

PMC-EF2a

(2010)

**U.S. DEPARTMENT OF ENERGY
EERE PROJECT MANAGEMENT CENTER
NEPA DETERMINATION**



RECIPIENT:Unico, Inc.

STATE: MO

PROJECT TITLE : Alternate Spacing Heating Systems Residential Cold Climate Heat Pump (CCHP)

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000621	DE-EE0006107	GFO-0006107-001	

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Order 451.1A), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

- A9 Information gathering, analysis, and dissemination** Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)
- B1.31 Installation or relocation of machinery and equipment** Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.
- B3.6 Small-scale research and development, laboratory operations, and pilot projects** Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.
- B5.1 Actions to conserve energy or water** (a) Actions to conserve energy or water, demonstrate potential energy or water conservation, and promote energy efficiency that would not have the potential to cause significant changes in the indoor or outdoor concentrations of potentially harmful substances. These actions may involve financial and technical assistance to individuals (such as builders, owners, consultants, manufacturers, and designers), organizations (such as utilities), and governments (such as state, local, and tribal). Covered actions include, but are not limited to weatherization (such as insulation and replacing windows and doors); programmed lowering of thermostat settings; placement of timers on hot water heaters; installation or replacement of energy efficient lighting, low-flow plumbing fixtures (such as faucets, toilets, and showerheads), heating, ventilation, and air conditioning systems, and appliances; installation of drip-irrigation systems; improvements in generator efficiency and appliance efficiency ratings; efficiency improvements for vehicles and transportation (such as fleet changeout); power storage (such as flywheels and batteries, generally less than 10 megawatt equivalent); transportation management systems (such as traffic signal control systems, car navigation, speed cameras, and automatic plate number recognition); development of energy-efficient manufacturing, industrial, or building practices; and small-scale energy efficiency and conservation research and development and small-scale pilot projects. Covered actions include building renovations or new structures, provided that they occur in a previously disturbed or developed area. Covered actions could involve commercial, residential, agricultural, academic, institutional, or industrial sectors. Covered actions do not include rulemakings, standard-settings, or proposed DOE legislation, except for those actions listed in B5.1(b) of this appendix. (b) Covered actions include rulemakings that establish energy conservation standards for consumer products and industrial equipment, provided that the actions would not: (1) have the potential to cause a significant change in manufacturing infrastructure (such as construction of new manufacturing plants with considerable associated ground disturbance); (2) involve significant unresolved conflicts concerning alternative uses of available resources (such as rare or limited raw materials); (3) have the potential to result in a significant increase in the disposal of materials posing significant risks to human health and the environment (such as RCRA hazardous wastes); or (4) have the potential to cause a significant increase in energy consumption in a state or region.

Rational for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to Unico Inc. to research and develop a prototype residential split-system 3-ton Cold Climate Heat Pump (CCHP) using boosted compression technology and variable speed motors. Over three budget periods, funding would be used to research, design, fabricate, test and validate four prototype CCHP generations (alpha, beta, field test and first article units). Activities would include component research and design; computer modeling analysis; prototype fabrication and indoor testing; prototype field testing, data acquisition, analysis and validation; design and implementation of advanced manufacturing processes; and industry marketing and outreach efforts.

Fabrication and indoor testing of the prototype CCHP units would be conducted at Unico's 75,000 sq. ft. manufacturing and research facility located at 7401 Alabama Ave in St. Louis, Missouri. Invention House, LLC, a project partner, Electrical would conduct component research, development and testing activities at their 4,000 sq. ft. research engineering facility located at 414 E Clinton Place in St. Louis, Missouri.

During indoor prototype testing at Unico's facility, an indoor heat pump test chamber with instrumentation would be installed within the existing facility. Additionally, advanced manufacturing tooling processes and techniques would be designed into the prototype development process and implemented at Unico's existing facility.

Field testing of the field test prototype CCHP units would occur outdoors at approximately six different cold climate locations. To field test and validate the prototype CCHP units, Unico would partner with electric utilities and rural electric co-ops to implement the field tests at selected locations. The CCHP units would be installed outside of new or existing residential structures and connected to indoor air handling lines and utilities per industry standards. The proposed prototype CCHP units would be similar in size and functionality to existing commercial units and their use would not have adverse effects to the environment. At each selected location, the field tests would occur for approximately three years.

Under this DOE award, authorization of federal funds for field test activities is subject to additional Section 106 (National Historic Preservation Act) consultation by the DOE, if the field test activities described above occur on any site, building, structure and/or district that is included in or eligible for inclusion in the National Register of Historic Places.

After prototype testing is complete, Unico would fabricate and analyze approximately three first article CCHP units to validate/verify the advanced manufacturing process design implemented at their facility during prototype development.

Unico and Invention House, LLC have completed R&D questionnaires addressing the protocols for facility safety, risk management and waste disposal. The facilities comply with standard safety procedures and all processes and procedures are monitored by Environmental Health and Safety staff. The facilities have all applicable permits in place, and would not need additional permits for the proposed activities. All handling and disposal of gases, chemicals, wastes and liquid effluents comply with appropriate regulations.

Based on review of the project information and the above analysis, DOE has determined the research, development, fabrication, testing and analysis activities associated with the development of a residential split-system 3-ton Cold Climate Heat Pump system would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined the proposed project is consistent with actions contained in DOE categorical exclusions A9 "information gathering, analysis and dissemination," B1.31 "installation or relocation of machinery and equipment," B3.6 "small-scale research and development, laboratory operations and pilot projects," and B5.1 "Actions to conserve energy," and is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Insert the following language in the award:

You are required to:

If the recipient chooses to conduct field test activities that occur on any site, building, structure and/or district that is included in or eligible for inclusion in the National Register of Historic Places, authorization of federal funds for these field test activities would be subject to additional Section 106 (National Historic Preservation Act) consultation by the DOE. The recipient must notify the DOE if such actions are being considered and would be restricted from field test activities until all consultations are complete and notification has been received from DOE.

Note to Specialist :

Obadiah Broughton 2/12/2013

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: 
NEPA Compliance Officer

Date: 2/14/2013

FIELD OFFICE MANAGER DETERMINATION

Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

- Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.
- Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____
Field Office Manager

Date: _____