



2015 Austin Energy Code

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Energy Code Overview

- What code affects (and doesn't)
- Review of ZECH task force
- Review of prior code development cycles
- Elements of the 2015 energy code
- Costs and benefits
- Looking beyond the 2015 code
- Commercial energy code



What code influences . . .

- Envelope thermal performance (R, U)
- Amount, distribution of glazing
- Building orientation
- Shape of the structure
- Space conditioning system performance
- Lighting
- Ventilation
- Exhaust fan efficacy
- Hot water distribution



What code DOESN'T influence

- Space conditioning system efficiency (at least, not directly)
- Water heating efficiency
- Appliance efficiency
- House size (not directly)
- Occupant behavior (for the most part)



Current Code

- Austin is currently under the 2012 IECC with local amendments aimed at a 10 – 15% improvement in efficiency
- Differences between published code and Austin's:
 - Opaque wall R/U
 - Lighting
 - Testing
 - Radiant barrier
- Austin allows limited envelope/mechanical tradeoff under Section 405



Net ZECH Task Force

- 2007 report set us on the path
- Developed the 2006 Austin Energy Code
- Made recommendations for subsequent code cycles
- Most of those recommendations have been incorporated into the code
- Anticipated improvements in space conditioning, water heating, appliance efficiency
- Worth noting – code has been built on the foundation of Austin Energy Green Building

“A home energy efficient enough to be net zero with addition of on-site or equivalent energy generation. Approximately 65% more efficient than a home built to the 2000 Austin Energy Code.”





2006 Austin Energy Code

Code Year	Measures
2006	Comprehensive Testing – Sampling allowed
	75% high efficacy lighting
	Roof radiant barrier or reflective roof
	R8 duct insulation
	MERV 6 AHU filter
	Water heater timers (electric)
	HVAC sizing



2009 Austin Energy Code

Code Year	Measures
2009	R15/R13+2 Opaque wall
	.30 SHGC/.51U fenestration
	Envelope metric changed
	Air barriers, attic bulkhead
	90% high efficacy lighting
	DWH piping insulation
	DWH circulation systems
	Sampling retained for MF



2012 Austin Energy Code

Code Year	Measures
2012	.25 SHGC/.40U fenestration
	Limited tradeoff of fenestration U and SEER
	HVAC system - 4 cfm/100sf CFA
	Envelope - 5ACH ₅₀
	Mechanical ventilation required
	Increase in Fed. efficiency minimums for space conditioning and water heating (April 2015)



What we've accomplished . . .

- Right sizing of cooling systems, more efficient envelopes, higher equipment efficiency and system testing has cut space cooling Kw and Kwh by almost half.
- Space heating energy has been reduced substantially
- High efficacy lighting has reduced lighting energy by around 75%
- More efficient plumbing fixtures and appliances have reduced water heating energy by 30%



Some observations

- Multi-level houses are more efficient than one-story houses
- Smaller houses use less energy overall, but have a greater energy density
- As the envelope (walls, windows) is made more efficient, savings from higher efficiency space conditioning shrinks
- Fenestration U below .40 makes a difference in heating, much less in cooling
- As we reduce energy required for space conditioning and lighting, occupant associated energy (water heating, cooking, appliances, ventilation) becomes more dominate
- Energy for water heating lacks persistence – the energy is lost upon use



Some challenges . . .

- HVAC efficiency set by Federal rule – pre-empted from prescriptively requiring higher efficiencies
- Same for water heater efficiency
- Plumbing code dictates 1st hour recovery – i.e., volume + energy input
- Construction costs
- Market
- Small house vs. large house
- Impact of natural gas on net zero goal
- Immutable laws of physics



2015 Austin Energy Code

- Improve envelope U, glazed SHGC for new construction
- Tradeoff envelope performance and mechanical system efficiency, but maintain a floor on wall & window performance
- Establish baseline EUI (energy per sqft) for either entire house or for cooling/heating
- Improve envelope & mechanical system tightness
- ECM (efficient, variable speed) air handlers
- Maximum wattage for water heating (some applications)
- Unvented attics (mechanical in thermal envelope)
- 100% high efficacy lighting
- Testing of mechanical ventilation



Costs and Benefits

- Many custom and some production builders are at or exceeding the anticipated 2015 code
- Cost of complying will range from \$300 -\$500 for most residential units
- Annual savings should be between \$60 and \$100 for most customers
- There will be a modest decrease in electricity demand (kW)
- Savings will depend on size of dwelling, number of occupants, whether all electric or mix of gas and electric
- Major goal of the code is a persistence in efficiency/savings over time



Further down the road . . .

- Designs optimized for efficiency
- Inverter/ductless HVAC systems
- Improved ventilation control
- Whole-house energy management systems
- Demand management
- More efficient lighting, lighting controls
- Energy storage
- Dynamic materials, assemblies



Commercial Energy Code

- Intent is to adopt ASHRAE 90.1-2013 as Austin's Energy Code
- Some amendments from 2012 code will be carried forward
- Most commercial architects, designers and specifiers are familiar with ASHRAE 90.1
- Will simplify energy reviews of commercial buildings
- Will result in greater efficiency, but difficult to quantify due to the variety of commercial buildings