



U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: George Washington University - Micro-scale Ultra-high Efficiency CPV/Diffuse Hybrid Arrays Using Transfer Printing

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Washington, DC; Evanston, IL; Cambridge, MA; Gaithersburg, MD; Durham, NC; Somerset, NJ

Proposed Action Description:

Funding will support the project team's small-scale, research and development activities to develop lightweight, easily deployable, and aesthetically advantaged hybrid photovoltaic (PV) modules. Specifically, the project team will: (1) characterize PV cell growth and materials requirements designs; (2) develop anti-reflection coatings for optics and characterize microlens arrays; and (3) verify harvest efficiency through extended outdoor testing. If successful, the technology will facilitate an increase in adoption of cost-effective solar energy by providing low-profile, hybrid concentrator solar modules capable of achieving harvest efficiencies of 30-35%, versus current high-end Silicon panels that typically achieve 16-20% harvest efficiency.

Project tasks will be conducted on a small-scale basis in dedicated laboratory, testing, and fabrication facilities at George Washington University & Naval Research Laboratory (Washington, DC), Northwestern University (Evanston, IL), Veeco (Somerset, NJ), Massachusetts Institute of Technology & Volpe (Cambridge, MA), X-Celeprint (Durham, NC), and NIST (Gaithersburg, MD). Project tasks will be conducted in accordance with established safety and materials/waste management protocols and pursuant to applicable Federal, State, and local regulatory requirements. No modifications will be made to the existing facilities to accommodate the proposed work.

Categorical Exclusion(s) Applied:

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of [10 CFR Part 1021](#).

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer:

(This form will be locked for editing upon signature)

Date Determined: 10/20/2017



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Submit by E-mail

Proposed Action Title: Semprius, Inc. (Semprius) - Micro-Scale Ultra-High Efficiency CPV/Diffuse Hybrid Arrays Using Transfer Printing

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Henderson, SC; Washington, DC; Somerset, NJ; and Urbana, IL

Proposed Action Description:

Funding will support research and development activities to develop a concentrated micro-photovoltaic (PV) module that integrates a six-junction PV cell and single-junction solar cell to efficiently capture diffuse and direct sunlight. Semprius will fabricate and assemble the six-junction PV cells using a cost-effective, micro-transfer printing technique. If successful, development of a cost-effective, high-performance, concentrated micro-PV system module would overcome the constraints of conventional CPV technologies by enabling diffuse light collection, and could lead to significant energy savings by expanding the geographic areas in which these technologies can operate successfully.

Research and development activities will be conducted in Semprius' laboratory facility located in Henderson, SC; the Naval Research Laboratory's laboratory facility located in Washington, DC; Veeco Instrument's laboratory facilities located in Somerset, NJ; and the University of Illinois, Urbana-Champaign's laboratory facility located in Urbana, IL. George Washington University's role in the proposed project will be limited to theoretical and computer simulation work performed within its office facilities located in Washington, DC. In addition, outdoor testing will take place in a previously disturbed area at Semprius' laboratory facilities. The project team will incorporate appropriate control technologies and best management practices during outdoor testing. All work will be performed in accordance with applicable Federal, State, and local safety, environmental, land use, and zoning requirements.

Categorical Exclusion(s) Applied:

B3.6 - Small-scale research and development, laboratory operations, and pilot projects

B5.15 - Small-scale renewable energy research and development and pilot projects

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of 10 CFR Part 1021.

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal 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 proposal that may affect the significance of the environmental effects of the proposal.

The proposal 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.

Based on my review of the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

NEPA Compliance Officer:

Date Determined: 12/2/2015