



FLORIDA SOLAR ENERGY CENTER®

Creating Energy Independence

Why Doesn't 25 Years of an Evolving Energy Code Make More of a Difference?

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***Session 4D: Perspectives on Implementing National - State and
Utility Policy***

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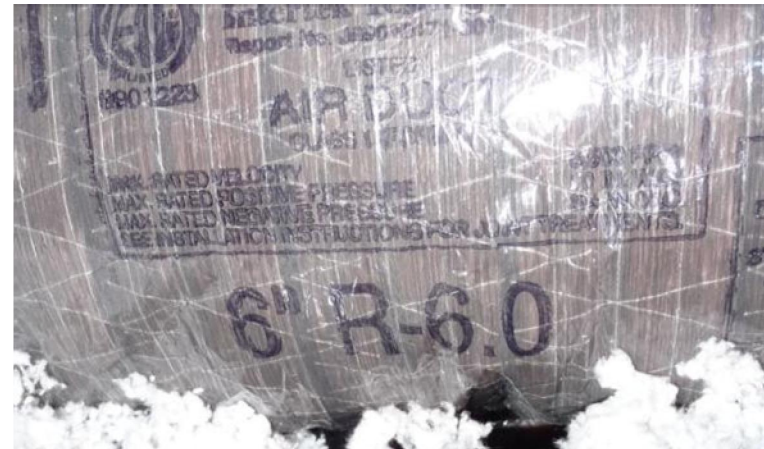
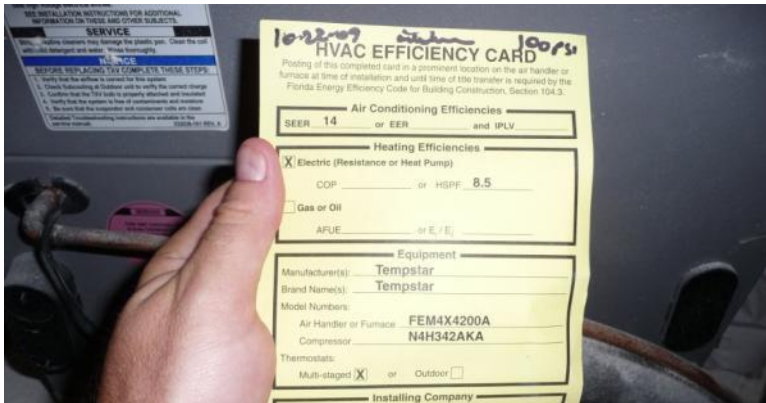
Where Did the Savings Go?

- Residential 1985 FL Code era “Old” vs 2010 era “New”
- Simulation 50% savings vs measured 7%-13% savings



Simulation (Fairey, 2009) compared as-built min. code efficiency “old” to “new”.

Detailed Energy Audits Completed, Energy Use and T & RH Monitored



“Old Home” vs “New Home”

Envelope Efficiency (as found 2011)

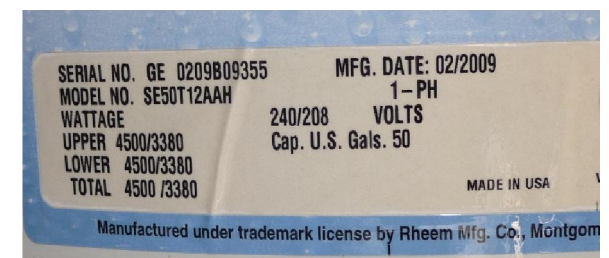
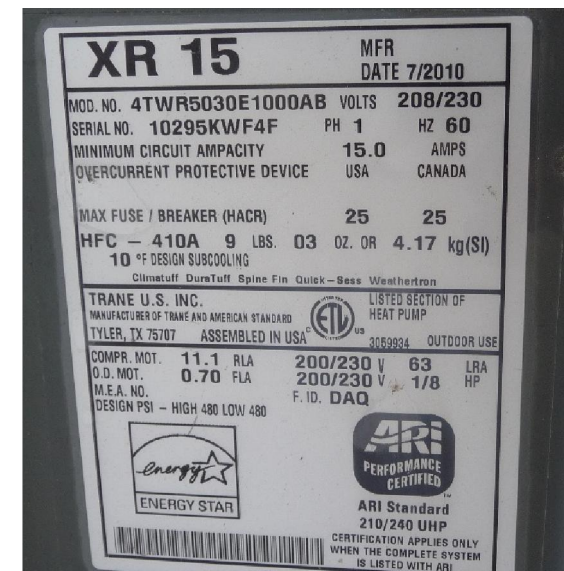
	Averages	
	New	Old
Stories	1.1	1.1
Floor Area [ft ²]	1,829	1,833
Volume [ft ³]	16,137	15,305
Attic Insulation [R]	31	24
Single Pane Window [ft ²]	29	197
Double Pane Area [ft ²]	182	59
Infiltration (ACH50)	5.6	9.1



“Old Home” vs “New Home”

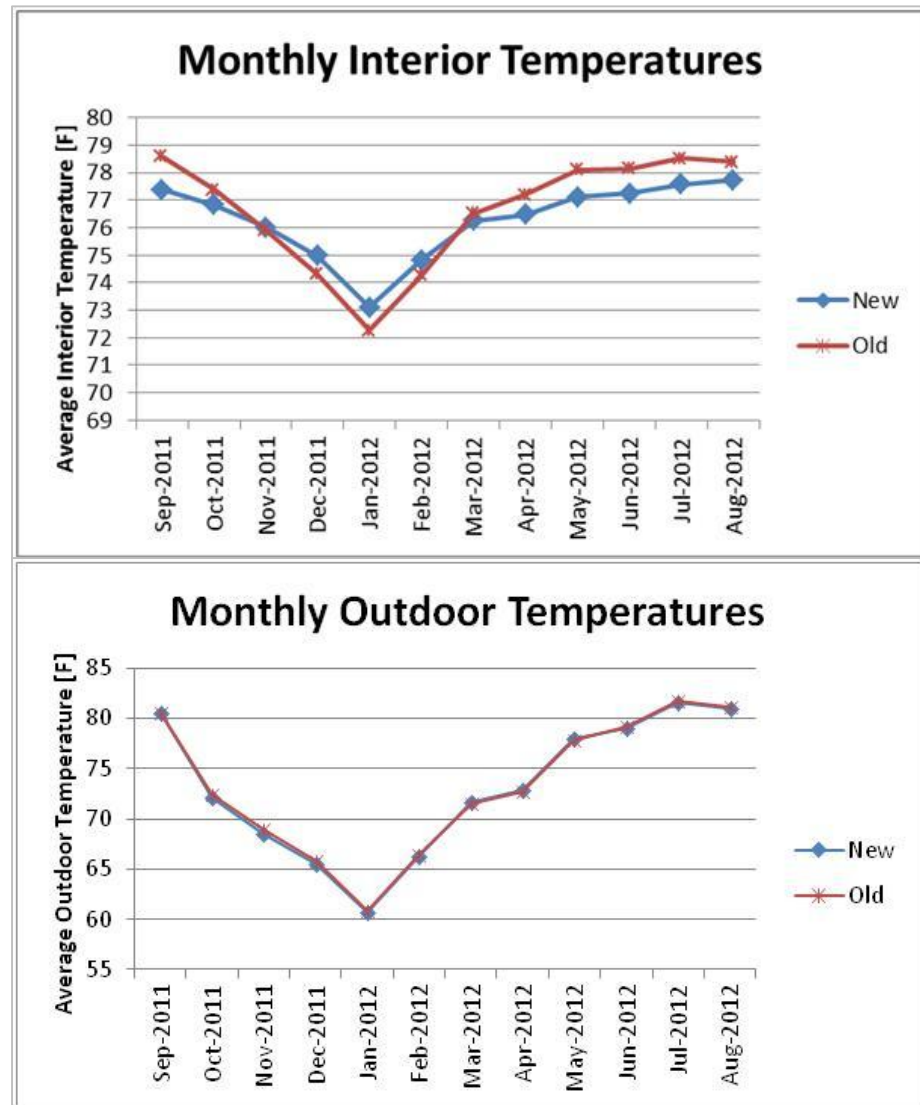
Equipment Efficiency (as found 2011)

	Averages	
	New	Old
A/C Efficiency [SEER]	14.1	12.9
Electric Heat Pump [HSPF]	8.3	7.6
Electric Water Heater Efficiency	0.92	0.92
Gas Water Heater Efficiency	0.66	0.64
Number of Ceiling Fans	3.3	4.1
% Fluorescent Bulbs	26	13



“Old” vs “New” Indoor Temperature

Is there any behavioral aspect to indoor temperature set-point differences?



What Happens if Adjustments Are Made to the Simulation?

- Simulation inputs were modified to account for average “as-found” qualities in old code and new code homes in study.
- Equipment efficiency
- Interior summer temperatures
- Baseline loads*
 - Old code study homes 13% lower than New.

**energy use other than space heat/cool or DHW energy*



What Happens if Adjustments Are Made to the Simulation?

- Simulation adjustments result in only 9.4% savings (instead of 50%).
- Adjustment results are much closer to the annual measured savings of 7%-13%.



Where Did the Savings Go?

Old home behavior related impacts?

- Replaced old appliances with more efficient options
- More conservative heat & cool setpoints
- Added ceiling insulation
- Used less baseline energy
- Some window replacement.



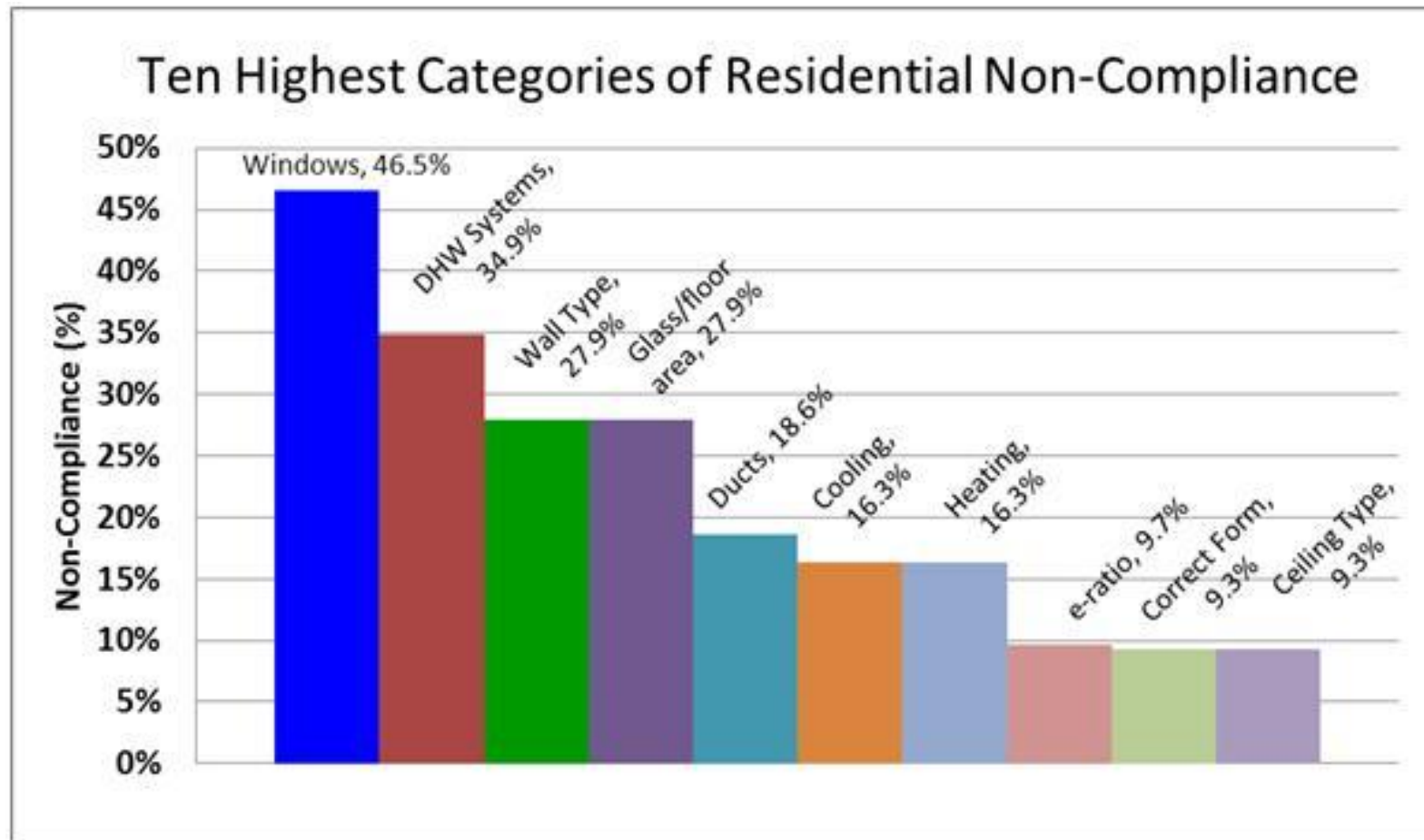
Impact of Non-Compliance in New code Homes

New code compliance 90%.

(minimal impact ~ 1% energy impact in Florida study)

Example: DHW EF 0.90 instead of EF=0.92

Florida 2009 Code Compliance



Some Influences on Implementation of Energy Efficiency/Conservation

- Increased awareness of benefits
- Increased energy cost
- Utility conservation programs and tax incentives
- Federal mandated minimum appliance efficiency standards
- Technological advances in efficiency

Parting Comments

- Energy codes have had significant impacts.
- They have long-term impacts for years, but limited impact in total energy use.



Parting Comments

- Energy codes only address legal minimal levels of efficiency in new construction.
- Homeowners are improving efficiency of older homes, however it occurs over long periods of time.



Thank You

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Search publications at:

escholarship.org

“Why Doesn't 25 Years of an Evolving Energy Code Make More of a Difference?”

By C. Withers Jr. and R. Vieira 2015.

www.fsec.ucf.edu

“A Comparison of Homes Built to the 2009 and 1984 Florida Energy Codes”.

By C. Withers, et. al 2012. FSEC-CR-1934-12

