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PNNL-SA-166037

Smart Monitoring and Diagnostic System (SMDS) for Packaged Air Conditioners and Heat Pumps for Small/Medium Commercial Buildings: Preparation for Commercialization

CRADA 478

September 2021

Michael Brambley

mCloud Technologies (USA) Inc.

U.S. DEPARTMENT OF ENERGY

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Abstract

This project will enable Pacific Northwest National Laboratory (PNNL) and industry partner, mCloud Technologies, to work collaboratively to ready the Smart Monitoring and Diagnostic System (SMDS) for commercial deployment and validate its performance under real-world conditions at field sites. This project will specifically focus on 1) implementing the SMDS algorithms in a scalable cloud-based software architecture, 2) designing new, innovative, complimentary commercial services based on the SMDS, 3) enhancing the SMDS energy and cost impact algorithms to reduce uncertainty in estimates, 4) determining the lower limits on SMDS performance degradation detection, 5) validating algorithm performance and default values of adjustable thresholds with existing data from controlled physical testing and from customer packaged air conditioners and heat pumps (commonly referred to as rooftop units or RTUs), 6) field testing to validate the system on multiple customer buildings in diverse environments, and 7) expanding field deployment to a larger set of mCloud's customer buildings. Project results by validating, enhancing, and quantifying the performance of the SMDS will position mCloud, and potential future licensees, to implement the SMDS in commercial offerings that encourage and enable use of condition-based and predictive maintenance, leading to significant reductions in energy use and greenhouse gas emissions associated with space conditioning by RTUs. Furthermore, these enhancements will increase the value of the SMDS for users and increase the potential market for its use and impacts.

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