



U.S. Department of Energy

Categorical Exclusion Determination Form

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

Project Title: 25A3191 - Large-Scale Energy Reductions through Sensors, Feedback, & Information Technology

Location: California

Proposed Action or Project Description:

American Recovery and Reinvestment Act:

Smart meters and related sensing technologies promise that energy information will change energy use. Poorly designed interactions with energy information, however, jeopardize billion dollar infrastructure investments. The current problems are numerous: sensor information is complex and dull, incentives are inappropriate, interactions with energy information are poorly designed to modify behavior, and social context is ignored. These problems all involve the intersection of human behavior and technology. The goal of this initiative is to develop a comprehensive human-centered solution that leverages the anticipated widespread diffusion of energy sensors to significantly reduce and shift energy use. Our major innovation is the creation of a transformative system that combines behavioral techniques with human-centered design, computation, and technology to affect energy behavior. The work involves a collaboration of Stanford University researchers and energy industry leaders that was formed in 2008 to establish a new concentration in energy and human behavior. Our group will conduct research, build systems, and test solutions at scale in the field. Our initiative has four parts: (1) a software platform that enables behavioral programs to be implemented at scale; (2) behavioral interventions to reduce and shift energy use; (3) data modeling that incorporates behavior into prescriptive engineering and economic analyses; and (4) an extensible energy communication network to enable future innovation. The behavioral

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

X - B5.1 Actions to conserve energy

*-For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, see Subpart D of 10 CFR 10 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: 2010.01.14 12:20:30 -05'00' Date Determined: 01/14/2010

Comments:

Webmaster:



25A3191 Proposed Action or Project Description (Continued)

engineering and economic analyses; and (4) an extensible energy communication network to enable future innovation. The behavioral interventions include technology (behavioral analytics, human-centered computational infrastructure), media (interaction design, social networking, games and feedback interfaces), policy (behavioral economic incentive programs) and community (schools, NGO's, utility and social organizations). Quantitative measurements relating to human behavior and energy efficiency are mostly absent in the literature. However, an analysis of the potential impact of our projects, computed by energy and economic experts specifically for this proposal, indicates substantial influence. We estimate a decrease in residential emissions of 22% annually, with a lower bound of 9% and an upper bound of 33%. Our mid-range projection would prevent 939 megatons of CO₂e cumulatively over 2010-2020, and an additional 2,780 megatons between 2020-2030. These reductions are competitive with supply solutions; for example, a reduction in energy use at our lower estimate would reduce fossil fuels consumed and CO₂ emissions by an amount equal to a 25-fold increase in wind plus solar power or a doubling of nuclear power (Sweeney, 2007).