

HOME ENERGY SAVINGS MYTHS AND FACTS

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September 21, 2011

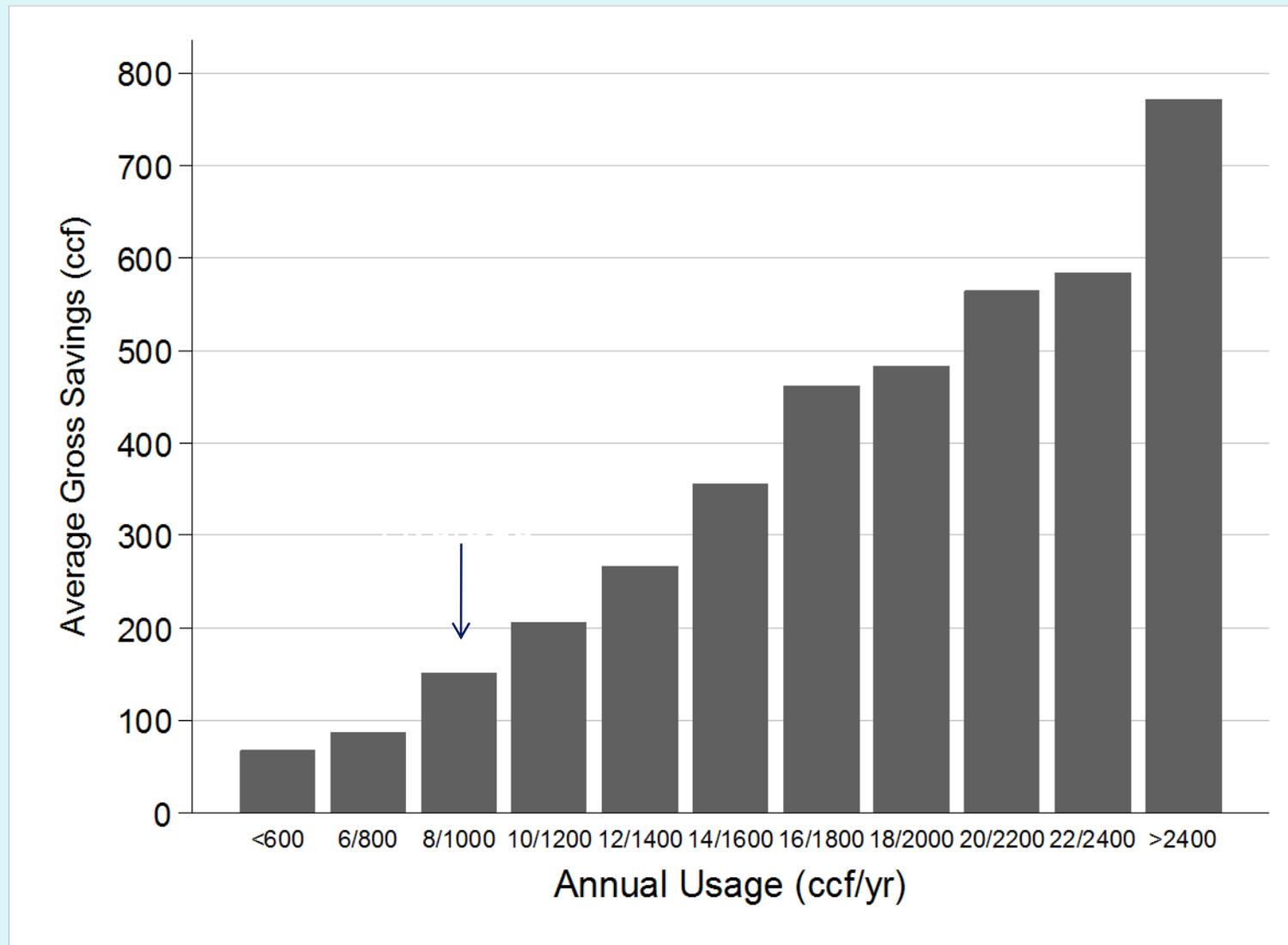
Presented by: Michael Blasnik
M. Blasnik & Associates
michael.blasnik@gmail.com

Who Needs More Energy Savings Advice?

- ◎ Lots of advice out there
 - Utility bill stuffers
 - Newspapers & magazines
 - Green group web sites and literature
- ◎ Unfortunately...it's often unreliable
 - Not many studies of measured energy savings
 - that's what I do
 - “10 simple things” ... lacks prioritization
- ◎ Prioritize and be specific

Energy Savings vs. Energy Use

Ohio Low Income (WAP 94)



Assumptions & Typical Energy Usage

- ⊙ Boston weather, old houses, gas heat & hot water
- ⊙ Boston energy prices/costs: single family home
 - Gas ~ \$1.90/therm (prices now ~25% lower)
 - Heating 400-1200 th/yr, average ~\$1500/yr
 - annual use typically 0.20 – 0.60 th/ft²
 - Hot water, dryer, stove 150-250 th/yr, \$400/yr
 - monthly use ~5 + 3-6 therms/person (compare to summer bills)
 - Electric ~ \$0.20 /kWh (prices now ~20% lower)
 - monthly use 300 – 900 kWh for lights, appliances, etc
 - \$1500/yr
 - Approximate CO₂: 1.3 lbs/kWh, 12 lbs/therm

Recipe for Energy Savings

- Lack of efficiency measures - install them
 - Insulate attics and walls
- Inefficient Stuff - replace or improve
 - Old furnaces , refrigerators, washers, lights
- Extra Stuff – unplug/remove/turn off/control
 - 2nd fridges, freezers, 24x7 computers, TVs, stereos; all night security lighting
- Defects - find and fix
 - Air seal, dense-pack cellulose, hot water leaks
- Behavior – learn/educate
 - Prioritize (after dealing with “Extra Stuff”)

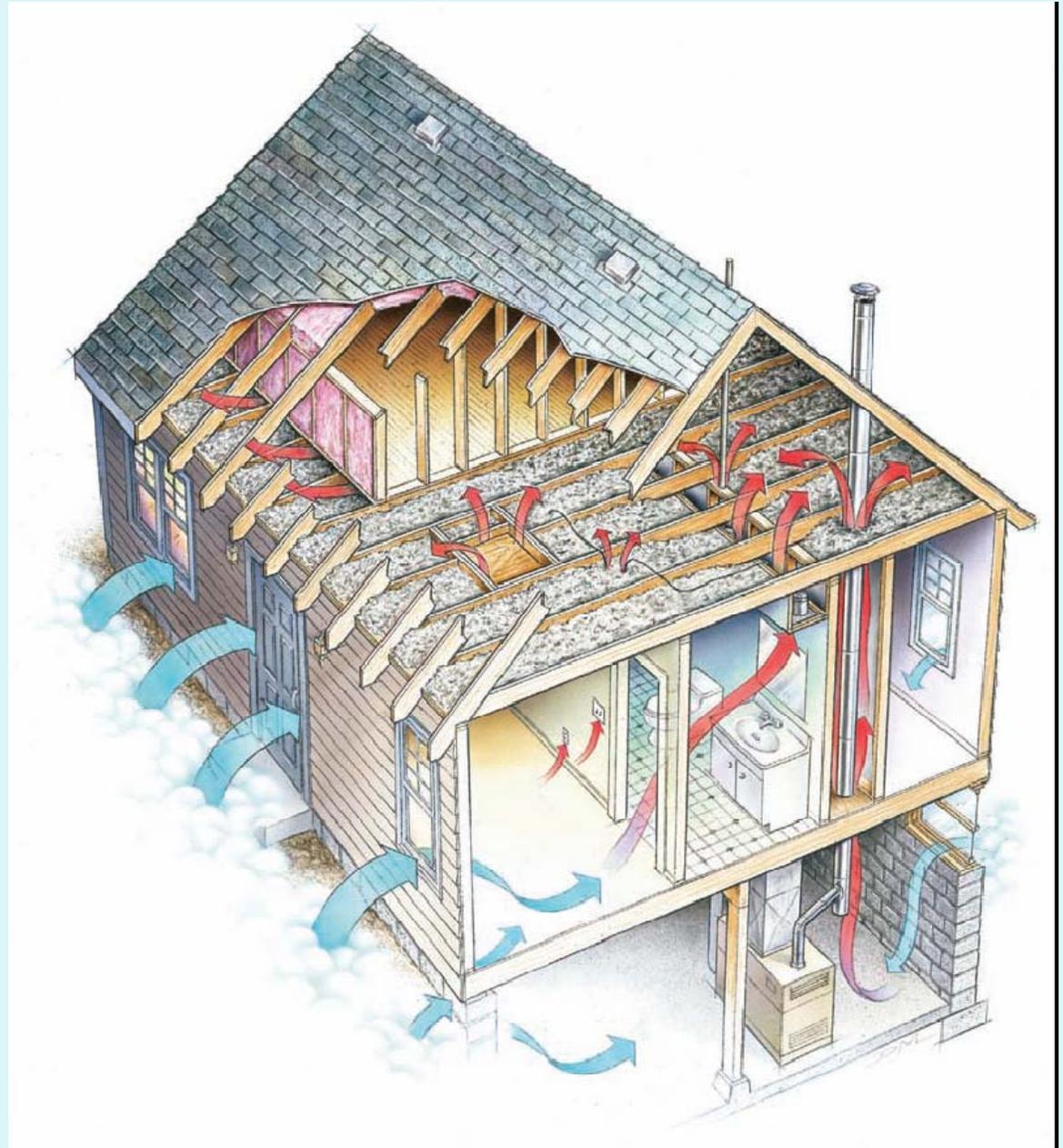
Energy Retrofit Priorities

High Priority Treatments when applicable

Retrofit	Cost	\$/yr save	lbs/yr
Insulate empty walls dense pack, 1000 ft ²	\$1,200	\$350	2200
Insulate empty attic bypass seal, 1000 ft ²	\$1,000	\$400	2600
Insulate attic: add to existing bypass seal	\$800	\$125	700
Air Seal using blower door	\$600	\$75-\$250	500-1600
- w/Strategic Dense Pack in tricky homes	\$1000	\$100-\$400	600-3000
Replace old (pre-93) fridge	\$500+	\$75-\$200	500-1600
Replace old Clothes Washer 1 load/day	\$500+	\$65-\$175 +\$100 H2O	400-1500
Replace old furnace w/92% if heat>1200 th	\$3,200	\$450+	3000+
Replace 15 bulbs with CFLs	\$60	\$75-\$150	500-1000
Security Lighting: motion detector	\$50	\$40-\$150	250-1000
Very low flow showerhead <1.8 gpm	\$25	\$10-\$40	60-250
Fix hot water leak	\$5-\$150	\$50-\$200	300-1200

Air Leakage Paths

- ⦿ Attics & basements usually 50%-75% of leakage
 - plumbing stacks
 - walls without top plates
 - ceiling height changes
 - chimneys
 - soffits
 - kneewalls
 - recessed lights
 - foundation walls
- ⦿ Windows and doors <20% of leaks



Blower Door Air Leakage Analysis

- ⦿ Measure leakage
 - before & after
- ⦿ Help find big leaks
- ⦿ Assess ventilation
- ⦿ works well with infra-red camera
- ⦿ Requires training
 - green jobs



Energy Retrofits: Lower Priorities

Retrofit	Cost	\$/yr save	lbs/yr
Insulate attic: some existing no seal (DON'T DO THIS - SEAL BYPASSES!)	\$700	\$30-\$60	200-400
Replace old furnace w/92+% avg. use	\$3,200	\$250-\$400	1500-2500
Replace old dishwasher	\$400+	\$25-\$40	200-300
Caulk/Weatherstrip Windows/Doors	\$50-\$600	\$10-\$40	50-250
Insulate basement ceiling 1000 ft ² (USUALLY A BAD IDEA)	\$1,200	\$30-\$100	200-600
Seal basement ducts unless big holes	\$50-\$600	\$0-\$50	0-500
Tankless gas water heater	\$2,500	\$60-\$120	400-800
Replace 15 old windows	\$10,000?	\$50-\$150	400-1000
Cool Roof (white roof coating on flat)	\$1,000	\$10	130
Hot Water Pipe Insulation <small>after first few feet</small>	\$20?	\$1?	?
Tune Up Gas Furnace (annual)	\$150	\$0?	0?

Energy Saving Actions: Priorities

Action Priorities, when applicable

Action	\$/yr save	lbs CO2/yr
Setback Heat 8°F, 8 hrs/day	\$75-\$140	500-1000
Turning Off Appliances vs. 24x7 operation		
- 2 nd fridge get rid of / unplug	\$125-\$400	800-2500
- Freezer get rid of / unplug	\$100-\$250	700-1600
- Computer sleep/hibernate/off vs. screen saver	\$40-\$120	300-900
- Furnace Fan ON change to AUTO	\$600-\$800	3400-5000
- TV off when not used vs. background noise	\$100-\$200	500-1300
- Stereo off when not used	\$80-\$160	500-1000
- Waterbed use quilted pad, no heat	\$150-\$200	900-1600
- Humidifier unplug – not needed in tight home	\$10-\$30	70-200
- Fans off when room is empty in summer	\$5-\$20	25-130

Energy Saving Actions: Motivated

Actions for the Motivated

Action	\$/yr save	lbs/yr
Lower Heating Thermostat 2°F	\$60-\$100	400-900
Cold Wash Laundry ½ hot loads to warm/cold	\$10-\$40	60-240
Clothesline ½ of loads, 2x savings if electric dryer	\$15-\$40	100-240
Shorter/Fewer Showers reduce by 4 minutes/day	\$20-\$40	120-240
Power Strip: Computer+	\$10-\$40	50-250
Power Strip: TV+ digital cable & satellite boxes worst	\$5-\$50	30-300
Turn off heat and close off unused rooms?	\$0-\$200+?	0-1200
Fans, drapes, etc. instead of Air Conditioning	\$20-\$200	130-1300

Energy Saving Actions: low priority

Lower Priority Actions

Action	\$/yr save	lbs/yr
Cook with lids on pots	\$2-\$10	10-60
Use carafe instead of coffeemaker warmer 1hr/day	\$5	30
Unplug cell phone charger	<\$1	7
Trivial?		
- Clean refrigerator coils	\$0-\$10?	0-70
- Use ceiling fan in winter	\$0?	0?
- Change furnace filters monthly vs. once per season	\$0-\$5	0-30
- Close refrigerator door quickly	<\$1	5
- Keep refrigerator full, add water bottles, etc.	<\$1	2
- Close Drapes on winter nights unless good seal	?	?

Summary

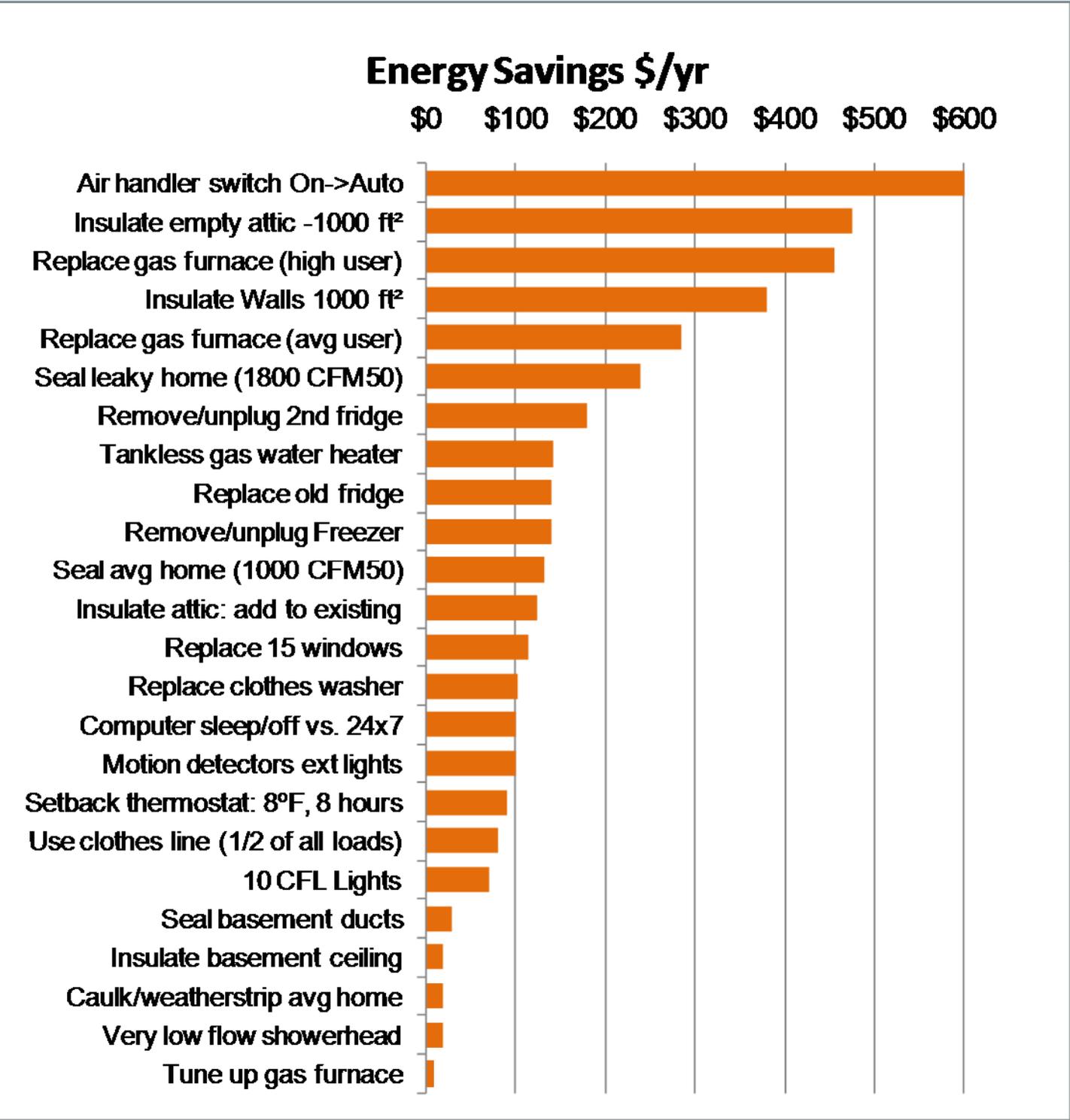
Really Works

- ⦿ Wall and attic insulation
- ⦿ Professional air sealing
- ⦿ Replacing old heating systems (esp. furnaces)
- ⦿ Unplug 2nd fridges, freezers
- ⦿ Turn stuff off – computers, TVs, furnace fans

Saves Less Than Expected

- ⦿ Replacing Windows
- ⦿ Tuning up gas furnaces
- ⦿ Insulating basement ceiling
- ⦿ Caulk and weather strip (good for DIY)
- ⦿ Replacing filters every month (vs. 2x/year)

Summary



Some Resources

- ⦿ EPA's Energy Star site
 - http://www.energystar.gov/index.cfm?c=home_improvement.hm_improvement_index
 - pretty good air sealing guide at
 - www.energystar.gov/index.cfm?c=diy.diy_index
- ⦿ Affordable Comfort Inc.
 - national & regional conferences for efficiency contractors, researchers, and policymakers
 - www.affordablecomfort.org many handouts from conferences available free
- ⦿ Home Energy Magazine
 - www.homeenergy.org
 - good archive of older articles on wide variety of topics
 - look up your refrigerator's rated usage at
 - <http://www.homeenergy.org/consumerinfo/refrigeration2/refmods.php>
- ⦿ ACEEE (American Council for an Energy-Efficient Economy)
 - Technical resource and advocacy group
 - www.aceee.org/consumerguide/
- ⦿ Advanced Energy (North Carolina)
 - good building science knowledge library, but southern orientation
 - www.advancedenergy.org/buildings/knowledge_library/index.html
- ⦿ Building Science Corporation (Westford, MA)
 - Extensive info about how houses work, how they fail, how they should be built, etc..
 - www.buildingscience.com