



# U.S. Department of Energy Categorical Exclusion Determination Form

Submit by E-mail

Proposed Action Title: (0471-1568) Massachusetts Institute of Technology - Thermal Fuel: HybriSol Hybrid Nanostructure for High-Energy-Density Solar Thermal Fuels

Program or Field Office: Advanced Research Projects Agency - Energy

Location(s) (City/County/State): Massachusetts

Proposed Action Description:

Funding will support development of (1) a novel solar thermal fuel ("HybriSol") with high energy storage capacity, thermal stability, and degradation resistance properties; and (2) a thermal energy storage device to capture and store energy from the sun.

Proposed work consists of indoor laboratory-based research and development, including (1) computer-based design and modeling to identify the tuning parameters to enable optimal performance of chromophore and template nanostructures; (2) synthesizing the designed nanostructures and non-templated photochromic molecules; (3) characterizing and validating the optical and thermochemical properties of the nanostructures and further refining the hybrid nanostructure based on results; (4) indoor, laboratory-based design, fabrication, and testing of a small-scale portable power generator that uses solar thermal fuel; and (5) computer-based design commercialization and engineering studies to evaluate the use of solar thermal fuels in large-scale applications. Project work will take place at dedicated laboratory facilities located at Massachusetts Institute of Technology (Cambridge, MA).

Categorical Exclusion(s) Applied:

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

A9 - Information gathering, analysis, and dissemination

B3.15 - Small-scale indoor research and development projects using nanoscale materials

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: 11/21/2011