

A New Residential Energy Code Compliance Environment for Builders & Raters

**Changes to the IECC and A/C Minimum
Efficiency Standards**

2005 RESNET Conference



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Presentation Outline

1. Changes in International Energy Conservation Code (IECC)
2. Changes in the residential A/C efficiency standard
3. Impact of changes on IECC compliance
4. Performance-based IECC compliance

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Major Changes in IECC

1. Effective with 2004 Supplement
2. May be additional changes in 2006
3. Fewer climate zones
4. Component U-values no longer function of HDD, only climate zone of building location
5. No restrictions on window area (prescriptive path only)
6. Window U-values increased
7. Enhanced performance path
 1. Well defined rule-base
 2. Energy cost is means of comparison

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Changes in A/C Efficiency Standard

1. Effective January, 2006
2. Mandated by National Appliance Energy Conservation Act
3. Minimum SEER increases from 10.0 to 13.0
4. Will affect 2004+ IECC
5. Will affect HERS rating scores -- must be included reference home

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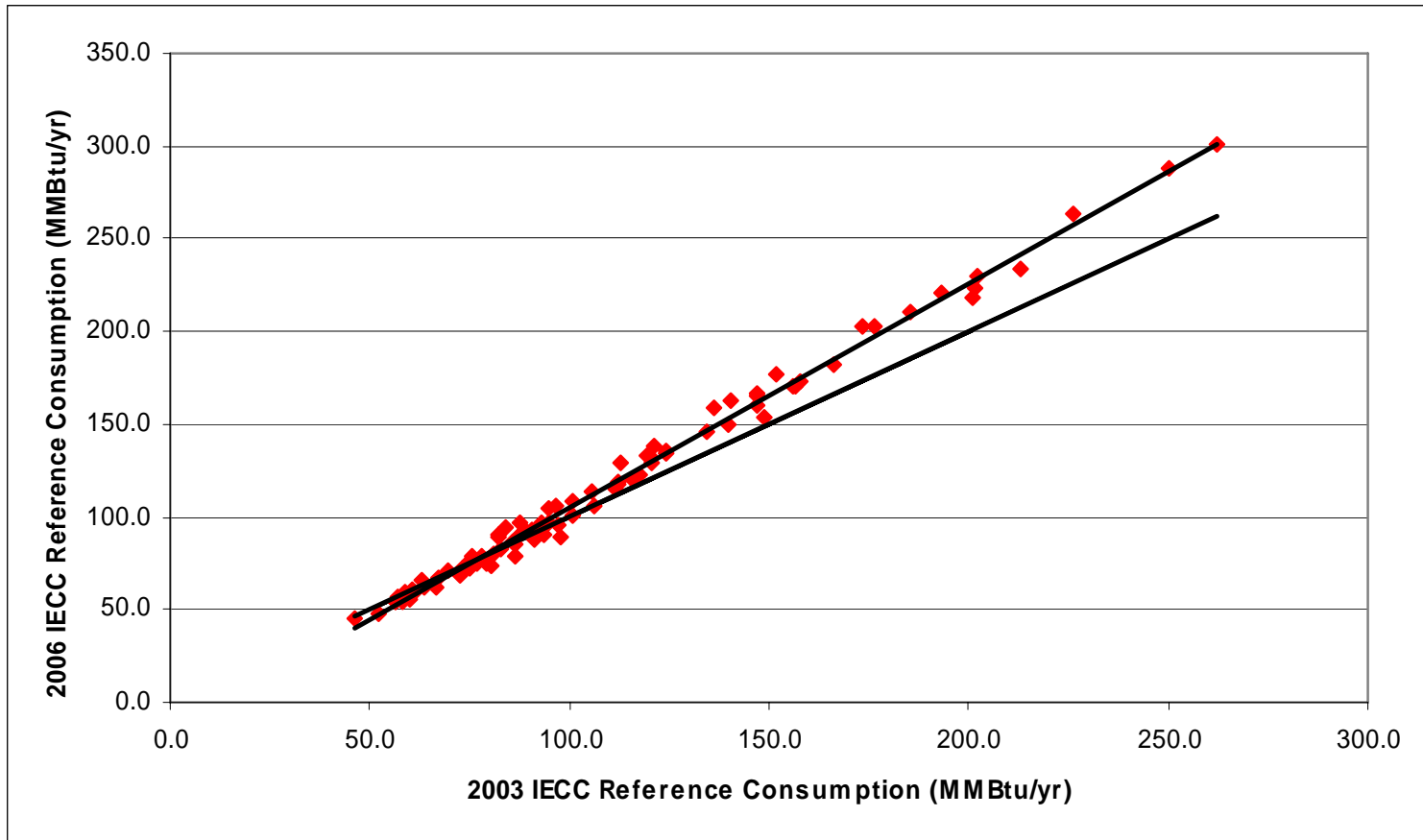


Impact of Changes on IECC Compliance

1. Analysis run with REM/Rate™ home energy rating software
2. Three home sizes -- 1500 sf, 2500 sf, 4000 sf
3. Foundation type varies by location
4. Gas heating in all locations, electric also run in South
5. 2006 IECC includes 13 SEER A/C

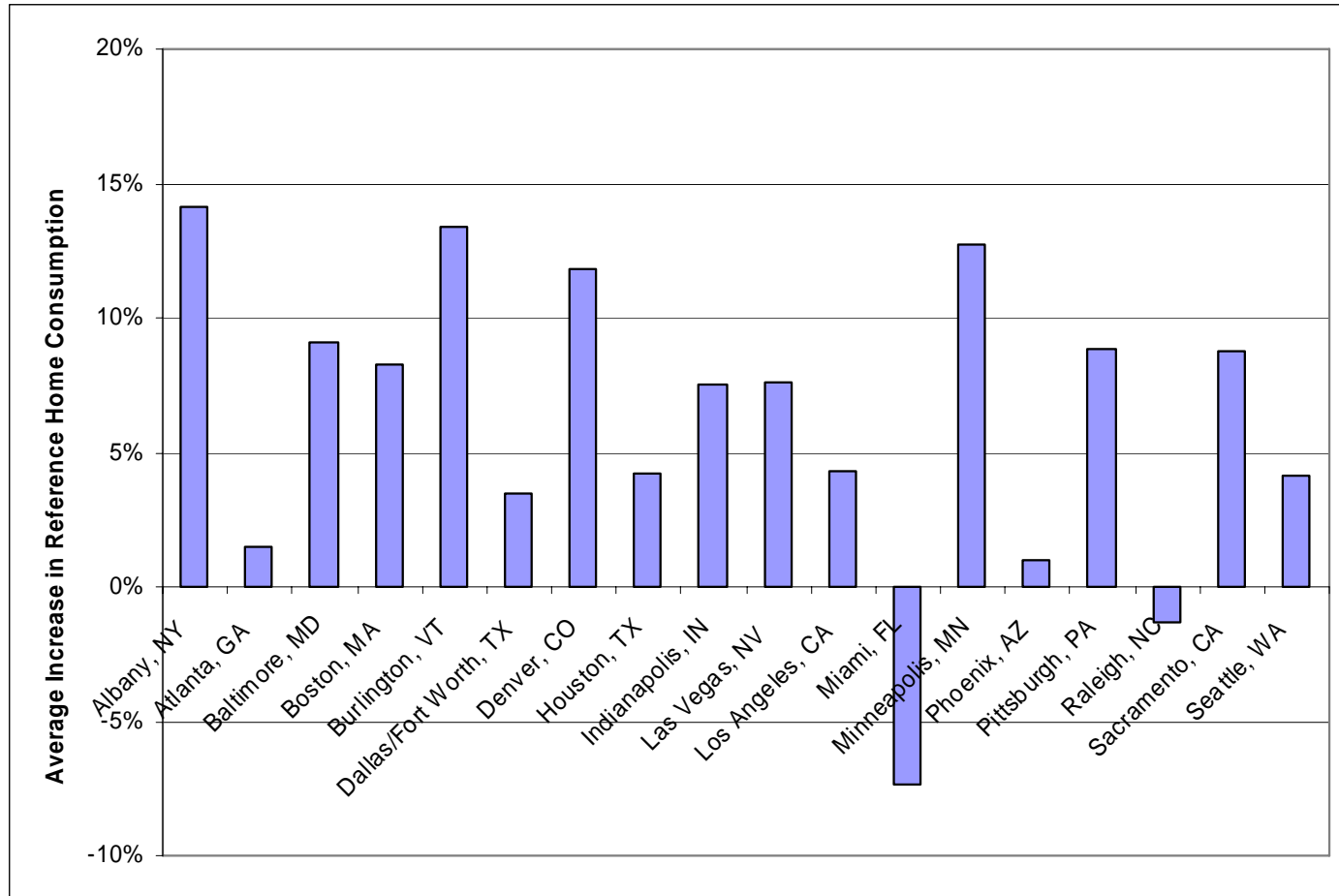
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Impact of Changes on IECC Compliance



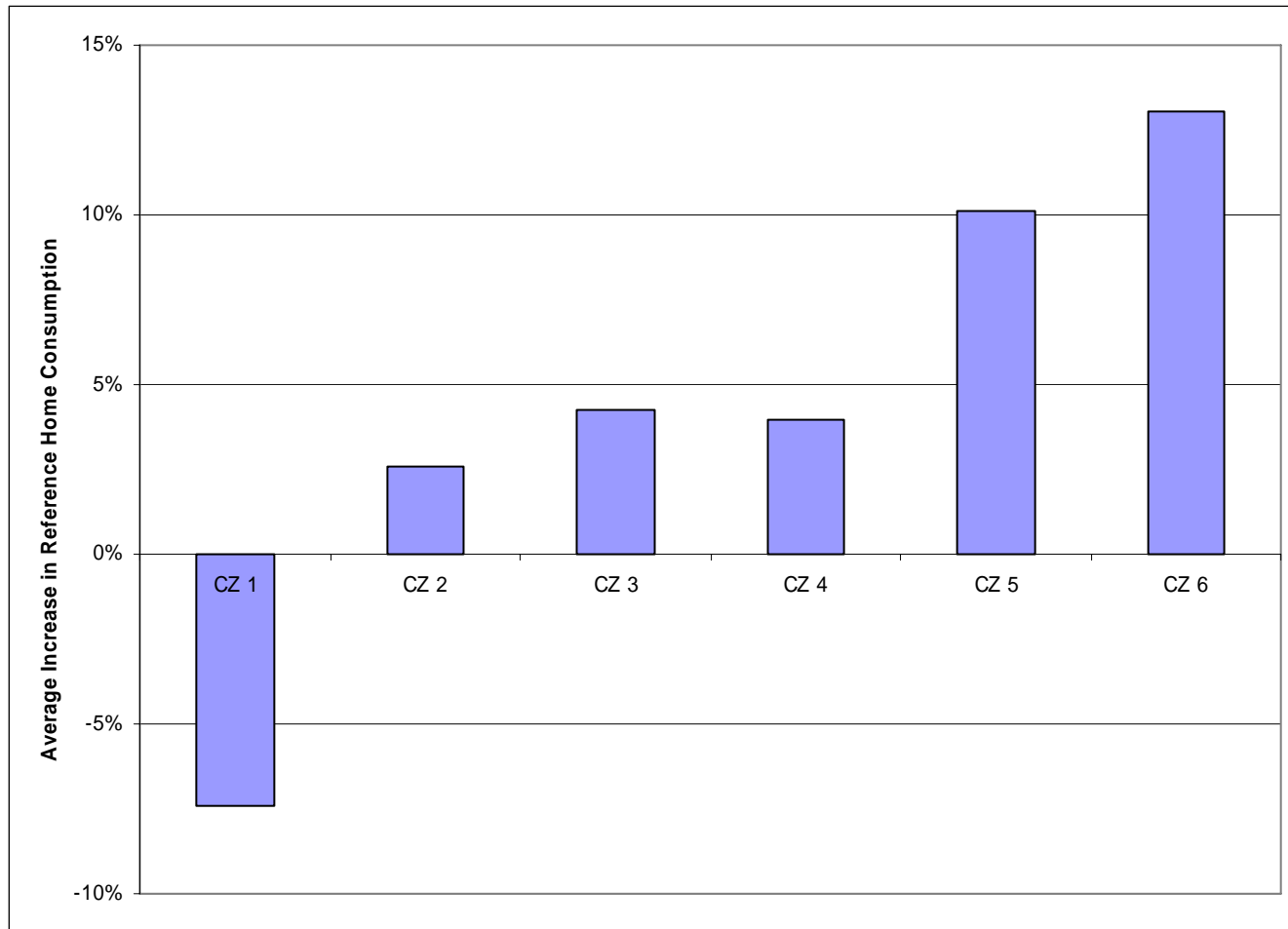
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Impact of Changes on IECC Compliance



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Impact of Changes on IECC Compliance



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Performance-Based Compliance

1. Provides for tradeoffs in shell components
2. Account for additional design features
 1. Infiltration reduction
 2. Winter shading and orientation
 3. Passive/active solar design
 4. On-site power production -- PV supplied power
 5. High efficiency mechanical equipment

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Performance-Based Compliance

“Some of the new building codes include energy-saving requirements, but trying to follow those codes in a ‘prescriptive’ way can result in high costs.”

Lee Kitson, Homebuilder
Grand Rapids, Michigan
Builder, February 2005

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Performance-Based Compliance

“Codes don’t treat the house as a system, and may not lead to a home that is both more sustainable and healthier for the occupants.”

Lee Kitson, Homebuilder

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Performance-Based Compliance

Doesn't pass UA
compliance path

Elements	Insulation Levels	
	2004 IECC	As Designed
Shell UA Check		
Ceilings:	30.0	32.9
Above-Grade Walls:	52.2	78.5
Windows and Doors:	99.8	108.7
Basement Walls:	62.3	58.7
Overall UA (Design must be lower):	244.2	278.9
This home DOES NOT meet the overall thermal performance requirements of the International Energy Conservation Code based on a climate zone of 5B. (Section 402, International Energy Conservation Code, 2004 edition.)		

Doesn't pass performance
compliance path

	Annual Energy Cost	
	2004 IECC	As Designed
Heating:	228	244
Cooling:	105	122
Water Heating:	135	135
Lights & Appliances:	465	465
Photovoltaics:	0	0
Service Charge:	120	120
Total:	1053	1086
This home DOES NOT meet the annual energy cost requirements of Section 404 of the 2004 International Energy Conservation Code based on a climate zone of 5B.		

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Performance-Based Compliance

Change orientation, add overhangs, a little mass for tempering, and...

Passes performance compliance path!

	Annual Energy Cost	
	2004 IECC	As Designed
Heating:	228	238
Cooling:	105	78
Water Heating:	135	135
Lights & Appliances:	465	465
Photovoltaics:	0	0
Service Charge:	120	120
Total:	1053	1038
This home MEETS the annual energy cost requirements in accordance with Section 404 of the 2004 International Energy Conservation Code based on a climate zone of 5B.		

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Performance-Based Compliance

Or, add active solar system for dhw, and...

Passes performance!

	Annual Energy Cost	
	2004 IECC	As Designed
Heating:	228	255
Cooling:	105	144
Water Heating:	135	19
Lights & Appliances:	465	465
Photovoltaics:	0	0
Service Charge:	120	120
Total:	1053	1002

This home **MEETS** the annual energy cost requirements in accordance with Section 404 of the 2004 International Energy Conservation Code based on a climate zone of 5B. In fact, this home surpasses the requirements by 16.7%.

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Conclusions

1. Even with A/C efficiency increase in 2006 IECC, total energy use and cost increases compared to 2003 IECC
2. 2004 IECC has a much improved performance compliance path -- rule base for analysis is more complete
3. Performance compliance path provides homebuilders and designers with greater design flexibility

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