U.S. Department of Energy
Categorical Exclusion Determination Form

Program or Field Office: Advanced Research Projects Agency - Energy (ARPA-E)

Project Title: 25A1543 - A Genetically Tractable Microalgal Platform for Advanced Biofuel Production

Location: Iowa

Proposed Action or Project Description: American Recovery and Reinvestment Act: ☒

The proposed project will integrate innovative, proprietary technical advances to develop a highly versatile and genetically tractable, microalgal-based platform for capturing solar energy and using it to convert atmospheric and waste CO2 to high-energy chemical products with biofuel applications. The use of a highly tractable organism as the biological platform to hyperaccumulate reduced carbon products, such as lipids, enables the iterative application of biotechnological-, genetic-, and recombinant-based manipulations to optimize bioenergy production. The proposed metabolic engineering will benefit greatly from guidance provided by state-of-the-art metabolite profile analyses, transcriptome sequence analyses and novel metabolic flux analyses, and will integrate established, locally held IP. The project will generate new biofuel production capability, adaptable to a wide range of conditions and end products and with the transformational capability of genetically combining (i.e., breeding) desirable traits available now or in the future. The associated IP will include a combination of unique metabolic engineering approaches for enhancing lipid accumulation, increased CO2 assimilation, and increased thermal tolerance of the platform organism. The proposed research is designed to implement three primary technical objectives to enable production rates of advanced biofuels for industrial-level cultivation of Chlamydomonas: 1) optimize the metabolic partitioning of carbon to hyper-produce lipids; this will be achieved by combining

Categorical Exclusion(s) Applied:

X - B3.6 Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects

*-For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, see Subpart D of 10 CFR10 21 Click Here

This action would not: threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive Orders; require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities, but may include such categorically excluded facilities; disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; or adversely affect environmentally sensitive resources (including but not limited to those listed in paragraph B.(4)) of Appendix B to Subpart D of 10 CFR 1021). Furthermore, there are no extraordinary circumstances related to this action that may affect the significance of the environmental effects of the action; this action is not "connected" to other actions with potentially significant impacts, is not related to other proposed actions with cumulatively significant impacts, and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

Based on my review of information conveyed to me and in my possession (or attached) concerning 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: /s/ William J. Bierbower Digitally signed by William J. Bierbower DN: cn=William J. Bierbower, o, ou, email=william.bierbower@hq.doe.gov, c=US Date: 2010.01.19 10:54:57 -05'00' Date Determined: 1/19/2010

Comments: Webmaster:

level cultivation of Chlamydomonas: 1) optimize the metabolic partitioning of carbon to hyper-produce lipids; this will be achieved by combining genetic engineering of candidate genes known to influence lipid biosynthesis with genetic screens for lipid hyper-accumulating mutants; 2) metabolically engineer an enhanced capacity for carbon assimilation; and 3) increase thermal tolerance to enable scale-up production. The potential impact arising from development of this technology is clear. It will make microalgal-based biofuel production a truly viable, sustainable and versatile option for fulfilling the needs of the U.S. for renewable, alternative energy to replace fossil fuel.