FLORIDA ENERGY CODE WORKGROUP

REPORT TO THE FLORIDA BUILDING COMMISSION

DECEMBER 9, 2009—MEETING IX

ORLANDO, FLORIDA

FACILITATION, MEETING AND PROCESS DESIGN BY

FCRC CONSENSUS CENTER

REPORT BY JEFF A. BLAIR
FCRC CONSENSUS CENTER
FLORIDA STATE UNIVERSITY

jblair@fsu.edu
http:// consensus.fsu.edu

This document is available in alternate formats upon request to Department of Community Affairs, Codes & Standards, 2555 Shumard Oak Blvd., Tallahassee, FL 32399, (850) 487.1824.

FLORIDA BUILDING COMMISSION
FLORIDA ENERGY CODE WORKGROUP

OVERVIEW

Governor Crist directed the Commission to increase building energy efficiency requirements by 15% in his July 2007 Executive Order 127. In addition, the 2008 Legislature through passage of The Energy Act of 2008 created a suite of energy related assignments for the Building Commission. The Energy Code provisions were a major focus of the Commission during 2008, and the Commission increased the thermal efficiency requirements for the Florida Energy Code by 15% and integrated the enhanced requirements into the 2007 Florida Building Code. The Commission reviewed energy related code amendments adopted in the 2007 Florida Building Code Update to determine their cumulative level of increased efficiency, and adopted additional amendments required to achieve Governor Crist's directive of 15% increased efficiency. During 2008 the Energy Code was amended by administrative rule and then the revised Energy Code was adopted into the 2007 Florida Building Code during the 2008 "glitch" cycle concurrently with the March 1, 2009 effective date for the 2007 Florida Building Code. Working with stakeholders using consensus-building workgroups, the Commission was able to achieve the 15% increase in efficiency in buildings and implement code amendments that are efficient, consistent, understandable and enforceable for the full spectrum of Energy Code users. The Commission's Energy Code Workgroup will develop recommendations regarding energy conservation measures for increasing efficiency requirements in the 2010 FBC by 20% as required by law.

MEMBERS AND REPRESENTATION

Raul L. Rodriguez, AIA, Chair of the Florida Building Commission, made the following appointments to the Florida Energy Code Workgroup (below). Members are charged with representing their stakeholder group's interests, and working with other interest groups to develop a consensus package of recommendations for submittal to the Commission.

2010 Florida Energy Code Workgroup

Steve Bassett, Rusty Carroll, Bob Cochell, Phillip Fairey, Dale Greiner, Jeff Gross, Jeff Householder, Bill Kent, Tom Larson, Larry Maxwell, Donny Pittman, Paul Savage, Drew Smith, Jeff Stone, and Rob Vickers.

Meeting Schedule

February 3, 2009: Melbourne, March 5, 2009: Cape Canaveral, March 27, 2009: Tampa, April 30, 2009: Tallahassee, May 28, 2009: Tallahassee, September 3, 2009: Gainesville, October 14, 2009: Tampa; November 12, 2009: Gainesville; December 9, 2009: Orlando; February 3, 2010: Tampa.

REPORT OF THE DECEMBER 9, 2009 MEETING

Opening and Meeting Attendance
Rusty Carroll, Bob Cochell, Phillip Fairey, Dale Greiner, Jeff Gross, Jeff Householder (Joe Eysie alternate), Bill Kent (Ken Gregory alternate), Tom Larson, Donny Pittman, Drew Smith and Jeff Stone.

Members Absent:
Steve Bassett, Larry Maxwell, Paul Savage, and Rob Vickers.

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

FSEC Staff Present
Muthusamy Swami.

Meeting Facilitation
The meeting was facilitated by Jeff Blair from the FCRC Consensus Center at Florida State University. Information at: http://consensus.fsu.edu/

FCRC CONSENSUS CENTER

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/2010-Florida-Energy-Code.html

Agenda Review and Approval
The Workgroup voted unanimously, 11 - 0 in favor, to approve the agenda as presented including the following objectives:

- ✓ To Approve Regular Procedural Topics (Agenda and Summary Report)
- ✓ To Hear FSEC Report Regarding Small Building Prescriptive Compliance Method Analysis
- ✓ To Review and Discuss 2010 FEC Commercial Chapter Draft Code Mark-Up
- ✓ To Discuss Specific Building Technologies/Options to Achieve Energy Efficiency Improvements*
- ✓ To Identify Issues and Options Regarding Project Tasks and Sub-Tasks (Future Meeting)
- ✓ 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

November 12, 2009 Facilitator's Summary Report Approval
Jeff Blair, Commission Facilitator, asked if any members had corrections or additions to the November 12, 2009 Report, and none were offered. The Workgroup voted unanimously, 11 - 0 in favor, to approve the November 12, 2009 Facilitator's Summary Report as presented/posted.

FSEC Report on Small Building Prescriptive Compliance Method Analysis
Muthusamy Swami, FSEC, provided the Workgroup with a PowerPoint presentation on small building prescriptive compliance method issues and answered member's questions.

PowerPoint Presentation:

Background
- Currently 15% savings
- HB 7135 Florida Energy Code (FEC) requirements:
- 20% savings by 2010
- 30% savings by 2013
- 40% savings by 2016
- 50% savings by 2019
- All with respect to 2007 FEC
- Question? What about prescriptive packages?

Considerations
- Legislative energy savings requirement must govern solutions
- ASHRAE 90.1 is the base. 2009 IECC process essentially similar to ASHRAE for commercial buildings.
- Bumping up against technology and cost effectiveness limits for enclosure features (R-Value, U-Factor, SHGC, etc.)

Focus
- Where do we currently stand on envelope feature (R-Value)?
- What are the technology limits for other energy features (window U-Value/SHGC)?
- How does climate location impact savings potential (Jacksonville versus Miami)?
- What Options do we have for Prescriptive Path?

General Analysis Process
- Where do we currently stand on envelope feature (R-Value)?
- What are the technology limits for other energy features (window U-Value/SHGC)?
- How does climate location impact savings potential (Jacksonville versus Miami)?
- What Options do we have for Prescriptive Path?

Other Envelop Features
- Commercial Buildings are generally internal- load dominated
- Envelope improvement impacts are limited
- Depends on climate & building type

Other Factors

- Window-to-Wall Area (WWA) percentage lower than 50% (40% in 2007 & IECC) does not get credit in ASHRAE standard 90.1
- Window-to-Wall Area (WWA) percentage greater than 50% (40% in 2007/IECC) is penalized in ASHRAE Standard 90.1
- How much can we improve?

Envelop Only Improvements

No	Case	% Savings		
		MIA	ORL	JAX
1.	Florida base case	-	-	-
2.	IECC 2009	1.62	1.70	2.76
3.	IECC 2009 + wall R-19, roof R-30 + SHGC all 0.19	9.60	9.93	10.99
4.	IECC 2009 + wall R-60, roof R-60 + SHGC all 0.19	12.37	12.63	13.96
5.	IECC 2009 + wall R-100, roof R-100 + SHGC all 0.19	13.21	13.56	14.85

Getting to 20%

- Envelope options WILL not get us the 20%
- About the best we can do with "best practice" envelope features is 86 in Jacksonville (where insulation matters most)
- Must add impact of improved lighting and equipment efficiencies
- Note that improved lighting reduces both lighting energy use as well as cooling energy use

Improvements to Get to 20%

No	Case	% Savings		
		MIA	ORL	JAX
1.	Florida base case	-	-	-
3.	IECC 2009 + wall R-19, roof R-30 + 90% LPD	7.19	7.67	8.89
4.	IECC 2009 + wall R-19, roof R-30 + 90% LPD + 90% EER + 90% heating eff + fan 0.82 + SHGC 0.19 all	17.91	17.97	18.76

5.	IECC 2009 + wall R-19, roof R-30 + 85% LPD + 90% EER + 90% heating eff + fan 0.7 + SHGC 0.19 all	21.29	21.58	22.39

Issues

- Envelope will not suffice
- More than 30 building types
- Varying Occupancies & Schedules
- Need Specific considerations for Florida Climate
- Coming up with prescriptive packages is re-inventing the wheel. ie. Redoing ASHRAE & IECC
- While the % improvement approach over a baseline seems very simple, the complexity is in developing prescriptive/component packages

Things to Consider

- We can develop only limited packages – along the lines of ASHRAE Advanced Design Guides – including best practices
- ASHRAE Design guides save 30% over Std 90.1-1999 not 90.1-2004.
- Expecting 20% saving for a specific retrofit component is unreasonable.
- Proportionally weight savings. eg. If envelope constitutes 25%, then 25 x 0.2 = 5% savings should only be expected
- Similarly weight lighting and systems
- Need to build such strategy into EnergyGauge Flacom
- Seek Official ASHRAE advisory regarding WWR issue for specific building types in order to take credit for lower WWR
- ASHRAE 90.1-2010 is designed to be 30% better the 2004. *Note: this was called into question and may in fact be to high.*
- Now there is a baseline for 2013 without the hassles.

FEC Commercial Chapter Draft Code Mark-Up Review and Discussion

Ann Stanton, DCA Energy Code staff, provided the Workgroup with an overview of a FEC Commercial Chapter mark-up draft of the 2009 IECC based 2010 Florida Building Code, Energy Volume and answered member's questions. For each section of the Draft, the Workgroup received an overview, heard public comment and decided on the proposed text. The public was included in the discussions and provided opportunities to comment on each section.

Workgroup Actions:

Motion—The Workgroup voted unanimously, 11 – 0 in favor, commercial code prescriptive package options should be developed for evaluation by the Workgroup at the February 2010 meeting.

Motion—The Workgroup voted unanimously, 11 – 0 in favor, to modify shell building prescriptive packages to ensure the buildings will comply with the required energy efficiency increase requirements of law once they are built-out.

The complete text of the FEC Commercial Chapter Draft Code Mark-Up may be reviewed at the project webpage, as follows: http://consensus.fsu.edu/FBC/2010-Florida-Energy-Code.html

Following are the Regarding the Commercial Integration Draft:

The Workgroup supported the draft text for the FEC Commercial Code by voting on each of the sections or combination of sections. In most instances the vote was 11 – 0 in favor, there was one 9 – 2 in favor vote, and four 10 – 1 in favor votes. The revised Draft will be posted once compiled to reflect Workgroup actions.

Workgroup Discussion on Integration Draft:

- Madani: We need some guidance on how to proceed with a prescriptive package, at least for additions and renovations. Swami gave 3 options: Advanced Design Guides, Best Practice,
- Swami: Can come up with a package if lighting and equipment are also utilized.
- Dixon: If Workgroup agrees, if we set HVAC minimums for a package, then prescriptive package(s) can be developed that will meet the overall efficiency improvements.
- Madani: If Performance method is OK, we have an option.
- Fairey: Federal law says you must use a minimum NAECA efficiency for the baseline.
- Swami: Assume include lighting.
- 1) only one component is being changed. Then develop criteria for only that component (R X .80); same for lighting. Could bump system efficiency by 20%.
- Greiner: From enforcement standpoint, no way to enforce.
- Dixon: Presumption of a Baseline. % contribution overall x 20% of that component. Would have a defined prescriptive number. Can use this package for an overall building or, if only part of a building, can use for one or more components.
- Swami: Go with both prescriptive and performance paths. Baseline should have baseline for lighting, but all other factors would be as-built. Running the whole thing except for the item being changed.
- Fairey: Overall set of component increases should approximate overall target increase.
- Stone: Does this provide a markup for the IECC tables. No.
- Fairey: Principal method of complying with IECC for commercial is ASHRAE 90.1. 90.1, it is the base for the IECC.
- Palacios: If you drop each component 20% it will be difficult. Look at lights. Can get a real big percentage on lighting. Have to look at the overall picture.
- Cochell: Haven't heard details about how much outside air is being used. Why not put max. cfm? Drive to alternative solution.
- Swami: ASHRAE 62.1 doesn't allow this. Presently can't model air distribution, but will be able to soon.
- Fairey: Code should have requirement about outside air. Especially schools. Control latent load.
- Dixon: Does the current 90.1 deal with this.
  Swami: Currently can't model.
- Palacios: LEED projects, get credit points for recovering energy from exhaust. Should be using heat wheels for outside air.
- Greiner: Issue is that we're making the building so tight, that outside air (and combustion air) becomes a big issue. This is a critical point.
- Dixon: Prescriptive packages likely limited to small commercial buildings; limited usage for heat recovery. If ASHRAE doesn't set a requirement, FL adding a requirement would give credit toward increase in stringency.
- Dixon: Shell buildings need to have a way to comply.
- Fairey: Need to get out of the shell what is possible to ensure buildings can comply when built-out.
- Madani: Will need both the weighted average and the packages for small buildings and additions. Could derive from the same approach.
- Dixon: There are other buildings that need a prescriptive package.

- John Michael, ATEX: There is language in IECC in reference to % of fresh air, dictates use of energy recovery.
- Chuck Anderson: You need a method of complying each component over time. Without a prescriptive table, perception results in delay in energy improvements. It is fair to limit it to small buildings.
- Stone: Need to develop some packages. Want to see what changes will be made to the IECC.
- Stone: Made a motion to put together packages, prescriptive options. Approved.

General Public Comment
Members of the public were invited to provide the Workgroup with comments. In addition, members of the public spoke on each of the substantive discussion issues before the Workgroup throughout the meeting.
None were provided.

Member's Comments and Issues
Workgroup members were invited to provide comments, or identify any issues or agenda items for the next meeting.
None were provided.

Review of Workgroup Delivery and Meeting Schedule
The Workgroup will be meeting as follows:
February 3, 2009: Melbourne, March 5, 2009: Cape Canaveral, March 27, 2009: Tampa, April 30, 2009: Tallahassee, May 28, 2009: Tallahassee, September 3, 2009: Gainesville, October 14, 2009: Tampa; November 12, 2009: Gainesville; December 9, 2009: Orlando; February 3, 2010: Tampa.

Subsequent Workgroup meetings will focus on identifying and evaluating options regarding the additional project subtasks as follows: Humidity and moisture control problems; Energy efficient pools systems; Green roofs and cool roofs; and, 2010 FBC energy requirements.
(Attachment 3—Workgroup's Adopted Recommendations)
(Attachment 5—Statutory Charge)

Next Steps

At the February meeting the Workgroup will evaluate the FEC Commercial prescriptive package options and other outstanding issues regarding the commercial code. In addition, the Workgroup was asked to be prepared to discuss specific building technologies/options and elements available to meet the scheduled increases in energy performance of buildings established in law. Energy efficiency performance options and elements including, but not limited to: solar water heating; energy-efficient appliances; energy-efficient windows, doors, and skylights; low solar-absorption roofs, also known as "cool roofs"; enhanced ceiling and wall insulation; reduced-leak duct systems; programmable thermostats; and, energy-efficient lighting systems. At a previous meeting the Workgroup identified the following technologies/options as follows:

- Solar water heating.
- Energy-efficient appliances.
- Energy-efficient windows, doors, and skylights.
- Low solar-absorption roofs, also known as "cool roofs."
- Enhanced ceiling and wall insulation.
- Reduced-leak duct systems.
- Programmable thermostats.
- Energy-efficient lighting systems.
- Water source, geo-thermal HVAC systems.
- Solar photovoltaic systems.
- Variable refrigerant flow mechanical systems.
- Data center efficiencies.
- Under-floor duct systems.
- Induction lighting and new lighting technologies.
- Passive energy efficient design and day-lighting.
- Building envelop efficiencies.

(Attachment 4—Remaining Workgroup Tasks)

Adjournment

The Workgroup voted unanimously, 11 – 0 in favor, to adjourn at 4:20 PM.

ATTACHMENT 1

MEETING EVALUATION RESULTS

December 9, 2009—Orlando, Florida

Average rank using a 0 to *10* scale, where *0* means totally disagree and *10* means totally agree.

1. Please assess the overall meeting.

9.3 The background information was very useful.
9.3 The agenda packet was very useful.
9.7 The objectives for the meeting were stated at the outset.
9.6 Overall, the objectives of the meeting were fully achieved.

2. Do you agree that each of the following meeting objectives was achieved?

9.5 Review of FSEC Report Regarding Small Building Prescriptive Compliance Method Analysis.
9.2 Discussion and Ranking of 2010 FEC Commercial Chapter Draft Code Mark-Up.
9.1 Discussion of Specific Building Technologies/Options to Achieve Energy Efficiency Improvements.
9.4 Identification of Next Steps.

3. Please tell us how well the Facilitator helped the participants engage in the meeting.

9.6 The members followed the direction of the Facilitator.
9.6 The Facilitator made sure the concerns of all members were heard.
9.7 The Facilitator helped us arrange our time well.
9.7 Participant input was documented accurately.

4. Please tell us your level of satisfaction with the meeting?

9.2 Overall, I am very satisfied with the meeting.
9.6 I was very satisfied with the services provided by the Facilitator.
9.2 I am satisfied with the outcome of the meeting.

5. Please tell us how well the next steps were communicated?

9.4 I know what the next steps following this meeting will be.
9.4 I know who is responsible for the next steps.

6. What did you like best about the meeting?

- Ann Stanton!
- Facilitator's direction and all members involved.
- Throughout the entire workshop, all questions were thoroughly answered.
- Room temperature was good.

7. How could the meeting have been improved?

- Improve sound system.
- Wanted internet and web access but it was not available.
- Perhaps a very basic 1 or 2 page executive summary on all proposed changes in the commercial energy code (not essential, just a suggestion).

8. Member Evaluation Comments.

- Ann did an outstanding job preparing revisions prior to the meeting, very helpful!!
- Swami's presentation should have been posted as an PDF document.

Public Written Comments

None were provided.

ATTACHMENT 2
PUBLIC MEETING ATTENDANCE

Public Meeting Attendance	
NAME	**REPRESENTATION**
Rafael Palacios	FBC
Jennifer Hatfiled	FPSA
Lisa Pate	FRSA
Mike Reed	FRSA
Michael LaFevre	Custom Window System
Rudy Camera	PTC
CW Macomber	APA
Paki Taylor	USGBC/Empirical
Chuck Anderson	AAMA
Jim Heise	PGT
Dick Wilhelm	FMA/WDMA
Mike Nau	PGT
Frank O'Neill	Full Service Green
John O'Conner	BOAF/RCID
Bob Boyer	PBC
Mike Rickabaugh	RCID
Ralph Jones III	RCID
John Michael	ATEX
Irvin Derks	Bard MFG Co.

ATTACHMENT 3

WORKGROUP'S CONSENSUS RECOMMENDATIONS

1.A. ENERGY EFFICIENCY COST-EFFECTIVENESS TESTS FOR RESIDENTIAL CODE CONSENSUS RECOMMENDATIONS

The Florida Legislature directed the Commission to develop a rule for determining cost effectiveness of energy conservation measures to be considered for inclusion in the Florida Energy Code. The rule must be completed and applied to the update of the energy provisions of the for the 2010 Florida Building Code.

"(3) The Florida Building Commission shall, prior to implementing the goals established in subsection (1), adopt by rule and implement a cost-effectiveness test for proposed increases in energy efficiency. The cost-effectiveness test shall measure cost-effectiveness and shall ensure that energy efficiency increases result in a positive net financial impact."

Energy Analysis Calculations Methodology

Energy analysis necessary to determine energy savings for Energy Conservation Measures (ECMs) be accomplished using Florida's code compliance software, EnergyGauge®.

Energy simulation analysis will be conducted for both single ECMs and packages of ECMs.

Economic Analysis Assumptions

Energy Conservation Measure (ECM) costs will be the full, installed incremental cost of improvements, where the incremental cost is equal to the difference between the baseline measure cost and the improved measure cost unencumbered by any federal tax credits, utility incentives or state rebates.

Energy Conservation Measure (ECM) costs will be the full, installed incremental cost of improvements, where the incremental cost is equal to the difference between the baseline measure cost and the improved measure cost unencumbered by any federal tax credits, utility incentives or state rebates, with option to consider encumbering utility incentives, etc. later, if possible.

Study Life Period

The analysis for residential buildings shall be conducted over a 30 year study period.

ECM Service Life

The evaluation shall be conducted using the appropriate service lives of the measures.

Home Mortgage Parameter Values

Mortgage interest rate: the greater of the most recent 5-year average and 10-year average simple interest rate for fixed-rate, 30-year mortgages computed from the Primary Mortgage Market Survey (PMMS) as reported by Freddie Mac.

Mortgage down payment: 10%.

Annual Rate Parameter Values

General inflation rate: the greater of the most recent 5-year and 10-year Annual Compound Interest Rate (ACIR) computed from the annual average Consumer Price Index (CPI) as reported by the U.S. Bureau of Labor Statistics.

Discount rate: General inflation rate plus 2%.

Fuel escalation rate: the greater of 5-year and 10-year ACIR computed from revenue-based prices as reported by Florida Public Service Commission minus the general inflation rate.

The baseline electricity and natural gas prices used in the analysis shall be the statewide, revenue-based average residential price for the most recent available 12 months as provided by the Florida Public Service Commission.

Cost Effectiveness Criteria

For present value cost-to-benefit ratio (PVCB) a value of 1.0 or greater.

For the internal rate of return (IRR) on investments, a value equal to 8%. {The recommended value is approximately 1.5% greater than the guaranteed return on State of Florida DROPS (retirement account) investments and is considered large enough that any rational investor would consider the investment wise compared with any other long-term investment.}

*For the levelized cost of conserved energy (LCCE), a value equal to the statewide residential revenue-based retail cost of electricity adjusted at the fuel escalation rate over one-half of the life of the measure (yields average over the measure life). {This is based on the fact that, over their life, accepted measures will cost consumers the same or less than purchasing electricity from the utility, where: LCCE criteria = (current price) * [(1+fuelEsc) ^ (life/2)].}*

Evaluation Methodology for Measures and Packages of Measures

Create multiple packages of ECMs that result in the target % efficiency increase for each code cycle update (20, 30, 40 and 50%), based on comparison to the 2007 FBC as adopted October 31, 2007 (without the 2009 supplement).

Evaluate each ECM using adopted cost effectiveness indicators (PVBC, IRR, LCCE), within their specific package of ECMs. PVBC will be considered the primary measure with IRR and LCEE used as measures for illustration and communication of individual ECMs and packages of ECMs comparative economic viability.

Validation of the cost effectiveness of Florida Energy Efficiency Code for Building Construction changes shall mean that a number of ECM packages evaluated to comply with the statutory percent energy efficiency increase requirements have a greater benefit than cost as measured in present value dollars.

1.B. ENERGY EFFICIENCY COST-EFFECTIVENESS TESTS FOR COMMERCIAL CODE CONSENSUS RECOMMENDATIONS

Energy Analysis Calculations Methodology

Energy analysis necessary to determine energy savings for Energy Conservation Measures (ECMs) will be accomplished using Florida's code compliance software, EnergyGauge®.

Energy simulation analysis will be conducted for both single ECMs and packages of ECMs.

Economic Analysis Assumptions

Energy Conservation Measure (ECM) costs will be the full, installed incremental cost of improvements, where the incremental cost is equal to the difference between the baseline measure cost and the improved measure cost unencumbered by any federal tax credits, utility incentives or state rebates.

Energy Conservation Measure (ECM) costs will be the full, installed incremental cost of improvements, where the incremental cost is equal to the difference between the baseline measure cost and the improved measure cost unencumbered by any federal tax credits, utility incentives or state rebates, with option to consider encumbering utility incentives, etc. later, if possible.

Study Life Period

The analysis for commercial buildings shall be conducted over a 30 year study period with appropriate service lives included in the analysis.

ECM Service Life

The evaluation shall be conducted using the appropriate service lives of the measures.

Mortgage Parameter Values

Mortgage interest rate: the greater of the most recent 5-year average and 10-year average simple interest rate for fixed-rate, 30-year mortgages computed from the Primary Mortgage Market Survey (PMMS) as reported by Freddie Mac, rate plus 2%.

Mortgage down payment: 20%.

Annual Rate Parameter Values

General inflation rate: the greater of the most recent 5-year and 10-year Annual Compound Interest Rate (ACIR) computed from the annual average Consumer Price Index (CPI) as reported by the U.S. Bureau of Labor Statistics. Discount rate: General inflation rate plus 2%.

Fuel escalation rate: the greater of 5-year and 10-year ACIR computed from revenue-based prices as reported by Florida Public Service Commission minus the general inflation rate.

The baseline electricity and natural gas prices used in the analysis be the statewide, revenue-based average commercial price for the most recent available 12 months as provided by the Florida Public Service Commission.

Cost Effectiveness Criteria

For present value cost-to-benefit ratio (PVCB) a value of 1.0 or greater.

For the internal rate of return (IRR) on investments, a value equal to 7%.

*For the levelized cost of conserved energy (LCCE), a value equal to the statewide commercial revenue-based retail cost of electricity adjusted at the fuel escalation rate over one-half of the life of the measure (yields average over the measure life). {This is based on the fact that, over their life, accepted measures will cost consumers the same or less than purchasing electricity from the utility, where: LCCE criteria = (current price) * [(1+fuelEsc) ^ (life/2)].}*

Evaluation Methodology for Measures and Packages of Measures

Create multiple packages of ECMs that result in the target % efficiency increase for each code cycle update (20, 30, 40 and 50%), based on comparison to the 2007 FBC as adopted October 31, 2007 (without the 2009 supplement).

Evaluate each ECM using adopted cost effectiveness indicators (PVBC, IRR, LCCE), within their specific package of ECMs. PVBC will be considered the primary measure with IRR and LCEE used as measures for illustration and communication of individual ECMs and packages of ECMs comparative economic viability.

Validation of the cost effectiveness of Florida Energy Efficiency Code for Building Construction changes shall mean that a number of ECM packages evaluated to comply with the statutory percent energy efficiency increase requirements have a greater benefit than cost as measured in present value dollars.

1.C. DEFINITION OF "CONSUMER" (APPLIES TO BOTH RESIDENTIAL AND COMMERCIAL)

Consumer: A class of economic system participant that makes no distinction between the owner of the building and the utility rate payer.

All of the above recommendations have been adopted by the Commission.

3. ENERGY CONSERVATION MEASURES FOR REPLACEMENT OF AIR CONDITIONING EQUIPMENT RECOMMENDATIONS

Consensus Recommendations:

Sizing of Replacement Air Conditioning Systems:

The A/C contractor or licensed Florida PE shall submit a nationally recognized method based sizing calculation at time of permit application for total replacement of the condensing / evaporator components of HVAC systems 65,000 Btu/h and less.

Exception: Buildings designed in accordance with Section 105.3.1.2 of the Florida Building Code, Building.

Testing of air distribution systems when air conditioning systems are replaced:

At the time of the total replacement of HVAC evaporators & condensing units, under 65,000 Btu/h, all accessible (a minimum of 30 inches clearance) joints and seams in the air distribution system shall be sealed using reinforced mastic or code approved equivalent and shall include a signed certification by the contractor that is attached to the air handler unit stipulating that this work had been accomplished.

Exception:

1. Ducts in conditioned space.

2. Joints or seams that are already sealed with fabric and mastic.

3. If system is tested and repaired as necessary.

2. DEVELOP A STRATEGIC PLAN FOR INCREASED EFFICIENCY REQUIREMENTS REQUIRED BY LAW FOR FUTURE FBC EDITIONS

Consensus Recommendations:

Strategic Plan Criteria

1. The Strategic Plan must implement s.553.9061(1), F.S., scheduled increases in the Code's energy performance standard.
2. The Strategic plan must consider cost effectiveness of the incremental changes in efficiency required by the Code.
3. The Strategic Plan must implement s.553.73(6)(a), F.S., selection of the IECC as a foundation code and its modification to maintain the efficiencies of the Florida Energy Efficiency Code for Building Construction, s.553.901, F.S..
4. The Strategic Plan must implement s.553.9061(2), F.S., requiring the Code to recognize including energy efficiency performance options and elements including but not limited to: Solar water heating; Energy efficient appliances; Energy efficient windows, doors and skylights; Low solar absorption roofs/cool roofs; Enhanced ceiling and wall insulation; Reduced leak duct systems; Programmable thermostats; and Energy efficient lighting systems.
5. The Strategic Plan should identify compliance methods with the best potential for complying with the schedule for increasing efficiency standards.
6. The Strategic Plan should be adaptable for all potential mandated efficiency performance standard increase schedule.
7. The Strategic Plan should allow flexibility for builders to choose different ways to adapt their construction.
8. The Strategic Plan should provide flexibility appropriate to product innovation.
9. The Strategic Plan should provide for easy measurement and demonstration of compliance with the energy efficiency increases required by s.553.9061, F.S..
10. The Strategic Plan should require that compliance meets an equivalent energy standard regardless of the compliance method.

Strategic Plan Consensus Recommendation

Commission Select The IECC As Foundation Code For Florida Building Code, Energy Pursuant To S.553.73(6)(A), F.S.

Commission Adopt The Florida Energy Efficiency Code For Building Construction (FEC) Within The Florida Building Code Pursuant To S.553.901, F.S. By --

Modifying The IECC To Maintain The Efficiencies Of The FEC Adopted And Amended Pursuant To S.553.901, F.S. As Directed By S.553.73(6)(A), F.S.

Modifications To Include:

- Adding A Maximum Glass Percent Criteria To The Prescriptive Compliance Method To Maintain A Consistent Standard Of Energy Efficiency For All Compliance Methods. (Criteria 10, S.553.73(6)(A)), And S.553.901, F.S.)

- Modifying The Prescriptive Compliance Method's Component Efficiency Requirements To Meet The 20% Overall Efficiency Requirement Improvement Pursuant To S.553.9061(1), F.S., As Determined By Simulations Of Annual Energy Use By Energy Gauge USA Fla/Res. (Criteria 10 And S.553.73(6)(A))

- Modifying The UA Compliance Method's Compliance Criteria To Meet The 20% Overall Efficiency Requirement Improvement Pursuant To S.553.9061(1), F.S., As Determined By Simulations Of Annual Energy Use By Energy Gauge USA Fla/Res. (Criteria 10 And S.553.73(6)(A))

- Using The Energy Gauge USA Fla/Res Implementation Of The FEC Energy Budget Compliance Method For The Performance Compliance Method And Using 80 Points As The Compliance Criteria (S.553.73(6)(A), F.S., S.553.901, F.S., Criteria 4, 5, 6, 7, 8, 9, 10, 11 And 12)

- Modifying The IECC To Include All Other Energy Efficiency Requirements Adopted Pursuant To S.553.901, F.S. The "Thermal Efficiency Code".

The above recommendation has been adopted by the Commission.

ATTACHMENT 4

REMAINING WORKGROUP TASKS

4. SPECIFIC BUILDING OPTIONS TO ACHIEVE ENERGY EFFICIENCY IMPROVEMENTS

Section 553.9061 (2) The Florida Building Commission shall identify within code support and compliance documentation the specific building options and elements available to meet the energy performance goals established in subsection (1). Energy-efficiency performance options and elements include, but are not limited to: (a) Solar water heating. (b) Energy-efficient appliances. (c) Energy-efficient windows, doors, and skylights. (d) Low solar-absorption roofs, also known as "cool roofs." (e) Enhanced ceiling and wall insulation. (f) Reduced-leak duct systems. (g) Programmable thermostats. (h) Energy-efficient lighting systems.

Issues for Evaluation:

- Solar water heating.
- Energy-efficient appliances.
- Energy-efficient windows, doors, and skylights.
- Low solar-absorption roofs, also known as "cool roofs."
- Enhanced ceiling and wall insulation.
- Reduced-leak duct systems.
- Programmable thermostats.
- Energy-efficient lighting systems.
- Water source, geo-thermal HVAC systems.
- Solar photovoltaic systems.
- variable refrigerant flow mechanical systems.
- Data center efficiencies.
- Under-floor duct systems.
- Induction lighting and new lighting technologies.
- Passive energy efficient design and day-lighting.
- Building envelop efficiencies.

5. OPTIONS FOR ADDRESSING HUMIDITY AND MOISTURE CONTROL PROBLEMS FOR HOT AND HUMID CLIMATES

Issues for Evaluation:

- *Minimum efficiency equipment can result in problems with indoor humidity control for situations where AC equipment is oversized and sensible heat loads are diminished by advanced ECMs relative to latent loads contributed by outdoor moisture infiltration/diffusion and indoor moisture generation.*
- *Energy conservation achieved by sensible load reduction measures must be balanced with equipment requirements for improved moisture removal and latent loading control measures.*
- *High efficiency variable speed and variable capacity AC systems provide load matching capability and increase moisture removal effectiveness.*
- *Building envelope tightening to limit outdoor moisture infiltration/diffusion typically reduce air exchange resulting in building performance characteristics that may lead to required forced air ventilation of homes.*
- *Forced ventilation of homes will require preconditioning of ventilation air to remove moisture to achieve indoor humidity control.*

6. OPTIONS FOR DESIGN CRITERIA FOR ENERGY EFFICIENT POOLS

The Energy Act of 2008 (HB 7135) directs adoption of pool pump efficiencies in the 2010 FBC. During discussions with the Florida Spa and Pool Association regarding energy efficiency requirements for pool pumps members suggested improved efficiency could be achieved through criteria for pool hydronic system design.

This task will be evaluated by: Pool Efficiency Subcommittee to the Energy Code Workgroup.

Issues for Evaluation:

- *Pool pump standards.*
- *Pool plumbing system design.*
- *Performance and prescriptive compliance paths for pools.*
- *Credits for alternative energy sources for pool heating, lighting and pumping.*

7. EVALUATE REQUIREMENTS FOR GREEN ROOFS RECOGNITION IN FLORIDA BUILDING CODE

This task will be evaluated by: Green and Energy Efficient Roofs Subcommittee to the Florida Energy Code Workgroup.

Issues for Evaluation:

- *Green roof energy performance, structural and water protection characteristics in Florida environment.*
- *Cool roof options and energy performance in Florida environment.*
- *Alternative roof systems and components effect on roof/ceiling heating cooling loads and calculations for Florida environment (solar pool heater and DHW thermal arrays, pv arrays, pv roof tiles, mass and metal roof covering, evaporatively cooled, radiant barrier systems).*

ATTACHMENT 5

STATUTORY CHARGE

553.9061 Scheduled Increases In Thermal Efficiency Standards.--

(1) The purpose of this section is to establish a schedule of increases in the energy performance of buildings subject to the Florida Energy Efficiency Code for Building Construction. The Florida Building Commission shall:

(a) Include the necessary provisions by the 2010 edition of the Florida Energy Efficiency Code for Building Construction to increase the energy performance of new buildings by at least 20 percent as compared to the energy efficiency provisions of the 2007 Florida Building Code adopted October 31, 2007.
(b) Increase energy efficiency requirements by the 2013 edition of the Florida Energy Efficiency Code for Building Construction by at least 30 percent as compared to the energy efficiency provisions of the 2007 Florida Building Code adopted October 31, 2007.
(c) Increase energy efficiency requirements by the 2016 edition of the Florida Energy Efficiency Code for Building Construction by at least 40 percent as compared to the energy efficiency provisions of the 2007 Florida Building Code adopted October 31, 2007.
(d) Increase energy efficiency requirements by the 2019 edition of the Florida Energy Efficiency Code for Building Construction by at least 50 percent as compared to the energy efficiency provisions of the 2007 Florida Building Code adopted October 31, 2007.

(2) The Florida Building Commission shall identify within code support and compliance documentation the specific building options and elements available to meet the energy performance goals established in subsection (1). Energy efficiency performance options and elements include, but are not limited to:
(a) Solar water heating.

(b) Energy-efficient appliances.

(c) Energy-efficient windows, doors, and skylights.

(d) Low solar-absorption roofs, also known as "cool roofs."

(e) Enhanced ceiling and wall insulation.

(f) Reduced-leak duct systems.

(g) Programmable thermostats.

(h) Energy-efficient lighting systems.

(3) The Florida Building Commission shall, prior to implementing the goals established in subsection (1), adopt by rule and implement a cost-effectiveness test for proposed increases in energy efficiency. The cost-effectiveness test shall measure cost-effectiveness and shall ensure that energy efficiency increases result in a positive net financial impact.