REGIONAL AC EFFICIENCY WORKGROUP MEETING I

REPORT TO THE FLORIDA BUILDING COMMISSION

May 9, 2008

Tampa, Florida

Meeting Design & Facilitation By

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FLORIDA BUILDING COMMISSION

REGIONAL AC EFFICIENCY WORKGROUP REPORT

MAY 9, 2008

OVERVIEW
Chairman Rodriguez announced that at the recommendation of the Energy TAC the Commission is convening a Regional AC Efficiency Workgroup. The Workgroup will develop recommendations on whether the Commission and DCA should recommend to the United States Department of Energy (USDOE) regional AC efficiency standards for the hot and humid climate. The USDOE now has authority to develop and adopt regional AC efficiency standards. The Workgroup will work with affected stakeholder interests in a facilitated workgroup process. The Workgroup shall investigate the feasibility of a hot-and-humid climate regional efficiency rating for air-conditioner and heat-pump systems and if determined a regional standard is a good strategy, then to develop recommendations for the technical requirements.

Regional AC Efficiency Workgroup Members
Oscar Calleja
Bob Cochell
Roy Crawford
Ron Bailey
Philip Fairey
Dale Greiner
Gary Griffin
Pete Quintela

REPORT OF THE MAY 9, 2008 MEETING

Opening and Meeting Attendance
The meeting started at 9:00 AM, and the following Workgroup members were present: Oscar Calleja, Bob Cochell, Roy Crawford, Ron Bailey, Philip Fairey, Gary Griffin, and Pete Quintela.

DCA Staff Present
Rick Dixon, Mo Madani, and Ann Stanton.

Meeting Facilitation
The meeting was facilitated by Jeff Blair from the Florida Conflict Resolution Consortium at Florida State University. Information at: http://consensus.fsu.edu/

Project Webpage

Information on the project, including agenda packets, meeting reports, and related documents may be found in downloadable formats at the project webpage below:
http://consensus.fsu.edu/FBC/ac.html

Meeting Objectives

- ✓ To Approve Regular Procedural Topics (Agenda)
- ✓ To Hear an Overview of the Regional AC Efficiency Workgroup's Scope and Charge
- ✓ To Review Workgroup Procedures, Guidelines, and Decision-Making Requirements
- ✓ To Hear an Overview of DOE Small HVAC Rulemaking and Performance Issues for a Hot and Humid Climate
- ✓ To Hear Industry (Equipment/System Installers) Perspective on the Issue
- ✓ To Hear Equipment Manufacturers Perspective on the Issue
- ✓ To Discuss Whether to Recommend a Hot-and-Humid Climate Regional Efficiency Rating for Air-Conditioner and Heat-Pump Systems
- ✓ If Yes, To Identify Issues and Options Regarding Technical Requirements for Regional Standards
- ✓ To Discuss and Evaluate Level of Acceptability of Proposed Options
- ✓ To Consider Public Comment
- ✓ To Identify Needed Next Steps and Agenda Items for Next Meeting

Review of Regional AC Efficiency Workgroup Scope

Jeff Blair explained that the Workgroup's scope is two-fold. First does it make sense to have regional AC efficiency standards specific to the hot and humid climate and to recommend same to the United States Department of Energy (USDOE). Second, if so what should the technical requirements be for the regional efficiency standards regarding a hot and humid region.

Jeff explained that that the Workgroup's recommendation would be submitted to the Commission's Energy TAC for review and then to the Florida Building Commission who will make a decision and in turn pass final recommendations to the USDOE.

Review of Commission's Workgroup Meeting Guidelines, Consensus-Building and Decision-Making Process, and Sunshine Requirements

Jeff Blair reviewed the Commission's consensus and decision-making processes, and explained that Workgroup members were subject to the requirements of the Florida Sunshine Law, and could not discuss issues that may foreseeably come before the Workgroup with other Workgroup members outside of a properly noticed Workgroup meeting.

Overview of DOE Small HVAC Rulemaking and Performance Issues for Hot and Humid Climates

Don Shirey from the Florida Solar Energy Center (FSEC) provided members with an overview of DOE small HVAC rulemaking and performance issues for hot and humid climates and answered members questions.

Overview and Summary of Discussion and Member's Questions and Comments:

Gave overview of DOE rules for standards; one or two additional standards for cooling.

- Must produce significant energy savings, be economically justified and consider affects on stakeholders.

Discussed SEER rating

$SEER = (1 - 0.5 * C_D) * EER_B$

- Point B conditions are 82 outside dry bulb, 80 interior, 67 wet bulb

Discussed typical equipment and does it work adequately

- It depends on house loads, ventilation, equipment

Gave dehumidification enhancement options – listed 7 different ways, not all inclusive

Indicated no free lunch, takes energy to remove more moisture, also consumers have basis for comparing humidity performance.

Referred to Sachs, et al. ACEEE report:

- Change test from 0.1 inches water column static pressure to something higher, but still less than the 0.6 average found in a home study (FSEC-CR-1357-02).

Further recommendation to consider a rating at point B for moisture removal factor.

(The full presentation is available on the project webpage)

Industry Perspective on the Issue

Bob Cochell provided Workgroup members with Industry's perspective on the need for regional AC efficiency standards for the hot and humid climate.

Overview and Summary of Discussion and Member's Questions and Comments:

Spoke on comfort, SHR, sizing, local exhaust fans for moisture removal, some manufacturers achieve high SEER with strategies that increase SHR, some customers think bigger is better. Education of HVAC trade personnel is key to getting it right.

Some discussion followed regarding reduction in C_D sometimes being able to reduce time to dew point for coil, but evaporator sizing and fan operation may reduce the ability for condensate to leave the pan.

(The full presentation is available on the project webpage)

Manufacturers Perspective on the Issue
Roy Crawford (Trane), Dennis Harper (Trane), Austin Primiano (Lennox), and Dutch Uselton (Lennox) provided Workgroup members with Manufacturers perspective on the need for regional AC efficiency standards for the hot and humid climate.

Overview and Summary of Discussion and Member's Questions and Comments:

Roy Crawford Presentation
Spoke on equipment/load SHR issues. No standard to compare dehumidification of equipment. Suggested reducing duct leakage, ensure proper duct sizing, require tight construction, and ensure proper refrigerant charge.

- Gary: Will you support standards to have manufacturers provide standard data that the industry can use to compare?
- Roy: The industry does not want more testing.
- Oscar: I have trouble finding data for 75 F, 50% RH.
- Philip: How do you perceive ASHRAE 62.2 requirements?
- Roy: I would use an ERV to reduce the problem.

(The full presentation is available on the project webpage)

Austin Primiano and Dutch Uselton Presentations
Austin indicated that a regional rule could lead to local enforcement issues; industry would be burdened to ship the right unit to the right location; possible you will be only leaving options that will cost too much.
Dutch presented some different strategies for controlling humidity and the energy use –see summary of performance slide for Tampa.
(The full presentations are available on the project webpage)

Discussion on Whether to Recommend a Hot-and-Humid Climate Regional Efficiency Rating for Air-Conditioner and Heat-Pump Systems
The Workgroup was asked to discuss whether it makes sense to recommend a specific regional AC efficiency standard for the hot and humid climate.

Overview and Summary of Discussion and Member's Questions and Comments:
Gary: Thinks we should come up with a recommendation otherwise we may have to live with something that DOE comes up with -- we are better off making our own recommendation even if we don't want a regional standard.

Roy: Can we do more than a SEER rating?
Austin: As part of rulemaking they can look at other options. In last rulemaking they looked at EER in addition to SEER.

Pete: If we could control the design, the equipment is available.

Ann: When fed makes new standard, states have two years to show compliance or demonstrate why they could not meet it. For heating and cooling ratings, the federal standard is the max allowed also.

Mo: Do not limit ourselves at this point in time.

Gary: We don't want new standards that will affect our ability to maintain comfort.

Philip: We need to have some labeling that will allow consumers to know the dehumidification performance. This may be something that is a separate rating or combining the overall efficiency and dehumidification in a single rating.

Rick: Will DOE consider different test criteria?

Pete: % of humidity removal per kilowatt of energy.

Don Brundage, Southern Company: DOE can regulate one parameter under existing legislation - SEER and HSPF for heat pumps, but how to do it can be different.

Philip: Let us ask what we want.

Pete: Are we considering criteria for the Florida Building Commission?

Rick: No. This opportunity is to provide input to DOE.

Ann: Any kind of a rating may be dependent on many other items –can manufacturers indicate some criteria along with their rating (e.g., duct pressure)?

Gary: Establish a system to rate equipment performance for humidity removal at part-load conditions.

Philip: Create a rating that is composed of the SEER, modified by the SHR at 82 outdoor temperature.

$SEER_{modified} = SEER / SHR_{82}$.

Gary: Separate numbers may be better to avoid the high SEER with poor SHR.

Philip: Could set a minimum to avoid the poorest performers.

Roy: What are the units of this parameter?

Dutch: Would need to be more worked out with weighting factors, reviewed by engineers.

Ron: Manufacturers have done a great job in enhancing the dehumidification of their equipment and there is good equipment out there, but not sure it is available in small sizes 1.5, 2-ton needed

for affordable housing. We have two problems, spring/fall and winter. One problem that has not been discussed is how well do the design tools for sizing work?

Jennifer Valentine: How do we know if Manual J is done correctly? They would have to go through testing and certification to do the load calculation.

Don: There are many options available to meet the requirements. Do we want to restrict the options that we know are available that don't work.

Don Brundage: Different set of regulations for building codes versus equipment standards. You are making this a more difficult decision than it needs to be. I would look at it as a high humid climate standard, some equipment would not be allowed to be sold – there would just be restrictions.

Gary: I don't think there should be a minimum requirement for SHR. There are applications that require that type of equipment. A computer room may not need a low SHR. Better off with recommendations to installers and consumers on choosing equipment properly.

Don B: If it is served by three phase power it is not covered under this regulation.

Austin: I don't think that is correct. Usually anything under 65,000 Btu/hr is considered residential.

Don B: The regional rulemaking is residential equipment under 65,000 Btu/hr that would normally be installed in a residential application.

Dutch: SEER makes sense for hot and humid climates. We should talk about moisture removal.

Pete: I agree with what Dutch says.

Rob: Might we not be able to weed out poor humidity methods of achieving high SEER or give favor to those that do better if we end up with a combined system.

Bob: We will need a re-education of our dealers/installers in order to achieve our goals. Some contractors will be unreachable. This is kinda-like trying to grab a slippery fish. There are so many ways for the fish to slip away. I think we need something, not sure what it is.

Gary: I think we need to come up with something for humidity control. It would not have to be a placard.

Philip: It would not have to be all over the place. The current test point B that Don mentioned is already tested by the manufacturers.

Bob: Wouldn't 80 or 85 outside be better since that is in current tables.

Dutch: Don chose 82 trying to make it as accommodating as possible. We publish all sorts of data.

Don: How do we get it to a level of importance? This is a required test point.

Bob: This may stop them from using high air flow values to achieve their SEERs.

Roy: Is this what we are after here that there is a value – do we need to go to DOE?

Philip: If all we want is to get available information then we don't have anything to take to DOE rulemaking. If we want to have a regional minimum standard than we need to come up with that minimum standard.

Oscar: Could we recommend to DOE that they have a requirement for a maximum SHR at the 82 test point for hot humid climates?

Mo: Not just address the efficiency of the equipment – could come up with guidelines through the code or other means.

Pete: Discussed SEER and SHR. We have many units that will obtain 13 SEER that vary in how they achieve it. I don't think DOE is going to be concerned with our mold.

Ann: Can we request that the extra Btu's from running the air handler fan extra time after the compressor shuts off not be counted in the SEER for hot humid climates?

Gary: The only other direction I can see us going is to change the requirements for design steps or certification requirements for those that are specifying equipment.

Ron: How much moisture evaporation from the cooling coil will occur in 1.5 to 3 minutes (after the compressor turns off but the supply air fan stays on for 1.5 to 3 minutes)? Fan constant on is a big problem.

Philip: Agrees with Gary but neither needs DOE.

Dutch: Just because you have a minimum doesn't mean you solve the problem.

Oscar: Wanted to avoid the worst units.

Pete: Licensed contractors; this is part of the exam.

Don: 1.5 to3 minutes evaporates a very large part of the moisture on the coil. Thirty seconds at half flow is not so bad but the longer on times significantly degrades the dehumidification performance.

Mo: Some of the thermostats we heard about for humidity control would be good.

Dutch: Ann's suggestion would require new testing – don't use that here.

Ron: Enhanced air handlers in enhanced mode don't you get the overrun with it?

Dutch: No.

Don: Some do and some do not. Most air handlers have a way to disable the supply air fan over-run feature.

Non-Binding Straw Poll on Whether to Recommend A Regional AC Efficiency Standard for the Hot and Humid Climate

Non-binding Straw Poll: Does it make sense to tell the USDOE we should have a regional standard for the hot and humid climate?

2 yes, 3 no, 1 abstain due to lack of specifics.

Gary: I think we can set this through our Building commission.

Philip: I disagree – we can not set dehumidification capabilities for manufacturers.

Rick: We are limited with requiring higher standards within the federal appliance standards.

Ann: We have not talked about humidity control with higher efficiency equipment.

Don B. If you do not recommend to them to investigate it then you may kill it. If they pursue it, they will take time, maybe four years, figuring out how to do it. If you think there is potential then pursue for it without needing the details of what it will be.

Don S: Can we set a minimum on a different performance parameter.

Rick: Some history, ARI and FHBA sued DCA in 1980s – whether Florida could require insulation on air handler systems. Industry said it was invalid. Building code can not forbid minimum equipment.

Don B: Agree.

Rob: Various dehumidification and ventilation systems are going into homes and they take energy. Some methods are much more efficient than others. I would hate to pass up this opportunity to affect some significant energy use.

Options for Consideration
Members offered some options for consideration at the next meeting regarding a recommendation to the USDOE.

Following Were Options Offered for Evaluation:
Establish a system for rating equipment performance for removing humidity at part-load conditions.

Create a rating that is composed of the SEER, modified by the SHR at 82 outdoor temperature. **$SEER_{modified} = SEER / SHR_{82}$.**

Require that the extra Btu's from running the air handler fan extra time after the compressor shuts off can not be counted in the SEER for hot humid climates.

Require testing and certification to do load calculations using Manual J.

Create certification requirements for those that are specifying equipment.

Public Comment
Members of the public were invited to provide the Workgroup with comments.

Next Steps
The Workgroup will meet on May 22, 2008 in Tampa at the RACA facility.

Adjourn
The Workgroup adjourned at 3:30 PM.

ATTACHMENT 1

MEETING AGENDA AND PROCESS

FLORIDA BUILDING COMMISSION

REGIONAL AC EFFICIENCY WORKGROUP

May 9, 2008—Tampa, Florida

RACCA; 1920 East Sligh Avenue; Tampa, Florida 33610; 1.813.870.2607

Meeting Objectives

- ✓ To Approve Regular Procedural Topics (Agenda)
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- ✓ To Identify Needed Next Steps and Agenda Items for Next Meeting

All Agenda Times—Including Public Comment and Adjournment—Are Subject to Change

Meeting Agenda

9:00	**Welcome and Opening**	
9:05	**Review of Regional AC Efficiency Workgroup Scope**	
9:10	**Introductions and Workgroup Members' Expectations for Success**	
9:20	**Agenda Review and Approval**	
9:30	**Review of Commission's Workgroup Meeting Guidelines, Consensus-Building and Decision-Making Process, and Sunshine Requirements**	
9:40	**Overview of DOE Small HVAC Rulemaking and Performance Issues for Hot and Humid Climates**	(Don Shirey)
10:30	***Break***	
10:45	**Industry Perspective on the Issue**	(Bob Cochell)
11:05	**Manufacturers Perspective on the Issue**	(Roy Crawford and others)
12:00	**Lunch**	

1:00 **Discussion on Whether to Recommend a Hot-and-Humid Climate Regional Efficiency Rating for Air-Conditioner and Heat-Pump Systems**

2:00 **Discussion, Identification and Evaluation in Turn of Issues and Options Regarding Technical Requirements**

3:20 **General Public Comment**

3:40 **Review of Regional AC Efficiency Workgroup Delivery and Meeting Schedule**

3:50 **Next Steps and Agenda Items for Next Meeting**
Next meeting agenda items, needed information/presentations, location, and date

4:00 ***Adjourn***

Contact Information and Project Webpage
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Regional AC Efficiency Workgroup Members

Oscar Calleja
Bob Cochell
Roy Crawford
Ron Bailey
Philip Fairey
Dale Greiner
Gary Griffin
Pete Quintela

Meeting Schedule

Meeting I	May 9, 2008	Tampa
Meeting II	May 22, 2008	Tampa
Meeting III	June 13, 2008	Tampa

Overview
Chairman Rodriguez announced that at the recommendation of the Energy TAC the Commission is convening a Regional AC Efficiency Workgroup. The Workgroup will develop recommendations on whether the Commission and DCA should recommend to the United States Department of Energy (USDOE) regional AC efficiency standards for the hot and humid climate. The USDOE now has authority to develop and adopt regional AC efficiency standards. The Workgroup will work with affected stakeholder interests in a facilitated workgroup process. The Workgroup shall investigate the feasibility of a hot-and-humid climate regional efficiency rating for air-conditioner and heat-pump systems and if determined a regional standard is a good strategy, then to develop recommendations for the technical requirements.

REGIONAL AC EFFICIENCY WORKGROUP PROCEDURAL GUIDELINES

PARTICIPANTS' ROLE

- ✓ The Workgroup process is an opportunity to explore possibilities. Offering or exploring an idea does not necessarily imply support for it.
- ✓ Listen to understand. Seek a shared understanding even if you don't agree.
- ✓ Be focused and concise—balance participation & minimize repetition. Share the airtime.
- ✓ Look to the facilitator(s) to be recognized. Please raise your hand to speak.
- ✓ Speak one person at a time. Please don't interrupt each other.
- ✓ Focus on issues, not personalities. Avoid stereotyping or personal attacks.
- ✓ To the extent possible, offer options to address other's concerns, as well as your own.
- ✓ Represent and communicate with member's constituent group(s).

FACILITATORS' ROLE

- ✓ Design and facilitate a participatory task force process.
- ✓ Assist participants to stay focused and on task.
- ✓ Assure that participants follow ground rules.
- ✓ Prepare agenda packets and provide meeting summary reports.

GUIDELINES FOR BRAINSTORMING

- ✓ Speak when recognized by the Facilitator(s).
- ✓ Offer one idea per person without explanation.
- ✓ No comments, criticism, or discussion of other's ideas.
- ✓ Listen respectively to other's ideas and opinions.
- ✓ Seek understanding and not agreement at this point in the discussion.

THE NAME STACKING PROCESS

- ✓ Determines the speaking order.
- ✓ Participant raises hand to speak. Facilitator(s) will call on participants in turn.
- ✓ Facilitator(s) may interrupt the stack (change the speaking order) in order to promote discussion on a specific issue or, to balance participation and allow those who have not spoken on an issue an opportunity to do so before others on the list who have already spoken on the issue.

ACCEPTABILITY RANKING SCALE

During the meetings, members will be asked to develop and rank options, and following discussions and refinements, may be asked to do additional rankings of the options if requested by members and staff. Please be prepared to offer specific refinements or changes to address your reservations. The following scale will be utilized for the ranking exercises:

Acceptability Ranking Scale	***4 = acceptable,*** *I agree*	***3 = acceptable,*** *I agree with* ***minor reservations***	***2 = not acceptable, I*** *don't agree unless* ***major reservations*** *addressed*	***1 = not acceptable***

ATTACHMENT 2

PUBLIC ATTENDANCE LIST

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ATTACHMENT 3

MEMBER COMMENTS

- We need to understand our goal better. Maybe Rick should do a presentation and outline what would likely happen if we take no action, so we know the possibilities.
- Would like to see participation from other manufacturers, may have a different approach.

PUBLIC COMMENTS

Jennifer Valentine, Lennox Industries
Would it be feasible to have "certified" people & companies doing load & energy calculations (manual J)?

- Training & testing for certification
- Understanding of mfg. SHRO/S/T data
- Correct sizing of duct & systems
- Standardization of all homes
- Less "fudging" of numbers
- Accountability on those "certified" (stamp of approval)
- Less "policing" with random checks & less companies doing them & "trained properly"
- Humidity is only part of the problem; contractors being trained properly increases that problem.

Jeff Revlett, Lennox Industries
I would like to recommend that the Board explore the possibility of certifying approved HVAC contractors who pass a test and exhibit continued education and training on design criteria, would be the only contractors allowed to design and install HVAC equipment in residential applications.

The specific issues to address include: duct design, SHR interpretation and application, mold mitigation, variable speed and humidity control options, and dehumidification days.