OPTIMIZED INSTALLATIONS OF AIR SOURCE HEAT PUMPS FOR SINGLE-FAMILY HOMES

WHY THIS RESEARCH IS NEEDED

The 2018 CARD Minnesota Energy Efficiency Potential Study identified cold climate air source heat pumps (ccASHPs) as the technology expected to provide 25% of total residential electrical savings in the state in the coming decade. This will be an essential component in meeting Minnesota's 1.5% conservation goal. Within the past year several Minnesota electric utilities have modified their existing heat pump programs or undertaken ccASHP pilots to increase installations. However, installations have been slow to date, due to lack of familiarity and clear guidance on installation and operation in cold climate applications for this technology on the part of Minnesota contractors and consumers.

PROJECT PROCESS AND EXPECTED OUTCOMES

This project will install a sample of ccASHP systems in homes that are currently electrically heated. It will develop interim protocols for quality installation (QI) based on CEE's knowledge of heat pump performance in cold climates, existing best practices guides, and information developed by this project on Minnesota's electrically heated homes. The QI protocols will then be implemented, tested, refined, and validated. It will collect and analyze field data to assess performance and customer acceptance, and to provide government energy agencies and utilities with evidence of reliable real-world savings from ccASHPs that have been implemented according to best practices for QI. Interim QI protocols and Minnesota Technical Reference Manual calculations will provide early results to help close the gaps that currently hinder market transformation. Then the field study will enable the interim protocols and calculations to be tested, refined, and validated in an array of homes, ensuring that the thousands of ccASHP installations anticipated through conservation improvement programs over the next decade are fully optimized.

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PROJECT SUMMARY

Objectives

The study will develop and validate design, installation, and operational protocols necessary for ccASHPs to achieve high market acceptance and maximum energy savings.

Non-Energy Benefits

Decreased electric bills for heating. Increased home comfort.

Scope

Field work at least six to eight test homes selected based on previous market characterization. Develop and refine application protocols based on field data.

Timeline

April 2019–September 2020

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