

#### **(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

“Measured Impacts of Proper Air Conditioning Sizing in Four Florida Case Study Homes”, FSEC-CR-1641-06, *DRAFT* Contract Report (white paper) for Task 3.2. This report will be finalized in October 2006.

#### 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 is being primarily completed by other project partners. No activity by UCF/FSEC during this reporting period.

##### **Task 2 Robust Feature Set for Residential Air Conditioners**

- Task 2.1 Develop trial specification sets**
- Task 2.2 Draft specification**

Task 2 is being primarily completed by other project partners. 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 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.

UCF/FSEC completed a draft white paper summarizing the results for the Florida case study homes in July 2006. The draft paper was first distributed to the linked project partners. Comments received from the project partners were reviewed and several recommendations were incorporated into the paper. The revised draft was then forwarded to the project advisory committee for their review and comment (September 2006). A number of comments were received from three advisory committee members and these are currently being reviewed.

Results from this system sizing study were mentioned in a 'Letter to the Editor' submitted to Energy Design Update (EDU) in response to an article in their August 2006 issue. The brief letter will be included in the October 2006 issue of EDU ("Right Sizing Is Only Part of the Story", pg. 14).

### **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. The white paper for this task was nearly completed during this reporting period.

This analysis and the draft white paper summarizing the results will be completed in October 2006. The paper will be distributed to the linked project partners and the project advisory committee, with resolution of comments by the end of November 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. Components for the prototype system are currently being identified and will be procured during the next reporting period.

### **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 DeFuniak Springs, Florida in July and in Cocoa, Florida in September. Nine people attended the July workshop and ten attended the September workshop.

FSEC's *Residential HVAC as if Comfort and Energy Mattered* course was held in Jacksonville and Panama City in August, with fourteen people attending in Jacksonville and only seven in Panama City. The course was also offered at the Improving Building Systems in Hot and Humid Climate

symposium in July and had about seven attendees (the conference maintained the attendee list). FSEC also provided the Diagnosing Moisture Problems course which attracted about fifteen students.

The HVAC course is being offered twice in October 2006 and the class 1 rater training course is being offered in December 2006. The contractor training portion of this task will then be completed.

Plans for Next Quarter:

- Task 3.2: Address comments on the draft white paper that were received from project advisory committee members. Complete a 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, and finalize the draft version of the task report (white paper, October 2006). Distribute the white paper to the project linked partners and the project advisory committee for review and comment. Address review comments to the extent possible and issue a final version of the white paper (late-November 2006). 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 is being offered twice in October 2006. The *Class 1 Energy Gauge Rater Training* workshop is being offered in December 2006.