

ENERGY STAR®



**Windows, Doors & Skylights
NWDA Winter Meeting
January 15, 2008**

Agenda



- Motivation
- Guiding Principles
- Initial elements
- New and revised elements
- Timeline
- Current and pending legislation

Agenda



- **Motivation**
- Guiding Principles
- Initial elements
- New and revised elements
- Timeline
- Current and pending legislation

Criteria Update Needed



- Twenty-eight states have adopted IECC 2003 or other more recent editions
- Improving energy efficiency is a national priority
- ENERGY STAR barely beats code
- ENERGY STAR windows make up 53% of the market

Revision of ENERGY STAR Criteria



- DOE is revising the ENERGY STAR qualification criteria for windows, doors and skylights
- Formal process began this fall
- DOE is currently evaluating technical, market, cost and energy savings data
- Earliest effective date for new criteria – February 09

Agenda



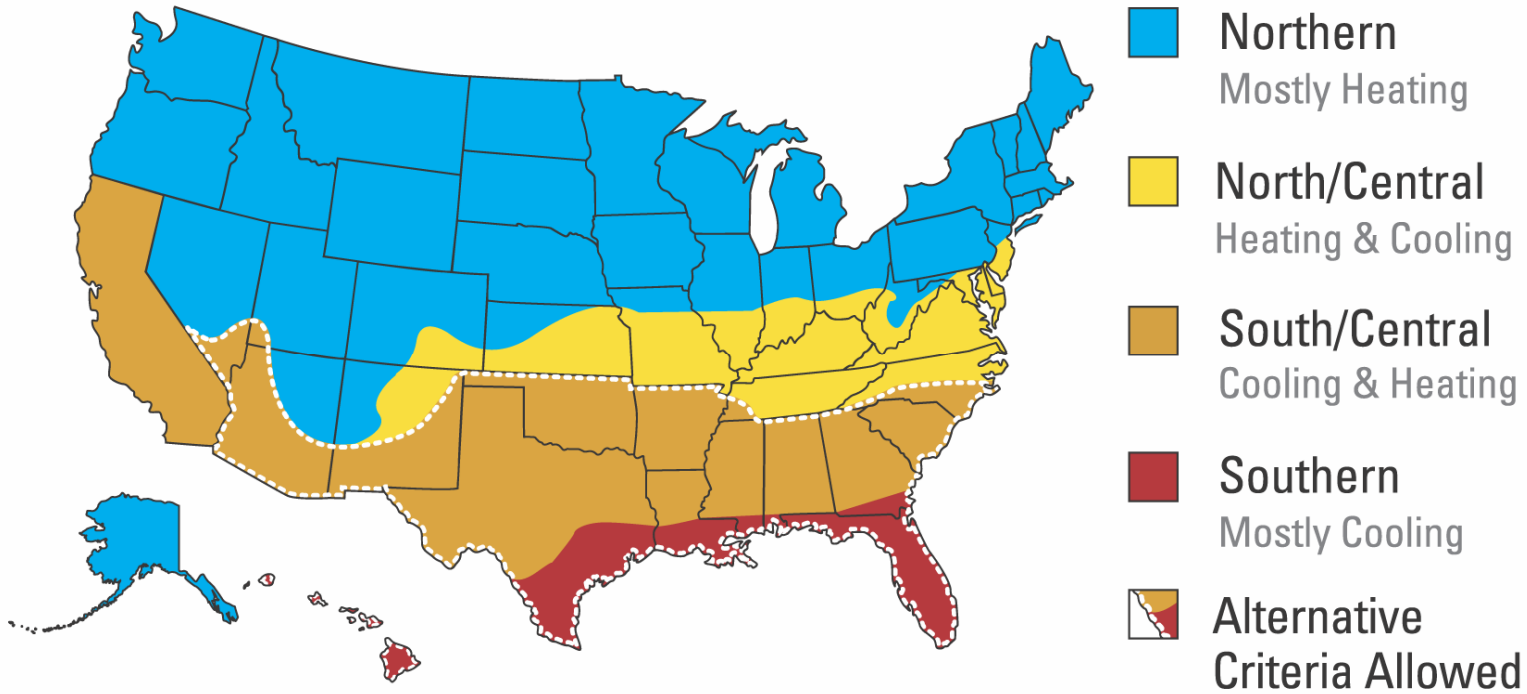
- Motivation
- **Guiding Principles**
- Initial elements
- New and revised elements
- Timeline
- Current and pending legislation

Guiding Principles



1. Significant energy savings
2. Cost-effective
3. Energy savings can be measured
4. Equivalent functionality and performance
5. No proprietary technologies
6. Label provides meaningful differentiation

ENERGY STAR Climate Zone Map



Qualification Criteria: Windows, Doors, Skylights



Climate Zone	U-Factor ¹	SHGC ²	
Northern	≤ 0.35	Any	
North/Central	≤ 0.40	≤ 0.55	
South/Central	≤ 0.40	≤ 0.40	Prescriptive
	≤ 0.41	≤ 0.36	Equivalent Performance (Excluding CA) <i>Products meeting these criteria also qualify in the Southern zone.</i>
	≤ 0.42	≤ 0.31	
	≤ 0.43	≤ 0.24	
Southern	≤ 0.65	≤ 0.40	Prescriptive
	≤ 0.66	≤ 0.39	Equivalent Performance
	≤ 0.67		
	≤ 0.68	≤ 0.38	
	≤ 0.69	≤ 0.37	
	≤ 0.70		
	≤ 0.71	≤ 0.36	
	≤ 0.72	≤ 0.35	
	≤ 0.73		
	≤ 0.74	≤ 0.34	
	≤ 0.75	≤ 0.33	

Climate Zone	U-Factor ¹		SHGC ²
	2001 NFRC rated at 20° ³	RES97 rated at 90° ⁴	
Northern	≤ 0.60	≤ 0.45	Any
North/Central	≤ 0.60	≤ 0.45	≤ 0.40
South/Central	≤ 0.60	≤ 0.45	≤ 0.40
Southern	≤ 0.75	≤ 0.75	≤ 0.40

¹ Btu/h.ft². °F

² Fraction of incident solar radiation.

³ U-Factor qualification criteria based on 2001 NFRC simulation and certification procedures that rate skylights at a 20-degree angle. Although reported U-Factor is higher than RES97 rated products, energy performance at the ENERGY STAR minimum qualifying level is equivalent.

⁴ NFRC certification using the 1997 NFRC procedures for residential windows (RES 97) that rated skylights at a 90-degree angle. Skylights rated under this procedure may be present in the marketplace until March 31, 2008. NFRC labels for products using this procedure state: "RES97 rated at 90 degrees."

Agenda



- Motivation
- Guiding Principles
- **Initial elements**
- New and revised elements
- Timeline
- Current and pending legislation

Elements Under Consideration



- DOE identified a number of elements for possible incorporation into a new specification
- Subsequent industry input has led to both revisions and expansion of these elements

Elements Under Consideration



1. Will result in **significant energy savings**, both for consumers and the nation as a whole. DOE is examining:
 - Substantially lower U-Factor in northern zones
 - Capture winter solar gain, e.g. minimum SHGC
 - Substantially lower SHGC in southern zones
 - AEP Guidance to determine consumption or savings

– Cont'd

Elements Under Consideration



2. Are **cost-effective** for consumers. DOE is examining:
 - Allowing SHGC/U-Factor trade-offs (expands range of qualified products)
 - Dividing Northern zone in two (expands range of qualified products)

– Cont'd

Elements Under Consideration



3. Energy **savings can be measured** and products can be compared, using:

- U-Factor and SHGC
- RESFEN 5.0 with NFRC AEP assumptions
 - Whole-house savings

– Cont'd

Elements Under Consideration



4. **Do not compromise functionality** or performance of the qualified product. DOE may require:
 - IGU certification
 - Adequate VT

– Cont'd

Elements Under Consideration



5. **Do not rely on proprietary technologies** of one, or a small set of, manufacturers.

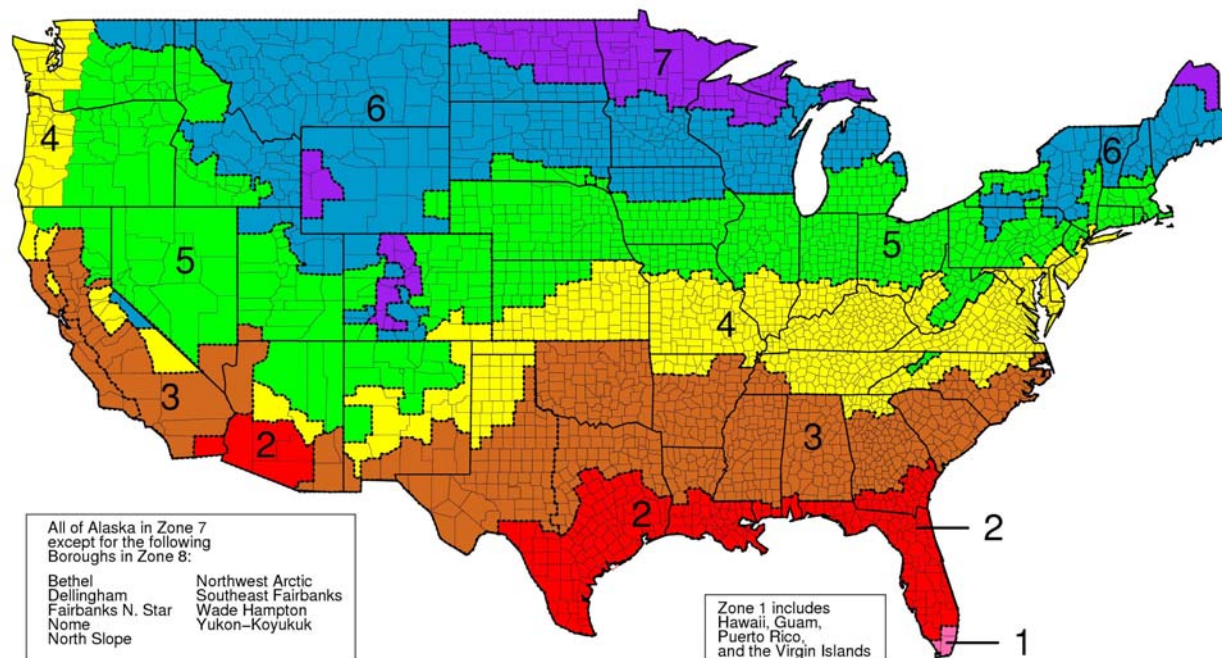
- Ensure multiple paths for achieving performance
- Provide ample consumer choice, in terms of number of models and a wide range of manufacturers.
- Allow SHGC/U-factor trade-offs
- Encourage emerging technologies, e.g. dynamic glazings
- Harness production-ready technologies

– Cont'd

Elements Under Consideration



6. Provide **meaningful differentiation** between ENERGY STAR qualified products and those that just meet the federal standard.
 - New criteria will move beyond just meeting energy and building codes.



All of Alaska in Zone 7
except for the following
Boroughs in Zone 8:
Bethel
Dillingham
Fairbanks N. Star
Nome
North Slope
Northwest Arctic
Southeast Fairbanks
Wade Hampton
Yukon-Koyukuk

Zone 1 includes
Hawaii, Guam,
Puerto Rico,
and the Virgin Islands

Agenda



- Motivation
- Guiding Principles
- Initial elements
- **New and revised elements**
- Timeline
- Current and pending legislation

New and Revised Elements



- Revised climate zone map
- Multi-year phased approach
- Criteria levels for 2009 that can be met with products currently in production
- Criteria levels for 2012 and 2015 that are aggressive and get progressively tighter
- IGU certification via NFRC

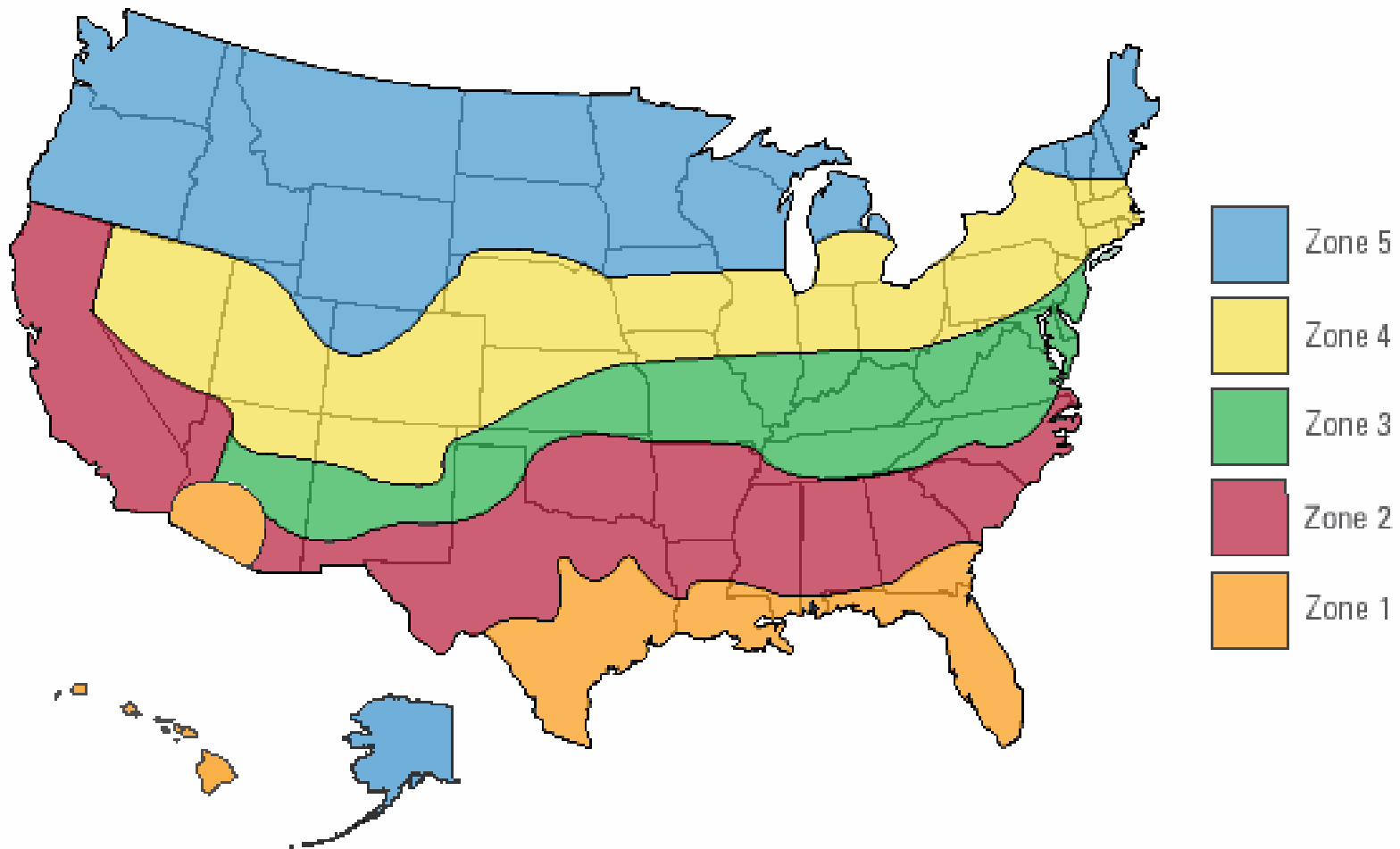
Revised Climate Zone Map



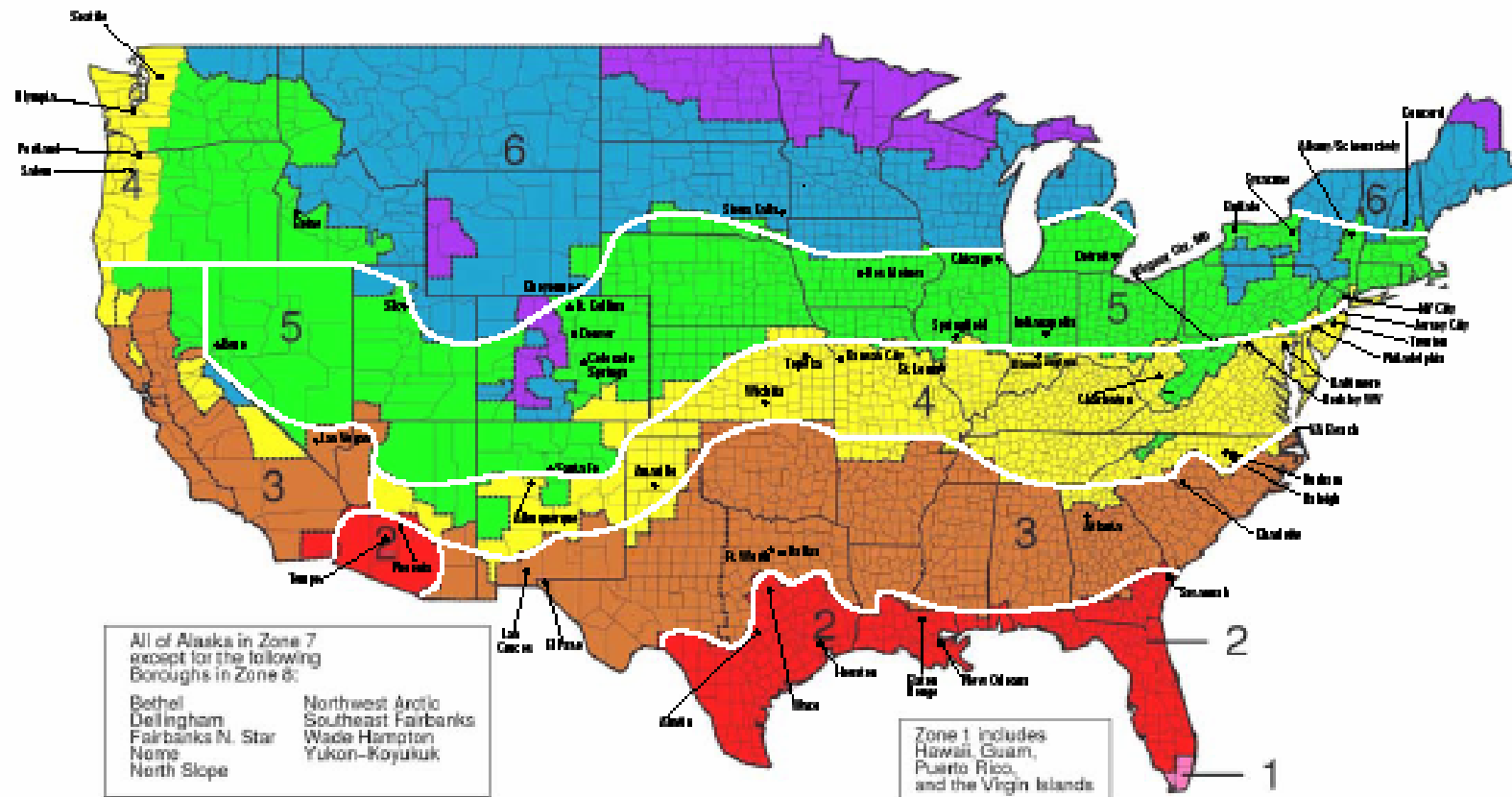
The revised climate zone map:

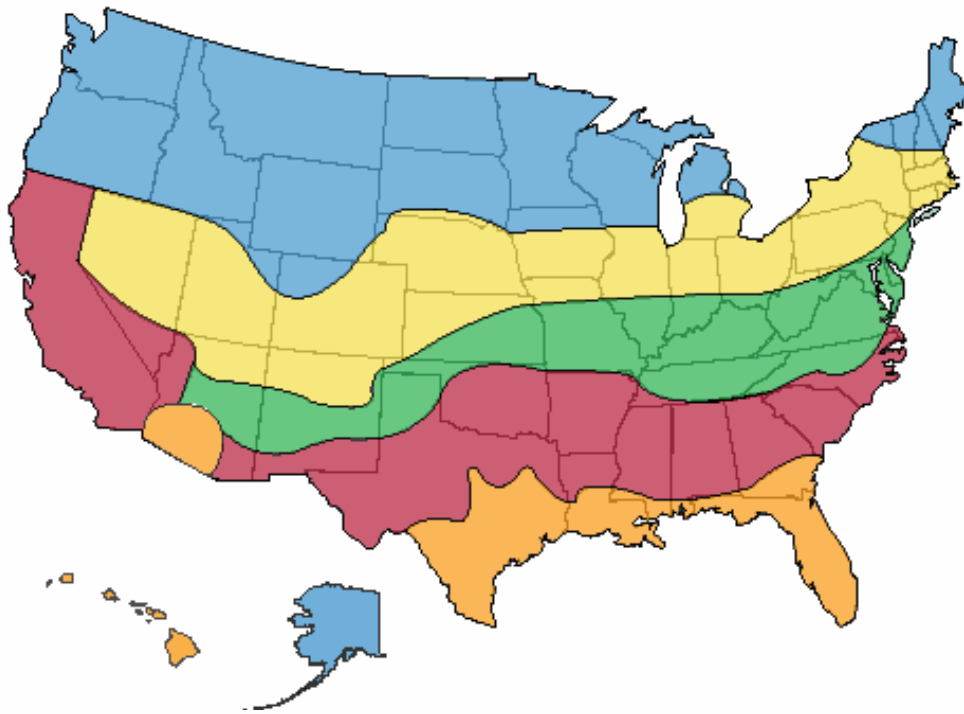
- Aligns with IECC 2006 climate zones
- Has five zones
- Preserves clean, easy boundaries

Proposed ENERGY STAR Climate Zone Map



2006 IECC Climate Zones with Proposed ENERGY STAR Climate Zones

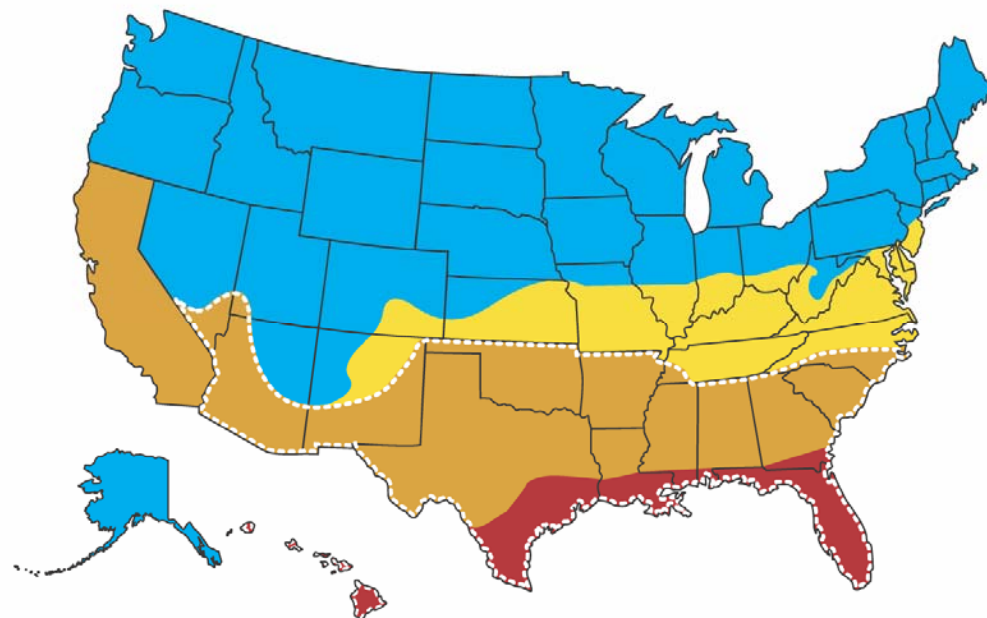




- Zone 5
- Zone 4
- Zone 3
- Zone 2
- Zone 1

Proposed

vs.



- Northern
Mostly Heating
- North/Central
Heating & Cooling
- South/Central
Cooling & Heating
- Southern
Mostly Cooling
- Alternative
Criteria Allowed

Current

Multi-Year, Phased Approach



- Announced simultaneously
- Phase 1: 2009
- Phase 2: 2012
- Phase 3: 2015

Criteria Levels for 2009



2009 ENERGY STAR Window Criteria Ranges Under Consideration

ENERGY STAR Climate Zone	U-Factor	SHGC
5	0.30-0.32	Minimum 0.35-0.55
4	0.30-0.33	TBD
3	0.33-0.36	TBD
2	0.33-0.36	Maximum 0.30-0.35
1	0.55-0.60	0.25-0.30

NOTE: Final criteria will be set as individual numbers, not ranges.

Criteria Levels for 2012 & 2015



2012 and 2015 ENERGY STAR Window Criteria Ranges Under Consideration

	2012		2015	
ES Climate Zone	U-Factor	SHGC	U-Factor	SHGC
5	0.24-0.27	Minimum 0.35-0.55	0.20-0.24	Minimum 0.35-0.55
4		TBD	0.20-0.27	TBD
3	0.28-0.32	TBD	0.24-0.32	TBD
2	0.28-0.35	0.25-0.30	0.28-0.35	0.23- 0.28
1**	0.50- 0.55	0.23- 0.28	TBD	0.18 - 0.23

NOTE: Final criteria will be set as individual numbers, not ranges.

New Elements Under Consideration



- Separate criteria for doors
- Air leakage requirement
- Longer transition period between old & new criteria

Separate Criteria for Doors



- Opaque doors can achieve much lower U-Factors than glazed doors and should have separate criteria
- Glazed doors criteria would be less stringent
- Also evaluating the possibility of having separate criteria for partially and fully glazed doors

Air Leakage Requirement



- IECC requires 0.3 cfm/sf, but no one validates
- Air leakage contributes to overall window performance
- Most manufacturers measure air leakage as part of structural testing
- Few obtain NFRC rating

Agenda



- Motivation
- Guiding Principles
- Initial elements
- New and revised elements
- **Timeline**
- Current and pending legislation

Preliminary Timeline

RK1



Initial Analysis	July 2007 - February 2008
Publish and Distribute Initial Analysis	Early March 2008
Stakeholder Meeting in Washington, DC	March 26, 2008
Announce Finalized Criteria	May 2008
Earliest Effective Date of New Criteria	February 2009

Slide 31

RK1

Need to edit picture showing the second line to be Early March 2008 and the meeting date to be March 26, 2008.

RKarney, 1/10/2008

Agenda



- Motivation
- Guiding Principles
- Initial elements
- New and revised elements
- Timeline
- **Current and pending legislation**

Energy Efficiency in Legislation



- **Energy Policy Act of 2005**
 - Created 10% tax credit (up to \$200) for windows
 - Created 10% tax credit (up to \$500) for windows
- **Energy Independence & Security Act of 2007**
 - No tax credit extension; provision would have to be reintroduced
 - No energy or building code provisions
- **HR 3221**
 - Introduction pending Congress reconvening in late January



Questions?

Comments and Input



Please contact:

Richard Karney

US Department of Energy

richard.karney@ee.doe.gov

Stephen Bickel

D&R International

sbickel@drintl.com