

(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. However, an invention disclosure was submitted to the University of Central Florida's Technology Transfer Office on December 11, 2007 regarding developments under Task 4.2 (Prototype System: Design, Construction, Laboratory and Field Testing). Determination of patentability is pending. Per contract requirements, the subject invention will be disclosed to NASEO but treated as confidential information.

Publications/Presentations:

"Measured Impacts of Proper Air Conditioning Sizing in Four Florida Case Study Homes", FSEC-CR-1641-06, Final Report, October 25, 2006. This was the UCF/FSEC deliverable for Task 3.2.

<http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1641-06.pdf>

"Closing the Gap: Getting Full Performance from Residential Central Air Conditioners, Task 4 - Develop New Climate-Sensitive Air Conditioner, Simulation Results and Cost Benefit Analysis", FSEC-CR-1716-07, April 27, 2007. This was the joint UCF/FSEC and CDH Energy deliverable for Task 4.1. <http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1716-07.pdf>

"Improving Central Air Conditioner Performance Ratings: A Review of Seasonal Energy Efficiency Ratings (SEER)", ACEEE Report A071, October 2007. Deliverable for Tasks 1.1 and 1.4 (ACEEE and CDH Energy [NYSERDA subcontractors], with input and assistance from UCF/FSEC). <http://www.aceee.org/pubs/a071.htm>

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 was primarily completed by project partner NYSERDA (subcontractors ACEEE and CDH Energy) with assistance from UCF/FSEC. During this reporting period UCF/FSEC reviewed and commented on the ACEEE press release regarding the report completed as part of Tasks 1.1 and 1.4: <http://www.aceee.org/pubs/a071.htm>

Task 2 Robust Feature Set for Residential Air Conditioners

Task 2.1 Develop trial specification sets

Task 2.2 Draft specification

Task 2 was primarily completed by project partner NYSERDA (subcontractors ACEEE and CDH Energy) with assistance from UCF/FSEC. No activity 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 was 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 project partner ECW.

UCF/FSEC's portion of Task 3.2 was fully completed in October 2006, with the findings summarized in the report "Measured Impacts of Proper Air Conditioning Sizing in Four Florida Case Study Homes", FSEC-CR-1641-06, Final Report, October 25, 2006.

<http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1641-06.pdf>

This Task 3.2 report was reviewed and discussed in the May 2007 issue of Energy Design Update

(<http://www.aspenpubs.com/energy/lpext.dll?f=templates&fn=main-h.htm>).

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

Task 4.1 was completed in April 2007. The final version of the white paper/report was finished on April 24, 2007. The report can be downloaded from:

http://securedb.fsec.ucf.edu/pub/pub_show_abstract?v_pub_id=4348 (abstract)

<http://www.fsec.ucf.edu/en/publications/pdf/FSEC-CR-1716-07.pdf> (full report)

Work on Task 4.2 continued during this reporting period. Field testing of the prototype air handler with enhanced dehumidification performance was completed. Field testing of the improved supply air fan control (separate test site) was also completed. The white paper (final report) summarizing Task 4.2 was initially completed and is awaiting final review. Distribution of the final Task 4.2 white paper/report is awaiting resolution of the patentability of the invention disclosure related to this task (see above, Section 3. Patents).

Task 5 Information Dissemination and HVAC Contractor Training

UCF/FSEC's portion of the training aspect of this task was completed in December 2006. Information dissemination has been on-going throughout the project (e.g., see Section 4. Publications/Presentations).

Plans for Next Quarter:

The STAC Agreement between NASEO and UCF/FSEC ended October 31, 2007. During the next quarter, the plan is to resolve the patent issue regarding Task 4.2, and then issue the Task 4.2 report (white paper). Then a brief final report will be issued (since it will include some information from the Task 4.2 report)