FLORIDA BUILDING COMMISSION
FLORIDA ENERGY CODE WORKGROUP
MAY 28, 2009—MEETING V
OPTIONS/RECOMMENDATIONS EVALUATION WORKSHEET

ACCEPTABILITY RANKING EXERCISE

This list of options is a preliminary list and is not meant to be an exhaustive list. All of the options regarding cost effectiveness test were extracted the FSEC Report: "Energy Efficiency Cost-Effectiveness Tests for Residential Code Update Process", and the balance were proposed by members during meetings. During the meeting(s) members are asked to propose any additional option(s) they would like the Workgroup to evaluate, and to develop and rank options, and following discussions and refinements, may be asked to do additional rankings of the options if requested by a Workgroup member. Members should be prepared to offer specific refinements to address their 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***

WORKGROUP'S OPTIONS EVALUATION PROCESS OVERVIEW

For each key topical issue area the following format will be used:

- Overview of the option will be provided by proponent,
- Questions and answers on the option,
- General discussion with Workgroup members on the topic/issue,
- Refinements proposed to existing options (to enhance option's acceptability),
- Public input on option or sweet of options,
- Acceptability ranking of options (new, or any a Workgroup member proposes to be re-evaluated),
- Information needs identified.

For each of the key topical issue areas, member's will be asked to identify a range of potential options for the Workgroup to consider. Issues and Options will be organized to address the tasks assigned by the Florida Building Commission and the Florida Legislature. A preliminary list of options will be drafted and the Workgroup may discuss and add any additional relevant options they deem appropriate. When available, staff will provide information from data collections, research studies, and other pertinent sources to the Workgroup. Members and staff should request any information they feel necessary for evaluating an issue, option or range of options. Once ranked by the Workgroup, options achieving a consensus level of support will be listed within relevant key topical issue areas. Options with 75% or greater number of 4's and 3's in proportion to 2's and 1's shall be considered consensus options/recommendations.

1.A. OPTIONS FOR 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.

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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. OPTIONS FOR 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.

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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 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 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

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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.

All of the above recommendations have been adopted by the Commission. Recommendations below are consensus Workgroup recommendations.

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.

Commercial: 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%.

Commercial: Mortgage down payment: 20%.

Commercial: For the internal rate of return (IRR) on investments, a value equal to 8%.

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

The Legislature established a schedule for increases in building energy efficiency requirements. This task expands the study of energy conservation measures for residential buildings to investigation of efficiency options for commercial buildings and the development of a plan to implement the requirements of the new law. Section 553.9061 "Scheduled increases in thermal efficiency standards." was created to establish percent increases in efficiency to be implemented in the 2010, 2013, 2016 and 2019 Code. With the adoption of the Glitch Amendments to the 2007 Edition of the Florida Building Code and the revisions to Rule 9B-13 Thermal Efficiency Standards, the Commission implemented a strategy for increasing the energy efficiency provisions of the Code by 15%. The Commission's Energy Code Workgroup and Energy TAC are working with stakeholder to evaluate options for achieving an additional 5% increase for the 2010 Edition of the Code, and for achieving the progressive increases in efficiency required for subsequent editions of the code.

Energy act of 2008 (HB 7135) directs the Commission to include, as a minimum, certain technologies for achieving enhanced building efficiency targets established by the Act in the Florida Energy Code. The Building Code act of 2008 (HB 697) directs the Commission to facilitate and promote the use of certain renewable energy technologies.

GOAL
Implement the energy efficiency standards increases established by s. 553.9061, F.S.

OBJECTIVE
Develop long range strategic plan for how to comply with statutory schedule of efficiency increases.

TASKS

1. Evaluate how to provide for future flexibility to implement efficiency increases for the broadest range of housing prices.
2. Compare characteristics of FEECBC to IECC for flexibility to achieve higher efficiency standards.
3. Develop strategic plan for FBC energy standards compliance methods.
4 Integrate FEECBC and IECC to implement the strategic plan for the 2010 FBC.

Task/Analysis:

Task 1:
- Identify compliance methods used in current national model and Florida energy codes.
- Identify compliance method characteristics that provide for future flexibility of efficiency increases.

Task 2:
- Create a matrix of IECC and FEECBC characteristics.
- Evaluate for flexibility to implement future efficiency increases.

Task 3:

- Select compliance method characteristics that provide the maximum potential to implement the 553.9061 mandated efficiency increases to form the strategic plan.

Task 4:

- Develop a draft of the energy standards chapters for the 2010 FBC.

Issues for Evaluation:

- *Review the adequacy of the current Code's accounting for the list of technologies recognized in statute.*
- *Identify technologies not yet in Code and prioritize for adding capability to consider.*
- *Conduct a cost/benefit analysis for ECMs using the new economic test rule for the 2010 Edition of the Code.*
- *Consider whether certifications of compliance with "above code programs" should be recognized in lieu of Code documentation and inspection.*
- *Evaluate FEECBC/IECC integration for 2010 FBC.*

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

Consensus Recommendations:

The A/C contractor 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 Btuh and less.

Issues for Evaluation:

- *Testing of air distribution systems when air conditioning systems are replaced.*

(Philip Fairey to identify alternative test methods for the May meeting)

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).*