FLORIDA ENERGY CODE WORKGROUP

REPORT TO THE FLORIDA BUILDING COMMISSION

NOVEMBER 12, 2009—MEETING VIII

GAINESVILLE, FLORIDA

FACILITATION, MEETING AND PROCESS DESIGN BY

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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 NOVEMBER 12, 2009 MEETING

Opening and Meeting Attendance
Bob Cochell, Phillip Fairey, Dale Greiner, Jeff Gross, Jeff Householder, Bill Kent (Dino Muggeo alternate), Tom Larson, Larry Maxwell, Donny Pittman, Paul Savage, and Drew Smith.

Members Absent:
Steve Bassett, Rusty Carroll, Jeff Stone and Rob Vickers.

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

FSEC Staff Present
Sherri Shields and Nick Waters.

Meeting Facilitation
The meeting was facilitated by Jeff Blair from the FCRC Consensus Center 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/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 Report from DOE Regarding REScheck Modifications for State (Florida) Needs Inquiry and to Discuss Options
- ✓ To Review Schedule and Strategic Plan Criteria for Development of Energy Volume of 2010 FBC
- ✓ To Review and Discuss 2010 FEC Residential Chapter Draft Code Mark-Up
- ✓ To Identify Issues and Options Regarding Project Tasks and Sub-Tasks (Time Permitting)
- ✓ 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

October 14, 2009 Facilitator's Summary Report Approval
Jeff Blair, Commission Facilitator, asked if any members had corrections or additions to the October 14, 2009 Report, and none were offered. The Workgroup voted unanimously, 11 - 0 in favor, to approve the October 14, 2009 Facilitator's Summary Report as presented/posted.

DOE Response/Clarification Regarding REScheck Modification for State Needs Inquiry and Discussion of Options
At the October meeting members asked whether DOE would be willing to modify REScheck to allow states to make their codes more stringent than the IECC. Rick Dixon reported that the request has been submitted to the appropriate staff at DOE, but they have not provided an answer to date. Rick reported, that the Workgroup would be apprised once DOE provided their response. In addition, Rick reported that there is a Florida solution available irrespective of whether DOE is able to provide the software modifications. FSEC has indicated they can provide a REScheck like tool on-line that can be used for free.

Review of Schedule and Strategic Plan Criteria for Development of the Energy Volume of the 2010 Florida Building Code
Jeff Blair, Commission and Workgroup Facilitator, provided the Workgroup with an overview of the Workgroup's adopted strategic plan for energy standard revisions pursuant to requirements of Section 553.9061, F.S. requiring the strategic plan to implement scheduled increases in the Code's energy performance standard, to recognize certain energy performance options, and to consider the cost effectiveness of the scheduled increases. Jeff noted that the goal of the Strategic Plan is to provide a strategy for achieving incremental increases in energy efficiency culminating with a 50% increase in efficiency relative to the 2007 FEC by 2019. The strategic plan provides a strategy for achieving the increased efficiency requirements required by law by providing the best combination of compliance methods to meet the ten (10) criteria for achieving the required efficiencies. See Attachment 3.

Rick Dixon, FBC Executive Director, provided the Workgroup with an overview of the schedule for completing the development of recommendations for achieving the statutory energy efficiency increases. The Workgroup will review the Residential Chapter at the November meeting and the Commercial Chapter at the December meeting, with the goal of posting a draft Energy Code on-line by February 1, 2010. The public will be able to provide proposed code amendments to the draft during the 2010 Code Update process, with amendments accepted between March 1 to April 2, 2010. Following the overview there was an opportunity for questions and answers and discussion. The public was included in the discussions and provided opportunities to comment.
(Attachment 3—Workgroup's Adopted Recommendations)
(Attachment 5—Statutory Charge)

Florida 2010 Residential Energy Code Alternatives Analysis
Philip Fairey, FSEC Deputy Director, provided the Workgroup with a background document relevant to the development of the Residential Energy Code.

FSEC produced a draft report titled:
"Evaluation of Alternatives of Florida's 2010 Energy Code Update for Residential Buildings—FSEC-CR-1831-09"

Overview of FSEC-CR-1831-09:
This report provides results of analysis of the Florida Energy Code (FEC) with respect to requirements of Florida House Bill 7135. The analysis uses Florida's performance-based code compliance software, EnergyGauge® USA, to conduct detailed analysis of H.B 7135 requirements to significantly increase the efficiency of new homes over time. First, results of an analysis of the long-term, year 2019 requirement for a 50% increase in new home energy efficiency are presented. Next, the 2009 edition of the International Energy Conservation Code (IECC) is analyzed with respect to the H.B. 7135 dual requirements that the 2009 IECC become the foundation code for the FEC and that the 2010 FEC achieve a 20% increase in new home energy efficiency relative to the 2007 FEC. Finally, the report presents results of analysis of three potential prescriptive compliance options for meeting the 20% efficiency improvement requirement of H.B. 7135.

Conclusion of FSEC-CR-1831-09:
The analysis indicates that Florida technically can achieve the required 50% reduction in new home energy use by 2019. However, to accomplish this, the efficiency of heating, cooling and hot water systems in Florida homes will have to be considered and may, depending on other energy efficiency measures, need to be greater than the current federal minimum standard.

The analysis of the 2009 IECC indicates that this code is either 8% more efficient than the 2007 FEC (i.e. 2006 IECC) or 19% more efficient than the 2007 FEC, depending on whether compliance is by the prescriptive procedures of Section 402, 403 and 404 or by the simulated compliance alternative specifications of Section 405. The 2009 IECC analysis further shows that air distribution system efficiency is a major determinant of overall home energy efficiency in Florida. Finally, the analysis shows that the 2009 IECC mass wall R-value requirements of Table 402.1.1 and equivalent U-factor requirements of Table 402.1.3 do not comport well with the frame wall R-value and U-factor requirements in Florida's climates. As a result, this study also recommends that minimum R-value for mass walls in the prescriptive compliance procedure be increased from R-6 to R-7.8 for all of Florida.

The final sets of analysis of options for the 2010 FEC, which must be 20% more efficient than the 2007 FEC showed that at least 3 options exist to select from for the 2010 FEC prescriptive compliance procedure. Depending on strategy, the resulting options incorporate a broad range of minimum window area limitations that span the range of likely window-to-floor area percentages in new Florida homes.

The full report may be reviewed at the project webpage, as follows:
http://consensus.fsu.edu/FBC/2010-Florida-Energy-Code.html

FEC Residential Chapter Draft Code Mark-Up Review and Discussion
Ann Stanton, DCA Energy Code staff, provided the Workgroup with an overview of a FEC Residential 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.

The complete text of the FEC Residential 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 Decisions and Changes Regarding the Integration Draft:
The Workgroup supported the draft text for the FEC Residential Code with the following revisions:

Chapter 1
Section 101.4.1 contains a definition that should be in Chapter 2.
Table 101.4.1: revise note #2.
Section 101.4.0 exempts ductwork for replacement HVAC systems; Workgroup action otherwise.
Section 103.2.3.1.2 Design professions: should defer to Florida law (revise text to reflect the same language used in law).

Chapter 3
Discussion of climate zones in Florida: "International" tables left in because it shows assumptions for climate zones. For years Florida had three climate zones in the Energy Code. PNNL made the climate zones, generally along county lines.

Chapter 4
- Revise 401.2 to add 403.2.4 as another section that projects must comply with.
- Section 401.3 Certificate: Posting the certificate on the power box is ill advised, should not be the building department's responsibility.
- Add air handling notice to power box (403.2.4).

- Table 402.1.1: Three prescriptive packages were presented. Group asked to choose one. The difference between them is percent glazing, all three packages are minimally compliant at the 80% of 2007 Florida levels with windows evenly distributed by orientation. The IECC doesn't have a maximum percent for glazing for Section 402; PNNL report backs this up. Prior to the 2004 IECC there was a limit; a 20% limit will likely be in the 2012 IECC. If the performance method is used, there is unlimited glazing. The package chosen will determine the features for the U_o option. Roof reflectance is added as a feature, as are duct and air handler location, door U-factor and the air leakage rate. In Florida, 90 percent of ductwork is in the attic while, in northern climates, it often is in the basement. Option 2 has more conventional features. Following discussion, and public comment, the Workgroup voted unanimously, 11 - 0 in favor, to select "Option 3" for the performance path component efficiencies required as follows:

~~Climate Zone~~ OPTION Percent Glazing[c]	Fenestration U-Factor[b]	Sky-light[b] U-Factor	Glazed Fenes-tration SHGC[b,] [e]	Ceiling R-value/ Attic Radiant Barrier[c]	Roof Reflectance Tested per S. 405.5.5.2	Wood Frame Wall R-value	Mass Wall R-value[i]	Floor R-value/ Slab R-value[d]	~~Basement[c] Wall R-value~~ Door U-Factor	~~Slab[d] R-value & Depth~~ Ducts: R-value/ Location[k]	~~Crawl Space[c] Wall R-value~~ Air Handler Location[k]	Air Leakage Tested per S. 403.2.2.1
3 20%	0.65[i]	0.75	0.30	30/No	0.25	13	6 / 7.8	13/0	0.65	R-6/ Conditioned	Conditioned	Qn=0.03

- 403.2.2.1: revise definition of "Substantially leak free".
- Revise 403.6.2.2 to reference Chapter 5.
- Revise Table 403.6.2.2(1) to reference Chapter 5.
- Revise 403.9.1 Add motor efficiencies per Florida law.
- Revise 403.9.3: add spas.
- Add new section 403.9.4: language from law.
- Revise 405.4.2(4)
- Revise 405.5.1: use language from law (reference Florida law).

- Revise Table 405.5.2(1): define "Class 1 Rater"; create an appendix for portions; revise note (d).
- Maintain the table and put ancillary information in an appendix.
- Revise Table 405.5.2(2) note (n): reference statute section 553.

Workgroup Discussion on Integration Draft:
- Option 3 is unbelievably restrictive. Code is already at 6 cfm on Form 1100B right now. See a problem with combustion air in tight houses, hole into attic. The FBC Fuel Gas code requires a sealed closet.
- Section 403.6 Minimum efficiencies for equipment. Can reference tables in Chapter 5.
- Section 403.9 Pools. Add motor efficiencies per Florida law. Expect a legislative issue to change to a 24 hour override.
- Section 405. Are there other computer programs that can be used. Why specify one. California allows multiple tools, has to certify. Florida has one tool, gives consistent results. Tie-in with Florida BERS rule 9B-60. Could just give criteria for tool.
- Question change expanding worst case option from orientation to envelope and equipment factors. Can put in Chapter 1 under resubmittal.
- Section 405.4.3 will require upkeep. Why specify percent more stringent than previous code? Suggest ask Counsel if needed.
- Prescriptives given for Florida-specific credits. Be consistent with options required by Florida law.
- Table 405.5.2(1) Glazing: 18 percent, establishes a budget. Is the reference to ASHRAE Fundamentals going to change by year? Will check and determine how best to reference. Can put in a Normative (required) appendix. Table 405.5.2(1) is an explicit part of the IECC. Footnote (n) references a Class 1 BERS rater; should put in a more specific reference.
- Staff recommendation: Maintain the table, can put ancillary information in an appendix. Also, make Option 3 the U_o alternative.

Public Comment on Integration Draft:
- Limited statutory charge. Law says use most current national code and modify to maintain Florida efficiencies. The proposal drifts from the IECC prescriptive package by expanding to other categories. Also eliminates climate zones. Should adopt IECC even if not applicable. Can't get to 20 percent savings without going beyond the envelope; IECC '09 only goes 9 percent beyond Florida's 2007 levels.
- If make efficiencies too high, people won't use this compliance method. More options should be allowed by this method. IECC only uses 1 prescriptive package. Options 1 and 2 are business as usual, Option 3 says do things right.
- Section 403: Duct testing criteria. IECC is at 8 cfm, Florida allows less leakage. Move definition of "Substantially leak free" to definitions. Believe duct testing is mandatory in IECC. It's not listed as mandatory.

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.

Next Steps
At the December meeting the Workgroup will evaluate the FEC Commercial Chapter mark-up draft of the 2009 IECC based 2010 Florida Building Code, Energy Volume. 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 2:45 PM.

ATTACHMENT 1

MEETING EVALUATION RESULTS

November 12, 2009—Gainesville, 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.

9.0 The background information was very useful.
8.8 The agenda packet was very useful.
9.2 The objectives for the meeting were stated at the outset.
8.9 Overall, the objectives of the meeting were fully achieved.

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

6.7 Report from DOE Regarding REScheck Modifications for State (Florida) Needs Inquiry and Discussion of Options.
8.6 Review of Schedule and Strategic Plan Criteria for Development of Energy Volume of FBC.
8.8 Discussion and Acceptability Ranking 2010 FEC Residential Chapter Draft Code Mark-Up.
9.0 Identification of Next Steps.

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

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

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

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

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

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

6. What did you like best about the meeting?
- Stayed on track and agenda.
- Good organization and plan.
- Good discussion.
- Quality info.

7. How could the meeting have been improved?
- Room temperature was on the chilly side.
- Room too cool.

8. Member Evaluation Comments.
None were provided.

Public Written Comments
None were provided.

ATTACHMENT 2
PUBLIC MEETING ATTENDANCE

Public Meeting Attendance	
NAME	**REPRESENTATION**
Dwight Wilkes	QiTEC LLC
David Rixx	Alachua County Bldg
Arlene Z. Stewart	AZS Consulting Inc.
Jack Glenn	FHBA
Dean Ruark	PGT Industries
Mike Nau	PGT Industries
Michael Rickabaugh	RCID
Philip Sutherland	Universal Engineering Sciences
Paki Taylor	Empirical Construction
Michael LaFevre	Custom Window Systems

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".

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.