FLORIDA SOLAR ENERGY CENTER®

Creating Energy Independence

Moisture and Energy Consequences of a Tight Residential Envelope

2014 FESC Workshop

May 12-13, 2014 Gainesville, FL

Rob Vieira

- Two identical side-by-side 1536 ft^2, concrete block, slab-on-grade residences
  - Single pane fenestration, evenly distributed
  - No concrete block wall insulation
  - R-19 ceiling insulation
  - SEER-13 w/strip heat HVAC systems
  - Sensible gains ≈ 15.5 kWh/day
  - Latent gains ≈ 12.1 lb H_2O/day (1st winter)

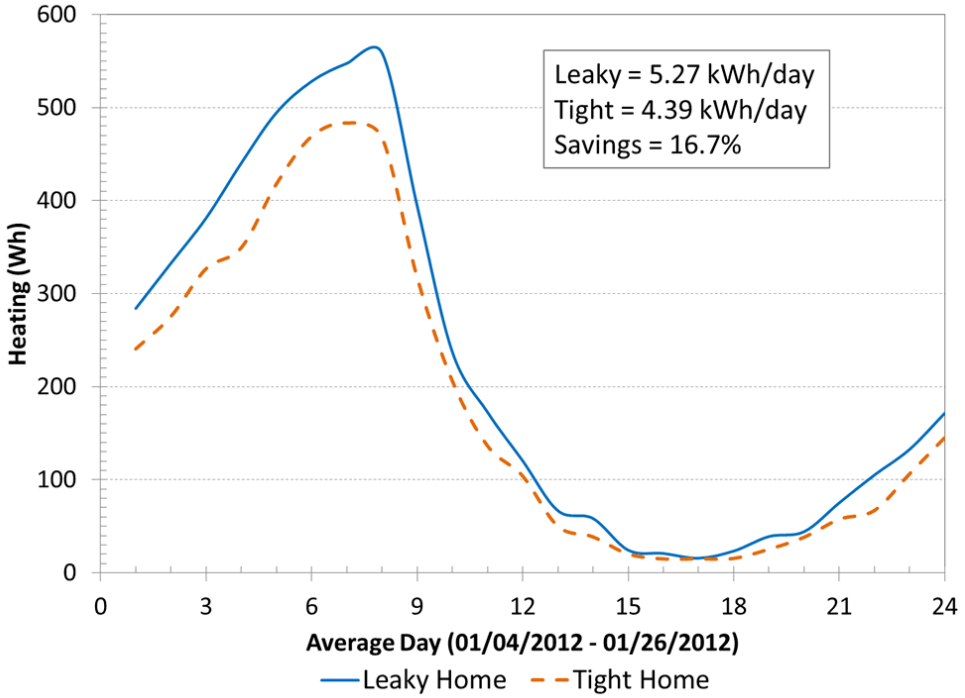
Enclosure Air Leakage Set-Up

- Both home enclosures air-tightened to achieve 2.1 ach50
- Leaky home configured with 4 controllable ceiling leakage sites providing ~70% of leakage area needed to achieve ~8 ach50
- Remaining 30% of leakage area in leaky home achieved using metal shims at all windows.

Ceiling-side port

Attic-side port

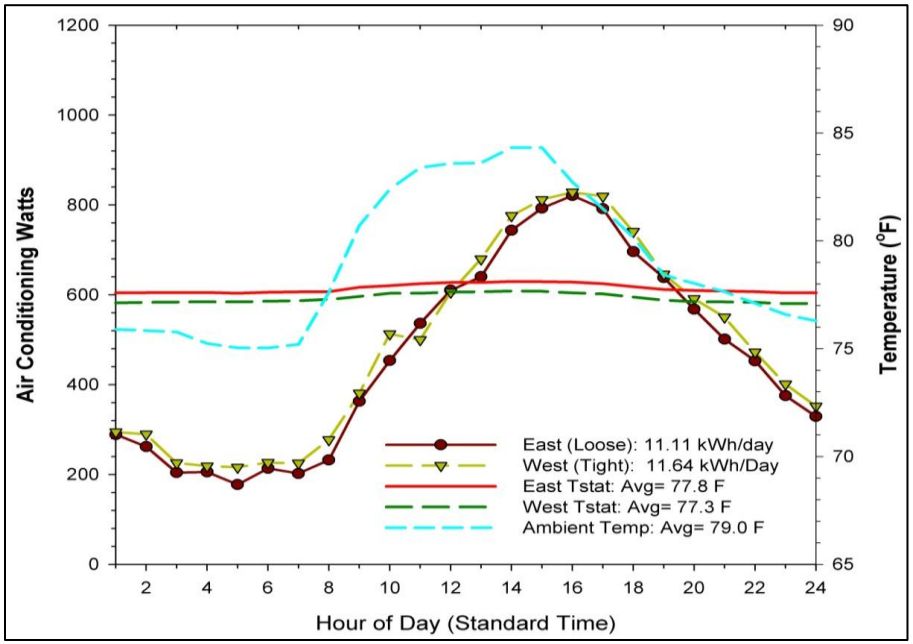
Winter Average Day Heating Energy



Winter Window Condensation Results in Mold in Tight Home

Summer Data: AC energy use October 2012; Tight house unvented and then vented

No mechanical ventilation



Supply 63cfm ventilation