

(4) Closing the Gap: Getting Full Performance from Residential Central Air Conditioners

This two-year project includes the development of next-generation central air-conditioning performance ratings, development and demonstration of a central air conditioner for hot/humid climates, and HVAC contractor training.

Total project cost: \$1,534,716

Funding request: \$683,179

Project Lead: New York State Energy Research and Development Authority

Project Participants: Florida Solar Energy Center; Advanced Energy; Energy Center of Wisconsin, American Council for an Energy-Efficient Economy; CDH Energy; Wisconsin Energy Conservation Corporation, Lawrence Berkeley National Laboratory

Patents

None

Publications/Presentations

None.

Progress in Past Quarter and Current Status

Task 1 Improve central air conditioner performance ratings

Task 1.1 Review present standards and method of testing

Task 1.2 Field performance data review

Task 1.3 Develop population weighted temperature bin-hour distributions

Task 1.4 Preliminary proposed rating procedures

Task 1.5 Simulate benefits of alternative metrics for diverse climates

Task 1.6 Analysis and recommendations

Task 1 will be primarily completed by other project partners. During this reporting period, UCF/FSEC reviewed and provided written comments on the Task 1.3 white paper entitled "Development of Population-Weighted Temperature Bin-Hour Distributions" which was authored by CDH Energy (NYSERDA subcontractor).

Task 2 Robust Feature Set for Residential Air Conditioners

Task 2.1 Develop trial specification sets

Task 2.2 Draft specification

Task 2 will be primarily completed by other project partners (NYSERDA and its subcontractors). So far, UCF/FSEC has assisted on Task 2.1 with developing trial specification sets and assisting with development of the analysis methodology. There was no additional activity performed on this task by UCF/FSEC during this reporting period.

Task 3 Field Performance Data and Innovation

Task 3.2 Benefits of proper sizing

The goal of Task 3.2 is to show the benefits of proper air conditioner sizing to contractors, customers and utilities. Field tests were conducted in 4 Florida case study homes by UCF/FSEC, with additional tests conducted at several homes in Wisconsin by ECW.

Efforts during this reporting period were focused on UCF/FSEC completing the analysis of measured data for the 4 Florida case study homes. A draft white paper was 95% completed by the end of this reporting period, and the 100% draft will be completed by mid-July 2006. The draft white paper will then be distributed to the linked project partners for their review and comment. Subsequently, the paper will be distributed to the project advisory committee for their feedback. The goal is to have this white paper fully completed, including addressing/resolving review comments to the extent possible, by September 1, 2006.

Task 4 Develop New Climate-Sensitive Air Conditioner Designs

Task 4.1 System Configuration: identification, simulation and cost-benefit analysis

Task 4.2 Prototype System: design, construction, laboratory and field testing

Work on Task 4.1 continued during this reporting period. CDH Energy (NYSERDA subcontractor) and UCF/FSEC continued analyzing existing HVAC systems and ventilation strategies along with new configurations for the climate sensitive air conditioner using computer simulation. Portions of the white paper for this task were drafted by CDH Energy, and UCF/FSEC reviewed the information and provided both written and verbal comments back to CDH.

This analysis and a draft white paper summarizing the results are scheduled for completion by the end of July 2006. The paper will be distributed to the linked project partners and the project advisory committee, with resolution of comments by early September 2006. Work on Task 4.2, which has been on-going at a modest level of effort, will continue in earnest following completion of Task 4.1.

Task 5 Information Dissemination and HVAC Contractor Training

The Class 1 Energy Gauge Rater Training workshop that trains and certifies Energy Raters to do house and duct airtightness testing in the state of Florida was held in June 2006. Twelve people attended the workshop.

A new brochure was developed and sent to 25,000 potential participants promoting FSEC's *Residential HVAC as if Comfort and Energy Mattered* course that is being offered in five Florida cities from August through October 2006 (http://www.fsec.ucf.edu/ed/cont_ed/php/res-hvac.php).

1. Plans for Next Quarter:

- Task 3.2: Complete a draft white paper summarizing the benefits of proper AC sizing based on measured data from four Florida case study homes. Distribute to the linked partners and the project advisory committee for review and comment. Address comments to the extent possible and complete final version of the paper.
- Task 4: Work with CDH Energy to complete computer simulations of candidate system configurations and cost/benefit analyses of the various options. Further develop the prototype design and procure equipment and components for system assembly.
- Task 5: FSEC's *Residential HVAC as if Comfort and Energy Mattered* course will be offered in five Florida cities from August through October 2006.

In Quarters 2 and 3, Wisconsin Energy Conservation Corporation prepared and released a draft write-up summarizing field test data on the operating characteristics of central air conditioners in Wisconsin and Minnesota.