

Task Group 5

Chapter 2 Definitions

PC #	Log ID	Full Name Company Jurisdiction Entity Represented	Section Number Requested Action	Comment	Proposed Resolution	TG Action	Reason
PC 100	604	Chris Allison City of Longmont City of Longmont	202 Definitions Revise as follows	The definition from the IECC is for High Efficacy Lamps and P020 should be changed to reflect this definition or the term High Efficiency Lighting should be a new definition in the NGBS.	Replace the definition for High Efficiency Lighting with the definition of High Efficacy Lamps from the IECC or define both terms		

Chapter 7 Energy Efficiency

PC #	Log ID	Full Name Company Jurisdiction Entity Represented	Section Number Requested Action	Comment	Proposed Resolution	TG Action	Reason
PC 101	712	Gladys Quinto Marrone BIA Hawaii BIA Hawaii	701.1 Mandatory Requirements Revise as follows	ACCA Manual J is not equipped to take into account the cooling effects of breezes through the structure in calculating cooling loads.	Requiring floor insulation over unconditioned crawl space would actually be counter-productive in a passively cooled home. A good post and pier design actually encourages air infiltration from the cooler underside of the home into the living space for cooling purposes.		
PC 102	710	Gladys Quinto Marrone BIA Hawaii BIA Hawaii	701.1.1 Minimum Performance Path Requirements Revise as follows	These requirements are geared to everywhere else, except Hawaii, where all new construction must have some type of mechanical system--either heating/cooling, or both. The Standard as it is now, actually encourages putting in a mechanical system where none is needed because more points can be gained. Many of the mandatory air sealing practices are less needed for a home without mechanical cooling. Here in Hawaii, most of our homes are passively cooled.	Performance path is difficult to use with passive cooled homes.		
PC 103	711	Gladys Quinto Marrone BIA Hawaii BIA Hawaii	701.1.2 Minimum Prescriptive Path Requirements Revise as follows	These requirements are geared to everywhere else, except Hawaii, where all new construction must have some type of mechanical system--either heating/cooling, or both. The Standard as it is now, actually encourages putting in a mechanical system where none is needed because more points can be gained. Many of the mandatory air sealing practices are less needed for a home without mechanical cooling. Here in Hawaii, most of our homes are passively cooled.	Prescriptive path has so many points dedicated to mechanical systems, that it is hard to find points to meet minimums for passively cooled homes.		
PC 104	678	Robert Hill NAHB Research Center NAHB Research Center	701.1.3 Alternative Bronze Level Compliance Revise as follows	The standard should clarify that if the alternate path is used what limitations and benefits are involved.	701.1.3 Alternative bronze level compliance. As an alternative, any building that qualifies as an ENERGY STAR Version 3.0 Qualified Home or demonstrates compliance with the 2012 IECC or Chapter 11 of the 2012 IRC <u>is deemed to meet all mandatory practices of Chapter 7 and achieves the bronze level for Chapter 7. The buildings achieving compliance under Section 701.1.3 are not eligible for achieving a rating level above bronze.</u>		
PC 105	789	Bridget Herring Mathis Consulting Company Mathis Consulting Company	701.1.3 Alternative Bronze Level Compliance Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	701.1.3 Alternative bronze level compliance. As an alternative, any building that qualifies as an Energy Star Version 3.0 Qualified Home or equivalent demonstrates compliance with the 2012 IECC or Chapter 11 of the 2012 IRC achieves the bronze level for Chapter 7.		
PC 106	709	Gladys Quinto Marrone BIA Hawaii BIA Hawaii	701.4 Mandatory Practices Revise as follows	Homes in Hawaii are mostly passively cooled by our tradewinds with no mechanical cooling.	Mandatory requirements specify both HVAC system checklists. What about passively cooled homes with no mechanical cooling?		
PC 107	735	Howard Fortunato LandmarkJCM self	701.4.1.1 HVAC system sizing Delete without substitution	Making mandatory for ACCA Manual S for selecting equipment will be problematic with hvac contractors that have never heard of Manual S; and it removes point opportunity for builders that presently use it and receive points in 704.5.1	see above		
PC 108	800	Shari Hendley J.S. Hovnanian & Sons J.S. Hovnanian & Sons	701.4.1.1 HVAC system sizing Delete without substitution	"Equipment is selected using ACCA Manual S or equivalent" - Many hvac contractors do not use this program for selecting equipment. Making this mandatory not only decreases point possibilities (from previous item 704.5.1) for builders, but may require them to switch from otherwise high quality and reliable hvac contractors.	Equipment is selected using ACCA Manual S or equivalent.		
PC 109	736	Howard Fortunato LandmarkJCM self	701.4.2.3 Duct system sizing Delete without substitution	Making mandatory for ACCA Manual D for size and design of duct system will be problematic with hvac contractors that have never heard of Manual D; and it removes point opportunity for builders that presently use it and receive points in 704.4.1	see above		

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PC 110	801	Shari Hendley J.S. Hovnanian & Sons J.S. Hovnanian & Sons	701.4.2.3 Duct system sizing Revise as follows	Many hvac contractors do not use Manual D for sizing duct systems. Making this mandatory not only decreases point possibilities (5 points from previous item 704.4.1) for builders, but may require them to switch from otherwise high quality and reliable hvac contractors	Mandatory 5 points																		
PC 111	657	Jamie Hager Southern Energy Management self	701.4.3.2 Air sealing and insulation Delete and substitute as follows	Delete "and insulation" from all language in 701.4.3.2. Based on what is currently written, a Grade 3 insulation job could be installed and still meet all the criteria. Recommend separating air sealing and insulation installation into separate mandatory items. Recommend Grade 2 insulation installation become mandatory, but 3rd party inspection is not mandatory (keep points in 703.1.2 for having it graded by a 3rd party.	701.4.3.2 Air sealing and insulation. Insulation and Air Sealing. Building envelope insulation must be installed to meet Grade 2 installation criteria as defined in 703.1.2.3. The compliance of the building envelope air tightness and insulation installation is demonstrated in accordance with Section 701.4.3.2(1) or 701.4.3.2(2). (1) Testing option. Building envelope tightness and insulation installation is considered acceptable when tested air leakage is less than seven air changes per hour (ACH) when tested with a blower door at a pressure of 33.5 psf (50 Pa). Testing is conducted after rough-in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances the requirements of 701.4.3.1 Building Thermal Envelope have been met. (keep a - g the same under this section) (2) Visual inspection option. Building envelope tightness and insulation installation are is considered acceptable when the items listed in Table 701.4.3.2(2) applicable to the method of construction, are field verified.																		
PC 112	777	Amanda Evans Santa Fe self	701.4.3.2 Air sealing and insulation Delete and substitute as follows	Change seven AHC 50 to five ACH 50 or lower. A green building standard should be above and beyond code and the 2012 IECC code requires 3ACH50 in some climate zones. Seven is just too leaky these days.	Remove seven and add five.																		
PC 113	802	Bridget Herring Mathis Consulting Company Mathis Consulting Company	701.4.3.2 Air sealing and insulation Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	701.4.3.2 Air sealing and insulation: The compliance of the building envelope air tightness and insulation installation is demonstrated in accordance with Section 701.4.3.2 (1) or 701.4.3.2 (2) . (2) Visual inspection option. Building envelope tightness and insulation installation are considered acceptable when the items listed in Table 701.4.3.2(2) applicable to the method of construction, are field verified. Table 701.4.3.2(2) Air Barrier and Insulation Inspection Component Criteria <table border="1"> <thead> <tr> <th>COMPONENT</th> <th>CRITERIA</th> </tr> </thead> <tbody> <tr> <td>Air barrier and thermal barrier</td> <td>Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.</td> </tr> <tr> <td>Ceiling/attic</td> <td>Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door, or drop-down stair is sealed.</td> </tr> <tr> <td>Wall</td> <td>Corners and headers are insulated. Junction of foundation and sill plate is sealed</td> </tr> <tr> <td>Windows and door</td> <td>Space between window/door jambs and framing is sealed.</td> </tr> <tr> <td>Rim joists</td> <td>Rim joists are insulated and include an air barrier.</td> </tr> <tr> <td>Floors (including above garage and cantilevered floors)</td> <td>Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.</td> </tr> <tr> <td>Crawl space walls</td> <td>Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.</td> </tr> </tbody> </table>	COMPONENT	CRITERIA	Air barrier and thermal barrier	Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired. Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.	Ceiling/attic	Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door, or drop-down stair is sealed.	Wall	Corners and headers are insulated. Junction of foundation and sill plate is sealed	Windows and door	Space between window/door jambs and framing is sealed.	Rim joists	Rim joists are insulated and include an air barrier.	Floors (including above garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.	Crawl space walls	Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.		
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PC 114	803	Bridget Herring Mathis Consulting Company Mathis Consulting Company	701.4.3.2 Air sealing and insulation Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	(+) Testing option. Building envelope tightness and insulation installation is considered acceptable when tested air leakage is less than three ^{seven} air changes per hour (ACH) when tested with a blower door at a pressure of 33.5psf (50 Pa). Testing is conducted after rough-in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.																						
PC 115	659	Jamie Hager Southern Energy Management self	701.4.4 High-efficacy lighting Revise as follows	Need more definition for reference of high-efficacy lighting. Recommend including language from the ICC for reference on lamps that qualify, otherwise builders will have no idea what you mean in areas that have not adopted the 2009 IECC or where it is not enforced well.	701.4.4 High-efficacy lighting. A minimum of 50 percent of the total hard-wired lighting fixtures, or the bulbs in those fixtures, qualify as high efficacy or equivalent. <u>ICC defines high efficacy as: 60 lumens/W for lamps over 40W; 50 lumens/W for lamps over 15W to 40W; 40 lumens/W for lamps 15W or less.</u> <table border="1"> <thead> <tr> <th>Lamp</th> <th>Efficiency</th> </tr> </thead> <tbody> <tr> <td>≤15W</td> <td>40 lumens/W</td> </tr> <tr> <td>>15W-40W</td> <td>50 lumens/W</td> </tr> <tr> <td>>40W</td> <td>60 lumens/W</td> </tr> </tbody> </table> <u>High-Efficacy Lamps</u>	Lamp	Efficiency	≤15W	40 lumens/W	>15W-40W	50 lumens/W	>40W	60 lumens/W														
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PC 116	804	Bridget Herring Mathis Consulting Company Mathis Consulting Company	701.4.4 High-efficacy lighting Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	701.4.4 High-efficacy lighting. A minimum of 75 ⁵⁰ percent of the total hard-wired lighting fixtures, or the bulbs in those fixtures, qualify as high efficacy or equivalent.																						
PC 117	792	Bridget Herring Mathis Consulting Company Mathis Consulting Company	702.1 Point Allocation (Performance Path) Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	702.2.1 ICC IECC analysis. Energy efficiency features are implemented to achieve energy cost performance that meets the <u>2012</u> ICCIECC. A documented analysis using software in accordance with <u>2012</u> ICCIECC, Section <u>R405</u> , or <u>2012</u> ICC IECC Section <u>C407.2 506-2</u> through <u>C407.5 506-5</u> , applied as defined in the <u>2012</u> ICC IECC, is required.																						
PC 118	793	Bridget Herring Mathis Consulting Company Mathis Consulting Company	702.2 Energy Cost Performance Levels Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	702.2.2 Energy cost performance analysis. Savings levels above the <u>2012</u> ICCIECC are determined through an analysis that includes improvements in building envelope, air infiltration, heating system efficiencies, cooling system efficiencies, duct sealing, water heating system efficiencies, <u>and</u> lighting, and appliances.																						
PC 119	795	Bridget Herring Mathis Consulting Company Mathis Consulting Company	702.2 Energy Cost Performance Levels Revise as follows	Appliances are not included in the referenced analysis and should be left out of this method as there is no standard reference design baseline. Furthermore, there are point awards elsewhere in the document for high efficiency appliances.	702.2.2 Energy cost performance analysis. Savings levels above the ICC IECC are determined through an analysis that includes improvements in building envelope, air infiltration, heating system efficiencies, cooling system efficiencies, duct sealing, water heating system efficiencies, <u>and</u> lighting, and appliances																						

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PC 120	836	Craig Conner Building Quality self	702.2 Energy Cost Performance Levels Delete without substitution	Comment: All occurrences of "ICC IECC" should be just "IECC".	702.2.1 ICC IECC analysis. Energy efficiency features are implemented to achieve energy cost performance that meets the ICC IECC. A documented analysis using software in accordance with ICC IECC, Section 405, or ICC IECC Section 506.2 through 506.5, applied as defined in the ICC IECC, is required.																																																																										
PC 121	602	Nils Petermann Alliance to Save Energy Alliance to Save Energy	703.1.1 UA improvement (building envelope) Revise as follows	Table 703.1.1: in the "Climate Zone" column, the bottom row states "7 and 9". This is a typo, as no climate zone 9 exists in the IECC.	Table 703.1.1: bottom row of the "Climate Zone" column: 7 and 9																																																																										
PC 122	819	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.1.1 UA improvement (building envelope) Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable	<p>703.1.1 UA improvement. Where the total building thermal envelope UA is less than required by ICC IECC, Section 402.1.4, the total building thermal envelope UA is in accordance with Table 703.1.1. The total building thermal envelope UA is in accordance with Table 703.1.2 and is less than or equal to the total UA resulting from the U-factors provided in Table 703.1.1. Where insulation is used to achieve these percentages UA improvements, a third-party grading of the installation as achieving Grade 1 is required. A documented analysis is performed using RESCheck version 4.0.1 or later, or equivalent, based on a comparison to the ICC IECC, IRC, or IBC. Total UA is documented using RESCheck or equivalent report and supplied to verify the baseline and the UA improvement.</p> <p>Table 703.1.1: Equivalent U-Factors</p> <table border="1"> <thead> <tr> <th>Climate Zone</th> <th>Fenestration U-Factor</th> <th>Skylight U-Factor</th> <th>Ceiling U-Factor</th> <th>Frame Wall U-Factor</th> <th>Mass Wall U-Factor</th> <th>Floor U-Factor</th> <th>Basement Wall U-Factor</th> <th>Crawl Space Wall U-Factor</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><u>0.50</u> 1.2</td> <td>.75</td> <td>.035</td> <td>.082</td> <td>.197</td> <td>.064</td> <td>.36</td> <td>.477</td> </tr> <tr> <td>2</td> <td><u>0.40</u> .65</td> <td><u>0.65</u> .75</td> <td><u>0.030</u> .035</td> <td>.082</td> <td>.165</td> <td>.064</td> <td>.36</td> <td>.477</td> </tr> <tr> <td>3</td> <td><u>0.35</u> .5</td> <td><u>0.55</u> .65</td> <td><u>0.030</u> .035</td> <td><u>0.057</u> .082</td> <td><u>0.098</u> .144</td> <td>.047</td> <td><u>0.091</u> .94</td> <td>.136</td> </tr> <tr> <td>4 except Marine</td> <td>.35</td> <td><u>0.55</u> .6</td> <td><u>0.026</u> .03</td> <td><u>0.057</u> .082</td> <td><u>0.098</u> .144</td> <td>.047</td> <td>.059</td> <td>.065</td> </tr> <tr> <td>5 and Marine 4</td> <td><u>0.32</u> .35</td> <td><u>0.55</u> .6</td> <td><u>0.026</u> .03</td> <td>.057</td> <td>.082</td> <td>.033</td> <td>.059</td> <td><u>0.055</u> .065</td> </tr> <tr> <td>6</td> <td><u>0.32</u> .35</td> <td><u>0.55</u> .6</td> <td>.026</td> <td><u>0.048</u> .057</td> <td>.06</td> <td>.033</td> <td>.05</td> <td><u>0.055</u> .065</td> </tr> <tr> <td>7 and 8</td> <td><u>0.32</u> .35</td> <td><u>0.55</u> .6</td> <td>.026</td> <td><u>0.048</u> .057</td> <td>.057</td> <td>.028</td> <td>.05</td> <td><u>0.055</u> .065</td> </tr> </tbody> </table>	Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor	1	<u>0.50</u> 1.2	.75	.035	.082	.197	.064	.36	.477	2	<u>0.40</u> .65	<u>0.65</u> .75	<u>0.030</u> .035	.082	.165	.064	.36	.477	3	<u>0.35</u> .5	<u>0.55</u> .65	<u>0.030</u> .035	<u>0.057</u> .082	<u>0.098</u> .144	.047	<u>0.091</u> .94	.136	4 except Marine	.35	<u>0.55</u> .6	<u>0.026</u> .03	<u>0.057</u> .082	<u>0.098</u> .144	.047	.059	.065	5 and Marine 4	<u>0.32</u> .35	<u>0.55</u> .6	<u>0.026</u> .03	.057	.082	.033	.059	<u>0.055</u> .065	6	<u>0.32</u> .35	<u>0.55</u> .6	.026	<u>0.048</u> .057	.06	.033	.05	<u>0.055</u> .065	7 and 8	<u>0.32</u> .35	<u>0.55</u> .6	.026	<u>0.048</u> .057	.057	.028	.05	<u>0.055</u> .065		
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PC 123	679	Robert Hill NAHB Research Center NAHB Research Center	703.1.2 Insulation installation Delete and substitute as follows	703.1.2 should be moved to the 701 mandatory section. It seems that the committee intended to require at least grade 2 installation in order to be certified. But as written the practice is optional for the prescriptive path. There is no way to tell if the insulation is grade two or 3 unless it becomes a mandatory practice. Since installation quality impacts the home's performance regardless of the prescriptive or performance path, it is reasonable to require this inspection for both paths. (Note: if this becomes 701.4.3.3 then the remaining 701.4.3 practices need to be renumbered.)	701.4.3.3 Insulation installation. The insulation installation is graded by a third party and is in accordance with Sections 703.1.2.1, 703.1.2.2, and/or 703.1.2.3, and/or 703.1.2.4, as applicable. Grade 3 insulation installation is not permitted. Grade 2 installation is permitted only for bronze level buildings. <u>Mandatory</u>																																																																										
PC 124	807	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.1.2 Insulation installation Delete without substitution	Green standards are universally understood and expected to be above code programs. The building code does not allow for substandard insulation installation. Level 1 should be mandatory. No options than less than proper insulation installation should be allowed.	Delete section 703.1.2 in its entirety																																																																										
PC 125	838	Craig Conner Building Quality self	703.1.2 Insulation installation Delete and substitute as follows	Remove Grade 3 insulation (it is not allowed) and delete points (zero points) for Grade 2 insulation. Grade 2 insulation is not point worthy in a green program.	In Section 703.1.2 table, remove Grade 3 insulation (it is not allowed) and delete points (zero points) for Grade 2 insulation. Grade 2 insulation is not point worthy in a green program.																																																																										
PC 126	680	Robert Hill NAHB Research Center NAHB Research Center	703.1.4 Radiant Barrier Revise as follows	Limit the use of radiant barrier to attic applications where it is most beneficial.	703.1.4 A radiant barrier with an emittance of 0.05 or less is used <u>in the attic</u> . The product is tested in accordance with ASTM C-1371-98 or ASTM E408-71 (2002) and is installed in accordance with the manufacturer's installation specifications.																																																																										

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PC 127	808	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.1.4 Radiant Barrier Revise as follows	Radiant Barriers only work as long as their lowE surface is protected.	703.1.4. A radiant barrier with an emittance of 0.05 or less is used. The product is tested in accordance with ASTM C-1371-98 or ASTM E408-71 (2002), and is installed in accordance with the manufacturer's installation specifications, and is permanently protected against the accumulation of dust or risk of corrosion for the life of the products.												
PC 128	662	Jamie Hager Southern Energy Management self	703.1.5 Building envelope leakage Revise as follows	Add "3rd party" to language. These test results should be provided by a 3rd party with so many points available for specific envelope leakage test results. Item 704.5.2.1 could then be deleted to avoid double dipping with points.	703.1.5 Building envelope leakage. The maximum leakage rate is tested by a 3rd party to be found to be in accordance with the following:												
PC 129	681	Robert Hill NAHB Research Center NAHB Research Center	703.1.5 Building envelope leakage Revise as follows	The prerequisite for appropriate ventilation for very tight buildings apparently was dropped during the revision. Proper ventilation is appropriate for tight houses.	703.1.5 Building envelope leakage. Whole building ventilation is provided in accordance with section 902.2 and the maximum leakage rate is in accordance with the following: (a) 5 ACH50 (b) 4 ACH50 (c) 3 ACH50 (d) 2 ACH50 (e) 1 ACH50												
PC 130	812	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.1.5 Building envelope leakage Delete and substitute as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable. No points should be awarded for meeting the minimum code.	703.1.5 Building envelope leakage. The maximum leakage rate is in accordance with the following: <table border="1" data-bbox="1485 681 1986 973"> <tbody> <tr> <td>5 ACH</td> <td>3</td> </tr> <tr> <td>4 ACH</td> <td>6</td> </tr> <tr> <td>3 ACH</td> <td>9.0</td> </tr> <tr> <td>2 ACH</td> <td>12</td> </tr> <tr> <td>1 ACH</td> <td>15</td> </tr> </tbody> </table>	5 ACH	3	4 ACH	6	3 ACH	9.0	2 ACH	12	1 ACH	15		
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PC 131	765	Eric Lacey RECA RECA	703.1.6.1 Fenestration Specifications Revise as follows	The 2008 edition of the National Green Building Standard recognized the critical role of efficient windows, doors, and skylights in sustainable building practice. The 2008 NGBS required windows in any green-certified home to meet or exceed the Energy Star requirements then effective (version 4.0). For some reason, the latest Public Comment Draft has removed fenestration from the list of mandatory provisions. We believe that efficient windows, doors, and skylights are crucial elements in any sustainable project, and propose restoring this section to the mandatory provisions. Since the publication of the 2008 NGBS, the IECC window requirements have been updated and improved. Consistent with RECA's previous submissions to the Committee, we believe that the 2012 IECC requirements are the logical foundation for the energy requirements of the NGBS, and we have incorporated those requirements into the proposal below. However, if the Committee decides to use the 2009 IECC as its baseline, we have included the 2009 values as a second option. At a minimum, we recommend maintaining the mandatory Energy Star requirements that are currently in the 2008 NGBS to ensure that there is no backsliding in the latest edition of the NGBS. Recognizing that any of the recommended standards represent an improvement in energy efficiency, we have also added the flexibility of an area-weighted average – something not available in the 2008 NGBS fenestration requirements.	<p>701.4.4.1 NFRC-certified U-factor and SHGC of windows, exterior doors, skylights, and tubular daylighting devices (TDDs) on an area-weighted average basis are in accordance with Table 701.4.4.1. Decorative fenestration elements with a maximum area of 15 square feet (1.39 m²) or 10 percent of the total glazing area, whichever is less, are not required to comply with this practice.</p> <p>[Option 1: 2012 IECC]</p> <p>Table 701.4.4.1 Fenestration Specifications</p> <table border="1"> <thead> <tr> <th rowspan="2">Climate Zones</th> <th>U-Factor</th> <th>SHGC</th> </tr> <tr> <th colspan="2">Windows and Exterior Doors (maximum certified ratings)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.50</td> <td>0.25</td> </tr> <tr> <td>2</td> <td>0.40</td> <td>0.25</td> </tr> <tr> <td>3</td> <td>0.35</td> <td>0.25</td> </tr> <tr> <td>4</td> <td>0.35</td> <td>0.40</td> </tr> <tr> <td>5 to 8</td> <td>0.32</td> <td>Any</td> </tr> <tr> <td colspan="3">Skylights and TDDs</td> </tr> <tr> <td>1</td> <td>0.75</td> <td>0.25</td> </tr> <tr> <td>2</td> <td>0.65</td> <td>0.25</td> </tr> <tr> <td>3</td> <td>0.55</td> <td>0.25</td> </tr> <tr> <td>4</td> <td>0.55</td> <td>0.40</td> </tr> <tr> <td>5 to 8</td> <td>0.55</td> <td>Any</td> </tr> </tbody> </table> <p><i>Mandatory</i></p> <p>¹ Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.</p> <p>[Option 2: 2009 IECC]</p> <p>Table 701.4.4.1 Fenestration Specifications</p> <table border="1"> <thead> <tr> <th rowspan="2">Climate Zones</th> <th>U-Factor</th> <th>SHGC</th> </tr> <tr> <th colspan="2">Windows and Exterior Doors (maximum certified ratings)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.20</td> <td>0.30</td> </tr> <tr> <td>2</td> <td>0.65</td> <td>0.30</td> </tr> <tr> <td>3</td> <td>0.50</td> <td>0.30</td> </tr> <tr> <td>4 to 8</td> <td>0.35</td> <td>Any</td> </tr> <tr> <td colspan="3">Skylights and TDDs</td> </tr> <tr> <td>1</td> <td>0.75</td> <td>0.30</td> </tr> <tr> <td>2</td> <td>0.75</td> <td>0.30</td> </tr> <tr> <td>3</td> <td>0.65</td> <td>0.30</td> </tr> <tr> <td>4 to 8</td> <td>0.55</td> <td>Any</td> </tr> </tbody> </table> <p><i>Mandatory</i></p>	Climate Zones	U-Factor	SHGC	Windows and Exterior Doors (maximum certified ratings)		1	0.50	0.25	2	0.40	0.25	3	0.35	0.25	4	0.35	0.40	5 to 8	0.32	Any	Skylights and TDDs			1	0.75	0.25	2	0.65	0.25	3	0.55	0.25	4	0.55	0.40	5 to 8	0.55	Any	Climate Zones	U-Factor	SHGC	Windows and Exterior Doors (maximum certified ratings)		1	1.20	0.30	2	0.65	0.30	3	0.50	0.30	4 to 8	0.35	Any	Skylights and TDDs			1	0.75	0.30	2	0.75	0.30	3	0.65	0.30	4 to 8	0.55	Any		OK
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PC 132	766	Eric Lacey RECA RECA	703.1.6.1 Fenestration Specifications Revise as follows	The 2008 edition of the National Green Building Standard recognized the critical role of efficient windows, doors, and skylights in sustainable building practice. Since the publication of the 2008 NGBS, the IECC window requirements have been updated and improved. Consistent with RECA's previous submissions to the Committee, we believe that the 2012 IECC requirements are the logical foundation for the energy requirements of the NGBS, for both prescriptive and performance paths, and RECA has submitted another proposal that would restore these requirements to the "mandatory" section of the NGBS. However, if the Committee decides not to adopt RECA's first proposal, we propose requiring at	<p>703.1.6 Fenestration</p> <p>703.1.6.1 NFRC-certified (or equivalent) U-factor and SHGC of windows, exterior doors, skylights, and tubular daylighting devices (TDDs) on an area-weighted average basis are in accordance with Table 703.1.6.1. Decorative fenestration elements with a maximum area of 15 square feet (1.39 m²) or 10 percent of the total glazing area, whichever is less, are not required to comply with this practice.</p>																																																																								

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				<p>least that homes built to the prescriptive option meet the 2012 IECC fenestration requirements. The proposal also clarifies that all windows installed must be NFRC-certified, again consistent with the previous edition of the NGBS. There is no "equivalent" to NFRC certification. NFRC is the standard-setting organization designated by Congress to rate residential and commercial fenestration, and NFRC labels are well-understood and widely used by all major manufacturers. A single, consistent standard that applies to all fenestration will simplify compliance and promote quality building. Recognizing that any of the recommended standards represent an improvement in energy efficiency, we have also added the flexibility of an area-weighted average – something not available in the 2008 NGBS fenestration requirements. The proposal also provides one additional table of "enhanced fenestration values" for additional points. Given the improvement in the 2012 IECC, it would not make sense to propose two additional "for points" tables in the NGBS. The values in the enhanced table represent roughly a 10% improvement in efficiency requirements – a moderate improvement consistent with the 10% improvement in fenestration efficiency required by the International Green Construction Code for commercial construction. If the Committee decides that the 2009 IECC should be the baseline for the prescriptive compliance path, then we recommend adopting the 2012 IECC table as the first set of enhanced requirements for points, followed by an additional enhanced fenestration table. This scenario is outlined in "Option 2" below.</p>	<p>[Option 1: 2012 IECC mandatory, with one enhanced fenestration option]</p> <p>Table 703.1.6.1 Fenestration Specifications</p> <table border="1"> <thead> <tr> <th rowspan="2">Climate Zones</th> <th>U-Factor</th> <th>SHGC</th> </tr> <tr> <th colspan="2">Windows and Exterior Doors (maximum certified ratings)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.65 0.50</td> <td>0.30 0.25</td> </tr> <tr> <td>2</td> <td>0.65 0.40</td> <td>0.30 0.25</td> </tr> <tr> <td>3</td> <td>0.40 0.35</td> <td>0.30 0.25</td> </tr> <tr> <td>4 to 8</td> <td>0.35 0.35</td> <td>Any 0.40</td> </tr> <tr> <td>5 to 8</td> <td>0.32</td> <td>Any</td> </tr> <tr> <td colspan="3">Skylights and TDDs</td> </tr> <tr> <td>1 and 2</td> <td>0.75</td> <td>0.30 0.25</td> </tr> <tr> <td>2</td> <td>0.65</td> <td>0.25</td> </tr> <tr> <td>3</td> <td>0.65 0.55</td> <td>Any 0.25</td> </tr> <tr> <td>4</td> <td>0.55</td> <td>0.40</td> </tr> <tr> <td>4 to 8</td> <td>0.60 0.55</td> <td>Any</td> </tr> </tbody> </table> <p>¹ Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.</p> <p>Delete Table 703.1.6.2(a) and replace with the following:</p> <p>Table 703.1.6.2(a) Enhanced Fenestration Specifications</p> <table border="1"> <thead> <tr> <th rowspan="2">Climate Zones</th> <th>U-Factor</th> <th>SHGC</th> </tr> <tr> <th colspan="2">Windows and Exterior Doors (maximum certified ratings)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.45</td> <td>0.25</td> </tr> <tr> <td>2</td> <td>0.35</td> <td>0.25</td> </tr> <tr> <td>3</td> <td>0.32</td> <td>0.25</td> </tr> <tr> <td>4</td> <td>0.30</td> <td>0.40</td> </tr> <tr> <td>5 to 8</td> <td>0.30</td> <td>Any</td> </tr> <tr> <td colspan="3">Skylights and TDDs</td> </tr> <tr> <td>1 and 2</td> <td>0.60</td> <td>0.25</td> </tr> <tr> <td>3</td> <td>0.50</td> <td>0.25</td> </tr> <tr> <td>4</td> <td>0.50</td> <td>0.35</td> </tr> <tr> <td>5 to 8</td> <td>0.50</td> <td>Any</td> </tr> </tbody> </table> <p>Delete Table 703.1.6.2(b) in its entirety</p> <p>[Option 2: 2009 IECC mandatory, with two enhanced fenestration options]</p> <p>Delete Table 703.1.6.2(a) and replace with the following:</p>	Climate Zones	U-Factor	SHGC	Windows and Exterior Doors (maximum certified ratings)		1	0.65 0.50	0.30 0.25	2	0.65 0.40	0.30 0.25	3	0.40 0.35	0.30 0.25	4 to 8	0.35 0.35	Any 0.40	5 to 8	0.32	Any	Skylights and TDDs			1 and 2	0.75	0.30 0.25	2	0.65	0.25	3	0.65 0.55	Any 0.25	4	0.55	0.40	4 to 8	0.60 0.55	Any	Climate Zones	U-Factor	SHGC	Windows and Exterior Doors (maximum certified ratings)		1	0.45	0.25	2	0.35	0.25	3	0.32	0.25	4	0.30	0.40	5 to 8	0.30	Any	Skylights and TDDs			1 and 2	0.60	0.25	3	0.50	0.25	4	0.50	0.35	5 to 8	0.50	Any	Mandatory		
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PC 133	824	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.1.6.1 Fenestration Specifications Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable.	<p>703.1.6.1 NFRC-certified (or equivalent) U-factor and SHGC of windows, exterior doors, skylights, and tubular daylighting devices (TDDs) are in accordance with Table 703.1.6.1. Decorative fenestration elements with a combined total maximum area of 15 square feet (1.39 m²) or 10percent of the total glazing area, whichever is less, are not required to comply with this practice.</p> <p>Table 703.1.6.1:Fenestration Specifications</p> <table border="1"> <thead> <tr> <th>Climate Zones</th> <th>U-Factor</th> <th>SHGC</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.65</td> <td>0.25 -0.30</td> </tr> <tr> <td>2</td> <td>0.40 0.65-</td> <td>0.25 -0.30-</td> </tr> <tr> <td>3</td> <td>0.35 0.40</td> <td>0.25 0.30-</td> </tr> <tr> <td>4-8</td> <td>0.32 -0.35</td> <td>Any</td> </tr> <tr> <th colspan="3">Skylights and TDDs</th> </tr> <tr> <td>1 and 2</td> <td>0.65 0.75-</td> <td>0.30</td> </tr> <tr> <td>3</td> <td>0.55 0.65-</td> <td>0.30</td> </tr> <tr> <td>4-8</td> <td>0.55 -0.60-</td> <td>0.40 Any</td> </tr> <tr> <td>5-8</td> <td>0.55</td> <td>Any</td> </tr> </tbody> </table>	Climate Zones	U-Factor	SHGC	1	0.65	0.25 -0.30	2	0.40 0.65-	0.25 -0.30-	3	0.35 0.40	0.25 0.30-	4-8	0.32 -0.35	Any	Skylights and TDDs			1 and 2	0.65 0.75-	0.30	3	0.55 0.65-	0.30	4-8	0.55 -0.60-	0.40 Any	5-8	0.55	Any																																													
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3	0.35 0.40	0.25 0.30-																																																																														
4-8	0.32 -0.35	Any																																																																														
Skylights and TDDs																																																																																
1 and 2	0.65 0.75-	0.30																																																																														
3	0.55 0.65-	0.30																																																																														
4-8	0.55 -0.60-	0.40 Any																																																																														
5-8	0.55	Any																																																																														

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PC 134	837	Craig Conner Building Quality self	703.1.6.1 Fenestration Specifications Add new as follows.	There are designs where a higher SHGC saves energy, or where a higher SHGC on a specific orientation saves energy. Dynamic glazing that can adapt to use the higher and lower SHGC as appropriate could save more energy than either high or low SHGC.	Add new text after existing text in 703.1.6.1 <u>There is no SHGC minimum where simulation analysis of the proposed design shows that a higher SHGC would reduce energy use. There is no SHGC requirement for any glazing which changes SHGC and which is controlled by automated controls.</u>																																
PC 135	601	Nils Petermann Alliance to Save Energy Alliance to Save Energy	703.1.6.2 Enhanced Fenestration Specifications Revise as follows	The maximum SHGC for skylights in climate zone 3 as proposed in Table 703.1.6.2(b) exceeds the mandatory maximum SHGC for skylights in this climate zone as shown in Table 703.1.6.1. The enhanced SHGC specifications should be at least as stringent as the mandatory specifications.	Table 703.1.6.2(b) Enhanced Fenestration Specifications Skylights and TDDs (maximum certified ratings) Climate Zone 3; U-factor 0.50; SHGC 0.35 <u>0.30</u> TBD																																
PC 136	642	John Gant Glen Raven Inc self	703.1.6.2 Enhanced Fenestration Specifications Revise as follows	It is incorrect to assume that a reduced SHGC in Zone 4 is an improvement. Heating is more expensive than cooling in these areas, and so solar gain is good. Shading can be provided to provide control as needed beyond what any static window could ever provide.	In proposed Table 703.1.6.2.a, the Zone 4 SHGC value should be "Any", in two places, and the footnote should be "4-8" rather than "5-8".																																
PC 137	822	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.1.6.2 Enhanced Fenestration Specifications Delete and substitute as follows	To maintain validity as an above code program these values need to be adjusted to be consistent with an above-code option compared with values in the latest national mode code, the 2012 IECC.	Delete tables 703.1.6.2 (a) and (b) and substitute one table as follows: Table 703.1.6.2: Enhanced Fenestration Specifications <table border="1"> <thead> <tr> <th>Climate Zones</th> <th>U-Factor</th> <th>SHGC</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>Windows and Exterior Doors (maximum certified ratings)</td> </tr> <tr> <td>1</td> <td>0.65</td> <td>0.25</td> </tr> <tr> <td>2</td> <td>0.35</td> <td>0.25</td> </tr> <tr> <td>3</td> <td>0.32</td> <td>0.25</td> </tr> <tr> <td>4</td> <td>0.32</td> <td>0.30</td> </tr> <tr> <td>5-8</td> <td>0.32</td> <td>N/R</td> </tr> <tr> <td></td> <td></td> <td>Skylights and TDDs (Maximum certified ratings)</td> </tr> <tr> <td>1-4</td> <td>0.50</td> <td>0.30</td> </tr> <tr> <td>5-8</td> <td>0.50</td> <td>N/R</td> </tr> </tbody> </table>	Climate Zones	U-Factor	SHGC			Windows and Exterior Doors (maximum certified ratings)	1	0.65	0.25	2	0.35	0.25	3	0.32	0.25	4	0.32	0.30	5-8	0.32	N/R			Skylights and TDDs (Maximum certified ratings)	1-4	0.50	0.30	5-8	0.50	N/R		
Climate Zones	U-Factor	SHGC																																			
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4	0.32	0.30																																			
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5-8	0.50	N/R																																			
PC 138	619	Robert Brown WaterFurnace Int'l Waterfurnace International	703.2.6 Ground Source Heat Pump Revise as follows	1) Energy Efficiency levels are so high that certain sizes of equipment will be precluded from installation. For instance only a 3 ton geothermal unit can pass the criteria if the home requires a 5 ton what is the resolution? 2)EER/COP should be the average of Part Load and Full Load for capacity modulated equipment. 3) Efficiencies are too high to represent any cross section of product. Below I have detailed out that (4) represents essentially the top tier of single speed units with ECM fan motors in the full range of 1 thru 6 ton. (5) represents the top tier of dual or variable speed capacity units with ECM fan motors and is averaging the part load and full load efficiencies of the full line from 1-6 ton. 4) AHRI 13256-1 should be referenced for all water to air product, 13256-2 should be referenced for all water to water product. AHRI 870 should be referenced for all direct exchange product. 5) Significant differences between Water to Air and Water to Water product efficiencies and conditions. Each should be detailed out.	W-A = Water to Air ISO/AHRI 13256-1 GLHP W-W= Water to Water ISO/AHRI 13256-2 GLHP (1) <u>W-A Open loop: ≥ 16.2 EER / ≥ 3.6 COP 20</u> <u>W-W Open loop: ≥ 16.0 EER / ≥ 3.4 COP 20</u> (2) <u>W-A Closed loop: ≥ 14.1 EER / ≥ 3.3 COP 20</u> <u>W-W Closed loop: ≥ 14.0 EER / ≥ 2.8 COP 20</u> (3) Direct expansion: ≥ 15.0 EER / ≥ 3.5 COP 20 (4) <u>W-A Any type (open, closed, direct expansion): ≥ 24 18 EER / ≥ 4.3 3.7 COP 30</u> <u>W-W Any type (open, closed, direct expansion): ≥ 15.7 EER / ≥ 3.1 COP 30</u> (5) <u>W-A Any type (open, closed, direct expansion): ≥ 28 20EER / ≥ 4.8 4.0 COP 35</u> <u>W-W Any type (open, closed, direct expansion): ≥ 17.5 EER / ≥ 3.2 COP 35</u>																																
PC 139	817	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.3 Duct Systems Revise as follows	Electric resistance heating does not meet the intention of this section.	703.3.1 All space heating is provided by a system(s) that does not include air ducts. <u>Electric resistance heating does not comply with this section.</u>																																

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PC 140	658	Jamie Hager Southern Energy Management self	703.3.4 Duct Leakage Revise as follows	Clarification needed if duct leakage is measured as total leakage of the system or leakage outside of conditioned space?	703.3.4 Duct Leakage. The entire central HVAC duct system, including air handlers and register boots, is tested by a third party for <u>total</u> leakage at a pressure differential of 0.1 inches w.g. (25 Pa). The maximum leakage as a percent of the system design flow rate is in accordance with the following:		
PC 141	826	Bridget Herring Mathis Consulting Company Mathis Consulting Company	703.3.4 Duct Leakage Revise as follows	Green standards are universally understood and expected to be above code programs. Failure to reference the current minimum code is misleading and unacceptable. Testing needs to be mandatory and points shall be given for above code performance.	703.3.4 Duct Leakage. The entire central HVAC duct system, including air handlers and register boots, is tested by a third party for leakage at a pressure differential of 0.1 inches w.g. (25 Pa). The maximum leakage as a <u>cfm per 100 square feet</u> percent of the system design flow rate is in accordance with the following: (1) 6 percent <u>2 cfm</u> for ductwork entirely outside the building's thermal envelope (2) 6 percent <u>3 cfm</u> for ductwork entirely inside the building's thermal envelope (3) 6 percent <u>2 cfm</u> for ductwork both inside and outside the building's thermal envelope		
PC 142	741	Susan Gitlin US Environmental Protection Agency US Environmental Protection Agency	703.5.3 Appliances Revise as follows	This section awards points for the installation of ENERGY STAR® or equivalent refrigerators, dishwashers, and washing machines. For refrigerators, proper disposal of old units should also be a factor. Taking old, inefficient refrigerators, freezers, window air conditioners and dehumidifiers off the grid contributes measurable energy savings. Replacing an older appliance with a new ENERGY STAR® unit can save more than 700 kilowatt-hours (kWh) per year. By saving energy, residents also save money: removing an energy-inefficient appliance translates to savings of more than \$140 per year per household. Reduced electricity generation brings down the emissions of some criteria air pollutants, resulting in improved air quality and increased environmental and health benefits for communities.	UUU		
PC 143	611	Curtis L Biggar Biggar Dev Ltd self	703.6 Passive solar design Revise as follows	I have over 50 years experience in passive design including the AIA passive studio in 1980. Many of my work employees octagonal floor plans allowing the sun to enter the interior space in the morning & in the afternoon. This increases the solar gain substantially. I also use transoms above the south glass from 2' high up to complete 2 story spaces. This is done with in-floor heat coils. I also use natural lighting & ventilation with vertical glass on the sides of cupolas or clerestory windows above halls ways electrically or pole operated. This eliminates airconditioning in Wisconsin. & should be considered natural whole house ventilation. I believe the remodeling chapter should also address passive solar additions & the other features above. I am pleased with the quality of the original standard & the changes being proposed. These additions could be under special points initiatives because of the lack of passive information available. Please check out my website @ WWW.CURTISLBIGGARARCHITECT.COM & check out my green page. Curtis L Biggar Architect/CGP [See the Additional Documents file for more information]			
PC 144	608	Chris Allison City of Longmont City of Longmont	704.2 Lighting Revise as follows	Change this section to reflect that more than 50% of the hard-wired lighting fixtures or bulbs in those fixtures qualify as high efficacy to gain compliance with this section.	Should points only be awarded if they exceed the code minimum of 50%?		
PC 145	663	Jamie Hager Southern Energy Management self	704.5.2.1 Building envelope leakage testing Delete without substitution	Revise Item 703.1.5 to include 3rd Party testing and then 704.5.2.1 Building envelope leakage could just be deleted as it adds confusion and seems like double dipping with points. Points are not lost to Performance Pathway projects as infiltration testing to determine the savings levels above the IECC is usually performed by a 3rd party.	Delete this item entirely		
PC 146	762	Gary Klein Affiliated International Management, LLC Self	704.5.3 Insulating hot water pipes Revise as follows	The content of the section is fine. However, since it is about water heating it would make sense for the pipe insulation to be in the water heating section.	Move to be a section within Section 703.4 Water Heating		

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PC 147	764	Gary Klein Affiliated International Management, LLC Self	704.5.3 Insulating hot water pipes Revise as follows	It seems useful to more clearly describe where the lengths in the table are to be measured from.	Revise the footnote to Table 704.5.3 Table 704.5.3 Maximum Pipe Run Length 1. Total length of all piping from the <u>source of hot water (either a water heater or distribution manifold (or tee) on a trunk line or a the recirculation loop) to a point of use.</u>		
PC 148	814	Amy Schmidt The Dow Chemical Company Dow Building Solutions	705.1 Energy Consumption Control Revise as follows	A two year commitment is extremely small in comparison to other energy savings measures. Either the time commitment should be altered or points altered.	705.2 Renewable energy service plan. Renewable energy service plan is provided as follows: (1) Builder selects a renewable energy service plan provided by the local electrical utility for interim (temporary) electric service. The builder's local administrative office has renewable energy service. 2 (2) The buyer of the building selects a renewable energy service plan provided by the utility prior to occupancy of the building. <u>with a minimum two twenty year commitment. 5</u>		
PC 149	816	Amy Schmidt The Dow Chemical Company Dow Building Solutions	705.5.1 Photovoltaic Revise as follows	As long as renewable energy systems are producing the required 100W per sq/ft they should get the same amount of points. BIPV systems should be included in the list of systems.	705.5 Additional renewable energy options 705.5.1 Renewable Energy System is Photovoltaic panels are installed on the property (e.g., solar photovoltaic panels, building integrated photovoltaics, wind energy, on-site micro-hydro power, active solar space heating systems, solar thermal hydronic heating system, photovoltaic hybrid heating system). 1 (Points awarded per 100 W of system rating per 2,000 square feet of total conditioned floor area of the building.) 705.5.2 Other on-site renewable energy source is installed (e.g., wind energy, on-site micro-hydro power, active solar space heating systems solar thermal hydronic heating system, photovoltaic hybrid heating system). One-half (Points awarded per 100-W of system rating per 2,000 square feet of total conditioned floor area of the building.)		