



# U.S. Department of Energy

## Categorical Exclusion Determination Form

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

**Project Title:** 25A1001 - Advanced Semiconductor Materials for High Efficiency Thermoelectric Devices

**Location:** \*- Multiple States - California, North Carolina, Oklahoma

**Proposed Action or Project Description:**

American Recovery and Reinvestment Act:

Phononic Devices is commercializing advanced thermoelectric semiconductor materials and devices designed to convert waste heat from industrial and commercial processes into usable electric power and cooling. Despite the national security risks and pollution concerns associated with fossil fuel consumption, the Department of Energy estimates that 50-60% of all the energy consumed in the US per year is wasted as heat. Thermoelectric designs that efficiently capture and utilize this waste heat are an intense area of research and investment interest. Developed in partnership with the University of Oklahoma, Phononic Devices' unique and proprietary approach combines enhanced Seebeck thermopower with thermally insulating semiconductor materials and is projected to dramatically enhance thermal to electric energy conversion efficiency. Leveraging superior efficiency with low cost thin film manufacturing processes is projected to result in high performance and cost competitive "green" thermoelectric products. As a highly efficient energy harvesting power source from waste heat and effective source of active solid state cooling, Phononic Devices' approach makes possible a more than \$125B market opportunity.

**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  
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 email=william.bierbower@hq.doe.gov, c=US  
 Date: 2009.12.16 11:57:38 -05'00'

Date Determined: Dec 16, 2009

**Comments:**

**Webmaster:**

ARPA-E Environmental Questionnaire Attached

