or the combustion characteristics of fuels), impact tests (such as pneumatic ejector tests using earthen embankments or concrete slabs designated and routinely used for that purpose), or drop, puncture, water-immersion, or thermal tests. Covered actions would not involve source, special nuclear, or byproduct materials, except encapsulated sources manufactured to applicable standards that contain source, special nuclear, or byproduct materials may be used for nondestructive actions such as detector/sensor development and testing and first responder field training.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Terabase Energy to develop control software to automate onsite material distribution and installation at utility-scale solar photovoltaic (PV) power plants. An autonomous unmanned ground vehicle (AUGV) would be equipped with software to enable it to navigate routes and place PV systems. The project would be completed over two Budget Periods (BPs) with a Go/No-Go decision point between each BP.

Previously, DOE reviewed and issued a conditional NEPA determination (GFO-0009326-001, CXs A9, B3.6, 1/29/2021). At the time, sites had not been selected for field testing for BP1 Subtask 2.4 and Task 6 and BP2 Subtasks 11.3 and 13.2. These sites have now been identified. This NEPA determination is to review the location and all activities associated with BP1 Subtask 2.4 and Task 6 and BP2 Subtasks 11.3 and 13.2.

Activities would include the collection of visual data on field test sites (i.e. photography) using sensors on a non-motorized push cart, equipping and calibrating the AUGV, testing AUGV controls, and testing the prototype AUGV system in an active PV site. The AUGV used would be an off-road vehicle, modified to enable movement underneath rows of PV modules and to lift and move modules.

Subtask 2.4 would involve testing of the developed driver-assist algorithm with the application running on a laptop and a driver operating a full-scale vehicle.

Task 6 would employ machine learning to train the AUGV. The localization and object detection software package would be prepared by collecting test data in solar fields with the AUGV to verify vehicle level control system environment sensing, localization, path following, and obstacle avoidance in a closed-loop field test.

Subtask 11.3 would include field testing of the AUGV in a solar field to collect learnings, refine sensing and controls, and validate functionality of the software package.

Subtask 13.2 would operate the PV table placement equipment in a solar field and characterize the performance of the autonomy sensors.

Proposed project activities by location are listed below:

Sunpower R&D Ranch - Davis, CA

- This is Terabase's research and development site. Activities would take place within a fenced-in area on rural agricultural land previously used for parking and materials storage. Visual data would be gathered at this site which would be used for developing algorithms. The autonomous rover controller hardware-software integration would be tested for performance.

University of California, Berkeley, Richmond Field Station – Richmond, CA

- This is on urban undeveloped land used for UC Berkeley research and development activities, storage, etc. This site would also be used to gather visual data for developing algorithms and to test the autonomous rover controller hardware-software integration.

Signal Energy - approximately 15 miles southwest of Brownwood, TX

- This is an existing permitted and approved 2200-acre commercial PV power plant. Terabase has a subcontract to use 2 acres for a beta demonstration site. This site would be used to test the operation of the AUGV system in an actual PV field.

The above activities would not affect cultural resources, wetlands, floodplains, or prime farmlands, and no additional permits would be required. Activities would take place on existing sites that experience ground disturbance through vehicle and foot traffic and no land conversion would occur as part of the project. A previously conducted environmental review of Signal Energy's larger project identified the presence of the Texas Horned Lizard within and around the proposed project site. The Texas Horned Lizard is listed as a threatened species by the state and mitigation measures are addressed in the site's Environmental Plan. The Terabase team would adhere to all applicable requirements and mitigation measures identified in the site's Environmental Plan. Based on these collective considerations, DOE has determined that no adverse impacts to sensitive resources are expected as a result of the proposed activities. No changes in the use, mission, or operation of existing facilities would be required as part of this project and no additional permits would be required in order to conduct any of the work activities.

Project activities would involve the operation of heavy equipment (forklifts, all-terrain vehicles, utility trucks, moving-parts assembly line, etc). Some activities would be conducted on an active solar site construction project. Any risks associated with these activities would be mitigated through adherence to established health and safety policies and procedures. All waste products would be disposed of by licensed waste management service providers. Terabase Energy and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assistance agreement:

If additional locations are identified for field work, further NEPA review of these sites would be required for approval prior to initiating activities.

Notes:

Solar Energy Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Shaina Aguilar on 1/26/22.

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: 1/31/2022

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: _____