Executive Summary

PURC Energy Advisory Council
Building Energy Code Working Group

The Energy Advisory Council Building Energy Code Working Group requested that the interested parties meet and project the anticipated cost to homebuyers of adopting the IECC 2009 in South Carolina.

On September 26, 2011, the interested parties met and reviewed the cost of implementing the 2009 IECC. These individual agreed upon an estimated cost of implementing the energy code changes based on current market prices.

The cost estimates are based on the construction of a 2,400 square foot home. Please note on page 3, two estimates were produced for Section 402.1 (compliance by prescriptive specification). As indicated on the chart, one estimate includes a basement for the home and the other is for a home without a basement.

The parties agreed that the average costs for testing envelop air leakage (Section 402.4.1) and testing duct sealing (Section 403.2.2), would be $330. However, a visual inspection could be conducted in lieu of a blower door test and ducts in conditioned spaces; a visual inspection can be conducted for free. The parties assume that most builders will choose to use the duct blaster and blower door tests instead of a visual inspection and therefore included the $330 as a cost.

The following is the sum of the agreed upon estimated costs:

Total Estimated Cost Increase

Total Cost Increase for Home without Basement	$880.00
(with 15% management cost)	$1,012.00
Total Cost Increase for Home with Basement	$1,030.00
(with 15% management cost)	$1,184.50

It was furthered discussed that there would be an additional $500 savings from the installation of a smaller HVAC unit because of the increased efficiency of the home. This savings **is not** reflected in the figures listed above.

Topic	2006 IECC (SC Current Code)	2009 IECC (SC Proposed Code)	Cost Difference
Chapter 1			
Additions, alterations and repairs	404.1 **Section 101.4.3** Exempts certain alterations to the building envelope from alteration requirements including exposing existing wall, roof and floor systems that are already insulated, glass replacement only in existing sash and frame and installing storm windows	Includes several exceptions for alterations including the following: • If a vestibule is part of the door assembly that is modified, it must remain on the building or be replaced • Up to 50% of the luminaries can be replaced as long as the load is not increased in the building. • Bulb, ballast replacements are exempt providing the alteration does not increase the load.	$ 50
Change in Occupancy	**Section 101.4.4** Requires that energy using features that are increased due to a change in occupancy to comply with the IECC.	Requires lighting to comply with the IECC if the building spaces change from one occupancy in Table 505.5.2 to another occupancy in Table 505.5.2.	$0
Change in Space Conditioning	None	Requires a space that was previously unconditioned to be brought into full compliance if the space is conditioned.	$0
Alternate Materials Method of Construction Design or Insulating Systems	**Section 103.1** Above Code Programs - Added provision that allows the building official to accept compliance with an above code programs as a deem to comply method to comply with the 20061ECC.	Requires that the above code programs also comply with the mandatory requirements specified in Chapter 4 and 5 of the IECC.	$0
Construction Documents	**Section 104** Requires that features that were used to demonstrate compliance with the IECC to be identified on the plans, specification or documentation.	Increases the scope of Section 104 to include provisions that focus on previous approvals, phased approvals, amendments to construction documents and also retention of construction documents.	$0
Inspections	**Section 105** Requires that no work shall be covered before approval. Also requires a final inspection	Adds additional language that allows the use of inspection agencies and specifies that the holder of the permit is responsible for notifying the building official for an inspection request. Also allows the inspector to revoke a notice of approval of the notice is issued in error or due to incorrect information.	$0
Fees	None	**Section 108** Provides guidance for when a permit can be	$0

M. Dennis Knight, P.E.
Whole Building Systems LLC

Mike Barcik - Southface
Michael K Barcik

Jonah Butcher JB

BRIDGET HERRING

BRANDON JONES BJ

Brian Senmiller BCAP

John Miller BCAP

TOM HOMOLEK

Andy Baird

Allen SCMHI

		, issued based on the payment of fees.	
Stop Work Order,	None	**Section 109** Provides authorization for the code official to stop work.	$0
Board of Appeals	None	**Section 110** Allows for the creation of a Board of Appeals.	$0
Chapter 2 *Definitions*			
Definitions (added the following definitions):			
Air Barrier	None	**Section 202** Defines an air barrier as a barrier to air leakage through the building envelope.	$0
C-Factor (Thermal Conductance)	None	**Section 202** Defines the coefficient of heat transfer through a building assembly in Btu/Hr-ft^2-°F	$0
Daylight Zone	None	**Section 202** Defines a daylight zone for vertical glazing and under a skylight in a commercial building.	$0
Demand Control Ventilation	None	**Section 202** Provides a definition for a control that provides for the automatic reduction in mechanical ventilation due to actual occupant load of the space.	$0
Fan Brake Horsepower	None	**Section 202** Defines how brake horsepower is determined for use in meeting the requirements in Chapter 5.	$0
Fan System Design Conditions	None	Section 202 Operating conditions that can be expected to occur during normal system operation that result in the highest supply fan air flow rate to conditional spaces served by the system .	$0
Fan System BHP		**Section 202** The sum of the break horsepower for all of the fan systems used to supply heated or cooled air to a space and to return the air.	$0
Fan System Nameplate HP	None	**Section 202** The sum of all of the motor nameplate horsepower for all of the fans that are required to provide and return heat and cool to a space.	$0

High-Efficiency Lamps	None	**Section 202** Provides a definition of lamps that will meet the minimum lumen/watt requirements that are set for Chapter 4.	$0
Nameplate Horsepower	None	**Section 202** The nominal motor horsepower stamped on the motor nameplate.	$0
Vapor Retarder	**Section 202** Moved vapor retarder criteria from residential provisions to Chapter 2 Definitions	Redefines vapor retarders based on the perm rating of the material.	$0
Chapter 4			
Compliance by Prescriptive Specification	**Section 402.1** Provides one table for building with unlimited glazing area. Comparison of requirements contained in separate table.	Reduced the Glazing U-factor: • U-0.65 Climate Zone 2 • U-0.50 Climate Zone 3 • U-0.35 Climate Zone 4 Reduced the Glazing SHGC: • SHGC-0.30 Climate Zone 1 • SHGC-0.30 Climate Zone 2 • SHGC-0.30 Climate Zone 3 Increased Exterior Wall R-value • R-20 or R-13+R-5 Climate Zone 5 and • 6 Increased Floor R-value: • R-38 Climate Zone 8 Increase Basement Wall R-value: • *R-5/13* Climate Zone 3 • *R-15/19* Climate Zone 6 *R-15/19* Climate Zone 7 and 8	With Basement - $450 Without Basement - $300
Compliance by total building envelope performance	**Section 402.1.4** Total UA Alternative provided (basis for REScheck software)	Modified values in Table 402.1.3 to reflect R-value changes to Table 402.1.1	$0
Truss/rafter construction	Section 402.2.1 Allows reduced insulation (down to R-30) levels in rafter systems up to 500 ff when insulation cannot fit into the rafter space.	Reduces area of reduced insulation in rafter systems to either 500 ff or 20% of the total insulated ceiling area, whichever is less.	$0
Access hatches and doors	None	**Section 402.2.3** Requires attic access hatches and doors from conditioned space to unconditioned space to be weather-stripped and insulated to the level equivalent to the assembly where it is located.	$150
Steel frame ceilings, walls and floors	**Section 402.2.4** Same	Allows R-3 continuous insulation to be installed on steel-framed wall systems in Climate Zone 1 and 2 if the stud spacing is 24" on center.	$0
Opaque door exemption	**Section 402.3.4**	Limits the door opaque door	$0

	Exempts up to one opaque door from the Prescriptive U-factor requirements	exemption to a side swinging door not more than 24 ff.	
Moisture Control	**Section 402.5** Exempts climate zones 1 - 4 from the vapor retarder requirement	Defines a vapor retarder based on Class (Type 1-3) and allows for the use of latex paint ~sa vapor retarder based on siding type and Climate Zone.	$0
Access hatches and doors	None	**Section 402.2.3** Requires attic access hatches and doors from conditioned space to unconditioned space to be weather-stripped and insulated to the level equivalent to the assembly where it is located.	$0
Steel frame ceilings, walls and floors	**Section 402.2.4** Same	Allows R-3 continuous insulation to be installed on steel-framed wall systems in Climate Zone 1 and 2 if the stud spacing is 24" on center.	$0
Opaque door exemption	**Section 402.3.4** Exempts up to one opaque door from the Prescriptive U-factor requirements	Limits the door opaque door exemption to a side swinging door not more than 24 ff.	$0
Moisture Control	**Section 402.5** Exempts climate zones 1 - 4 from the vapor retarder requirement	Defines a vapor retarder based on Class (Type 1-3) and allows for the use of latex paint as a vapor retarder based on siding type and Climate Zone.	$0
Air leakage	**Section 402.4.1** Contains similar requirements but identifies specific places where air sealing must occur.	Adds attic access openings and rim joists to the list of spaces to air seal. Also includes a checklist that must be followed with an option to perform a blower door test. Requires fireplaces to have tight fitting doors and use outdoor combustion air.	$330 for duct blaster and blower door tests (reference 403.2.2)
Programmable Thermostats	None	**Section 403.1.1** Requires programmable thermostats when the primary heating system is a forced air system.	$50
Piping Insulation	**Section 403.3** Requires HVAC piping to be insulated to an R-2.	Increases the pipe insulation to an R-3	$0
Duct Construction	**Section 403.2.2** Same as 2003 IECC but also requires air handler and filter boxes to be sealed.	Requires all ducts to be sealed and also requires ducts and air handler to either be located completely inside conditioned space or a duct tightness test performed on the system.	$0
Systems serving multiple dwelling units	None	**Section 403.7** Requires projects with mechanical systems with the ability to serve multiple dwelling units at the same time	$0

		Section 504.	
Snow melt system controls	None	**Section 403.8** Requires snow melt controls on all snow melt equipment installed as part of a residential project.	$0
Swimming pool	None	Requires pool covers on all heated pools and spas.	$0
Simulated Performance Approach	**Section 404** New base case requirements based on Table 402.1.1. RESNET modeling requirements for Energy Star buildings. Modeling assumptions based on	Modified the Standard Reference Design: • The proposed glass to floor area where the proposed glass to floor area • is :s;,15% • 15% glass to floor area where the proposed glass to floor area is 2: 15% • Heating efficiency same as proposed design • Cooling efficiency same as proposed Design Water heating Energy Factor same as proposed design.	$0

2,400 sq. ft. house

Total Cost Increase without Basement - $880.00
With 15% management cost - $1012.00

Total Cost Increase with Basement - $1,030.00
With 15% management cost - $1184.50

Savings from smaller HVAC unit - $500