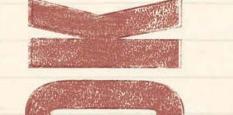
# **HOME ENERGY SAVINGS**













### Comfort ADVANTAGE

Comfort Advantage<sup>®</sup> represents energy efficiency programs, product efficiency standards, other energy information and home services provided by your local electric power association. The goal of the Comfort Advantage Program is to partner with members, so they may receive the most value from each energy dollar while enhancing comfort and quality of life.

## HOME ENERGY SAVINGS HANDBOOK

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### **MEASURING ELECTRICITY**

### WHAT'S A KILOWATT-HOUR?

Just as you purchase gasoline by the gallon and vegetables by the pound, you pay for electricity by the kilowatt-hour (kWh). Your monthly bill indicates the number of kWh used in your home during the billing period. The national average cost of the residential kilowatt-hour is 11.55 cents (2009). Of course your cost may be different and will vary with the amount of use each month.

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To calculate the number of kilowatt-hours used by household equipment, find the number of watts on the label or nameplate and determine the hours of operating time. Remember that some appliances, like an oven element, cycle "on" and "off".

### (Watts\*\* x Hours) divided by 1000 = Kilowatt-hours

1 kWh used for each:100-watt light bulb used for 10 hours13-watt compact fluorescent light bulb for 77 hours3-ton air conditioner\* for 22 minutes1 HP Swimming pool pump\* for 48 minutesPersonal computer\* sleep mode for 33 hours

- \* Use varies with equipment efficiency.
- \*\* If wattage is not listed on an appliance nameplate or label, multiply amps x volts to get an estimate of wattage for most household equipment.



### **HOME ENERGY USE**

Appliance:	Avg. Month	ly kWh Use:		
Refrigerator / Freezer (i	n conditioned space)			
1992 model; 21	cubic ft.	107		
2000 model; 21	cubic ft.	71		
2010 model; 21	cubic ft. ENERGY STAR® purchase	34		
Freezer				
1992 upright; 2	1 cubic ft.	123		
2010 ENERGY S	STAR® upright	57		
1992 chest; 21	cubic ft.	77		
2010 chest; 21	cubic ft. ENERGY STAR® purchase	37		
Clothes Dryer				
8 loads/week		146		
Clothes Washer				
front load – 8 lo	oads/week (cold water)	20		
top load – 8 loa	ads/week (cold water)	56		
Dishwasher				
4 loads per wee	ek	42		
Cooking				
Oven		69		
Electric cook to	q	36		
Microwave Ove	en (1/4 hr/day)	11		
Slow-Cooker (8	hrs/day 5 days)	12		
Water Heater, resistance storage		300 - 450		
Heat Pump Water Heater		142		
Pool Pump (1 HP - 12 hrs per day)		455		
Hot Tub (32 hrs per mon	th)	192		
Ceiling Fan (12 hrs per d	ay)	44		



### **ENERGY QUICK TIPS**

### **HEATING / COOLING:**

- Seal duct joints with mastic. See pages 12-17.
- Install a programmable thermostat to lower energy use while you sleep or while you are away.

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- Replace or clean filters on central systems at least once a month.
- Make sure that the return air filter grille is large enough. The return filter grille size for an average three-ton system should be around 600 square inches total or more. A high noise level at the return grille indicates restricted air flow.
- Undercut interior doors to allow air flow between rooms.
- Use kitchen and bath exhaust fans for excess moisture removal. Turn off when not needed. These fans can remove all of the conditioned air in a house in an hour, so limit use.
- Shade the outside unit of your air conditioner by planting trees or shrubs. Do not block air flow.
- Install ridge and soffit ventilation in unconditioned attics.
- Install a continuous vapor barrier (6 mil polyethylene) on the ground of the crawl space under your home
- Close the damper on fireplaces that are not in use.
- Wear seasonal clothing indoors to reduce heating and cooling needs.
- Lower the thermostat setting in winter and raise the temperature setting in summer.

# CARENARD

### **APPLIANCES:**

- Use small appliances and microwave ovens for the most efficient cooking.
- Use the cold water cycle on your clothes washer.
- Wash and dry full laundry loads.
- Check to see that the dryer vent exhausts to the outside and is not blocked by lint

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### • Clean the lint filter in the dryer with each load.

- Close the refrigerator or freezer door over a dollar bill. If the dollar bill slips out easily, the door seal may need to be replaced.
- For manual defrost freezers, defrost when ice builds up more than 1/4 inch.
- Use the air-dry cycle on your dishwasher or open the door after the rinse cycle is complete.

### **POOLS & SPAS:\***

- Use a pool cover and open it completely when pool is in use. Use a programmable timer to turn pool pumps "on" and "off" for many short periods each day. Total daily "on" time will be less than six hours for many pools.
- Keys to lower pool energy use are minimal pump size (3/4 horsepower or smaller for most residential pools); a high efficiency pump; a large filter rated at 50% higher than pool's design flow rate; and short lengths of large diameter pipes while avoiding 90 degree elbows.
- For heated pools, use a heat pump water heater or geothermal system. Every one degree temperature reduction can save 5-10% of pool heating energy.
- Use a marine-grade, heat-sealed, R-14 spa cover that latches snugly when the spa is not in use. Water-logged covers waste energy. Use a floating thermal blanket.

\* This does not necessarily apply to jetted bath tubs that are drained with each use.



### **PURCHASING HEATING / COOLING EQUIPMENT:**

- For the most efficient heating/cooling and water heating technology, purchase an ENERGY STAR<sup>®</sup> geothermal system. The higher the EER (Energy Efficiency Ratio) and the COP (Coefficient of Performance), the more efficient the system.
- Purchase an ENERGY STAR® air-to-air heat pump or central air conditioner with a high Seasonal Energy Efficiency Ratio (SEER) for lower summer cooling costs. SEER range from 13 to around 20. Your new air-to-air heat pump should have a high Heating Seasonal Performance Factor (HSPF) for lower winter heating costs. HSPF ranges from 7.7 to around 10.7. Some ductless split systems have even higher efficiency ratings.

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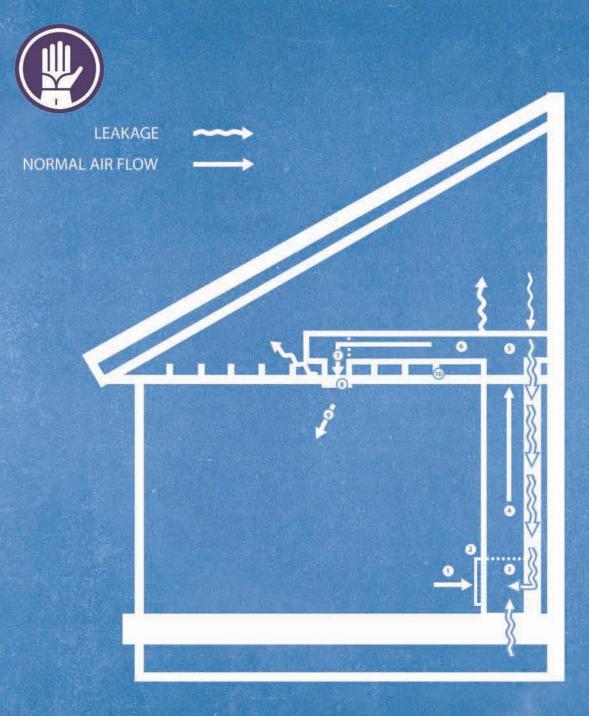
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- If replacing a central air conditioner in a gas heated home, consider a high efficiency dual fuel or piggyback heat pump instead.
- Avoid installing the indoor air handler unit in the attic. Attic air handlers can waste at least 10% to 25% of heating/cooling energy.

### PURCHASING WINDOWS, SOLAR SCREENS AND KITS:

- Check your local building supply store for low-cost interior storm window kits. Note the child safety hazard for non-rigid plastic films. Consider rigid plastic.
- Consider placing solar screens on existing windows for summer shading.
- Purchase windows with the ENERGY STAR<sup>®</sup> label including a designation for southern (coast) or south central climates. Some windows are designed to flip sides for different seasons.
- For southern climates, a window with a low Solar Heat Gain Coefficient (SHGC), is recommended (.27 SHGC). Ratings should appear on the National Fenestration Rating Council (NFRC) window label. If not, the window may not be officially rated.
- A low window U-factor is important for winter energy performance. (less than or equal to .30 is recommended for north Mississippi. A .35 or less U-Factor is a good choice for south Mississippi.)
- Shop for a high Visible Transmittance (VT) rating for allowing visible light to enter the window. A VT below .5 is usually unacceptable to most people.
- Buy a window with low Air Leakage (AL) Rate, .1 or .2.
- To avoid condensation, look for a high Condensation Resistance rating. Ratings range

from 0 to 100.



1 = RETURN AIR 2 = RETURN AIR GRILLE 3 = RETURN AIR CHAMBER 4 =AIR HANDLER 5 =PLENUM 6 =MAIN SUPPLY DUCT 7 =SUPPLY AIR DUCT 8 =SUPPLY AIR REGISTER 9 = SUPPLY / CONDITIONED AIR 10 = CEILING JOIST



Duct Sealing continued...

### Safety: Hire a duct contractor or "do-it-yourself"?

If there are gas appliances or gas equipment in your home, only a professional should perform duct sealing. Hiring a qualified heating and cooling contractor for diagnosing duct leakage or sealing ducts is the safest course of action. However, for electric-only heating and cooling systems, a skilled do-it-yourselfer, who has knowledge of heating and cooling systems, may decide to tackle the job. Regardless of whether you do it yourself or hire a contractor, check out "Online Energy Resource Guide" on pages 28-29 for more information. If you don't have access to the Internet, go to your local library and ask someone to print the online information for you.

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As another safety precaution, very old duct insulation and tape may contain asbestos, a cancer-causing agent. A qualified expert can identify asbestos and can proceed with the safest course of action. Only contractors licensed to perform asbestos abatement activities should undertake its repair, removal, or sealing. Do NOT attempt do-it-yourself work on materials containing asbestos.

A qualified duct diagnostics professional can use special equipment, a duct blaster or a blower door, to determine the amount of duct leakage. If leakage is obvious without testing, you can opt to skip the testing and start the duct sealing process. The technician who performs the sealing work should have been trained at a duct diagnostics/repair school.

> Check ducts for leakage. May need to hire a qualified contractor. DON'T FORGET!



### **Duct Sealing Materials:**

• Non-toxic fibrous mastic, a "gooey" paste, can be applied with a brush, trowel or gloved hand on either sheet metal or flexible duct joints. The mastic label should indicate adherence to UL-181 standards and specified for duct sealing on your duct type. Water-based products may offer benefits, as worker exposure limits are noted on the material safety data sheets (MSDS). Read directions.

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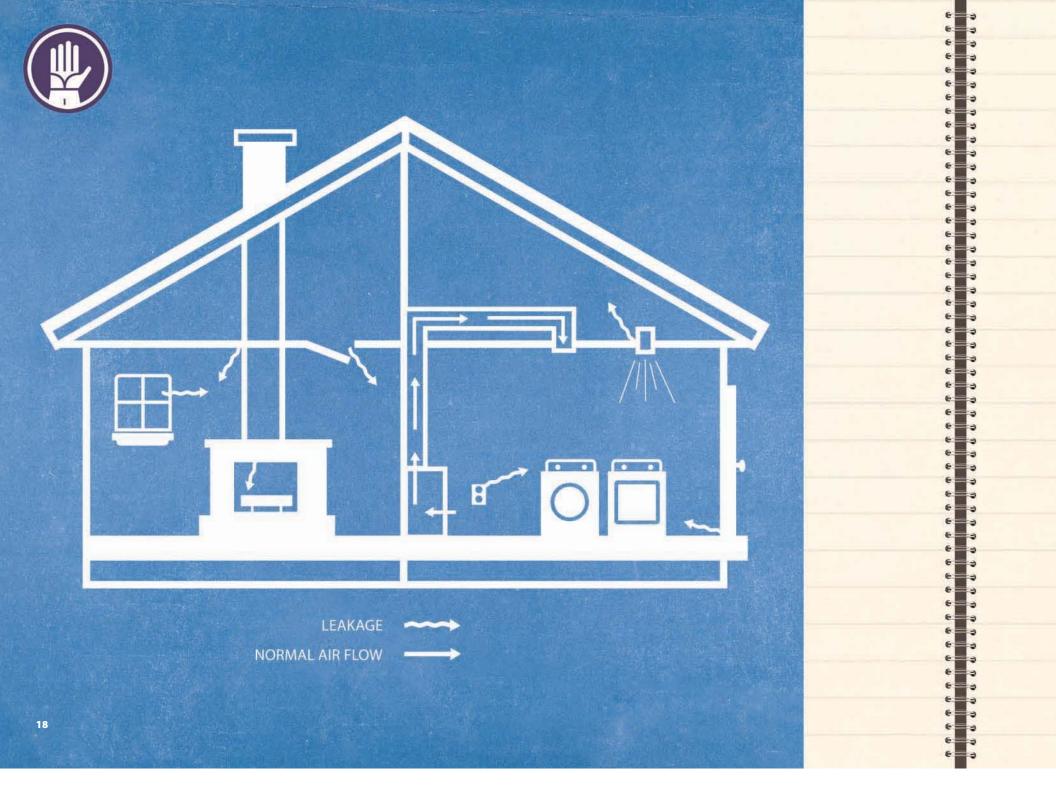
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- Fiberglass mesh tape / webbing for ducts is used as reinforcement for mastic on wide gaps. Read directions and apply to clean surface as directed by manufacturer.
- UL-181 Foil Backed Mastic Tape NEVER use the silver grey cloth duct tape for sealing ducts. UL-181 foil backed mastic tapes may be used, but may not seal as tightly or as long as "gooey" mastic. These tapes are more convenient, require no clean-up, and most produce almost no volatile organic compounds (VOC). Tape use could be limited to accessibility areas such as air handler cabinet exteriors.
- Gloves and/or brush to apply mastic
- Cleaning supplies as designated by mastic manufacturer
- Face mask for working near fiberglass or some other insulations
- Work gloves and knife for removing fiberglass insulation
- R-6 to R-8 duct wrap insulation with vapor barrier to replace any damaged insulation





### **Air Sealing Materials For Existing Homes:**

• **Caulk** can be used for gaps less than .25 inch. Select caulk with a 25-year life based on needs, such as high temperature, mildew resistant, indoor / outdoor application or fire-resistant. Acrylic latex with silicones, silicone, or urethane caulk are acceptable. Rope caulk or backer rod may be used with some applications. Some caulks can not be painted.

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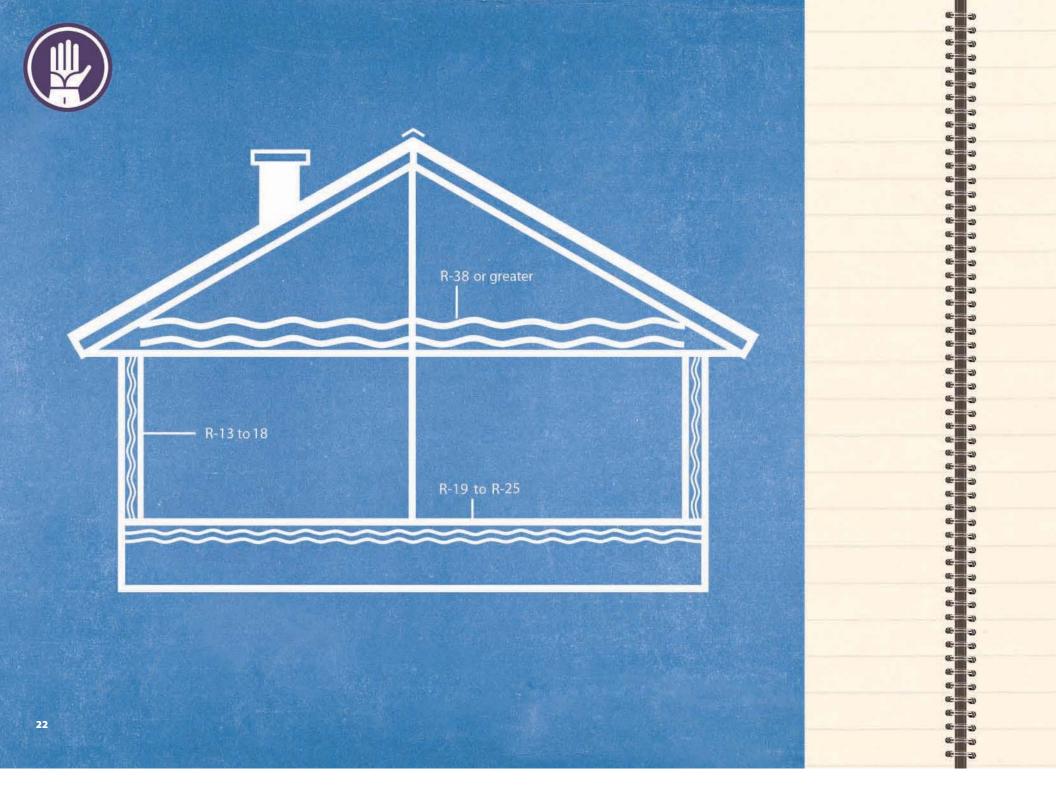
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- **Spray foam** will expand to fill large cracks and small holes but is not recommended near heat sources or flammable applications. Some low-expanding latex-based foams clean up with water.
- Weather-stripping can be used to seal doors, windows, attic access openings, and knee wall access openings. Door sweeps and thresholds are also necessary.
- **Polyethylene plastic**, drywall or rigid foam may be used for specific problem areas. Seams should be sealed with caulk or foam. (Sheet metal may be used with high temperature caulk to seal around chimney flues.
- Special gaskets are designed for use on electrical outlets and switches.
- Interior storm window kits for leaky windows may be needed.
- A caulk gun and a putty knife will be needed.

### **Home Air Sealing To-Do List**

- Weather-strip windows, doors, ceiling attic access openings, and knee wall openings to the attic.
- Install a tight latch and insulate attic access openings and knee wall openings.
- Install a door sweep and a threshold at the bottom of each exterior door.
- Clean old dried caulk, apply new caulk from the crack between the outside window/door frames and the
- exterior wall. Apply new caulk to cracks less than .25 inch. For larger cracks use foam backer rod rope caulk to fill the gap, then cover with caulk.
- Caulk cracks where inside window/door frames meet interior walls.
- Install low cost interior storm window kits on leaky windows (See Purchasing Windows).
- Seal any plumbing or electrical penetrations through walls, top-plates (the horizontal top

framing on interior and exterior walls), floors, and ceilings.





Insulation continued...

**Cellulose:** R-Value = 3.4 to 3.8 per inch. Cellulose, which is made from recycled newspaper, can be blown dry into existing wall cavities or blown damp into open wall cavities. Boric acid, an additive in cellulose insulation, increases fire resistance, repels insects, and helps prevent mold growth. For experienced "do-it-yourselfers", installing cellulose in the attic may be a manageable task. However, wall blown cellulose is a job for a professional insulation installer. Cellulose should be blown at a density of around 3 to 3.2 pounds per cubic foot so that it doesn't settle in walls, and so that it helps control air leakage. When comparing bids from insulation contractors, ask how many bags will be installed. Ask about how many pounds of insulation are in each bag. Many consumers refer to the coverage chart on the bag label and count the number of bags as they are installed.

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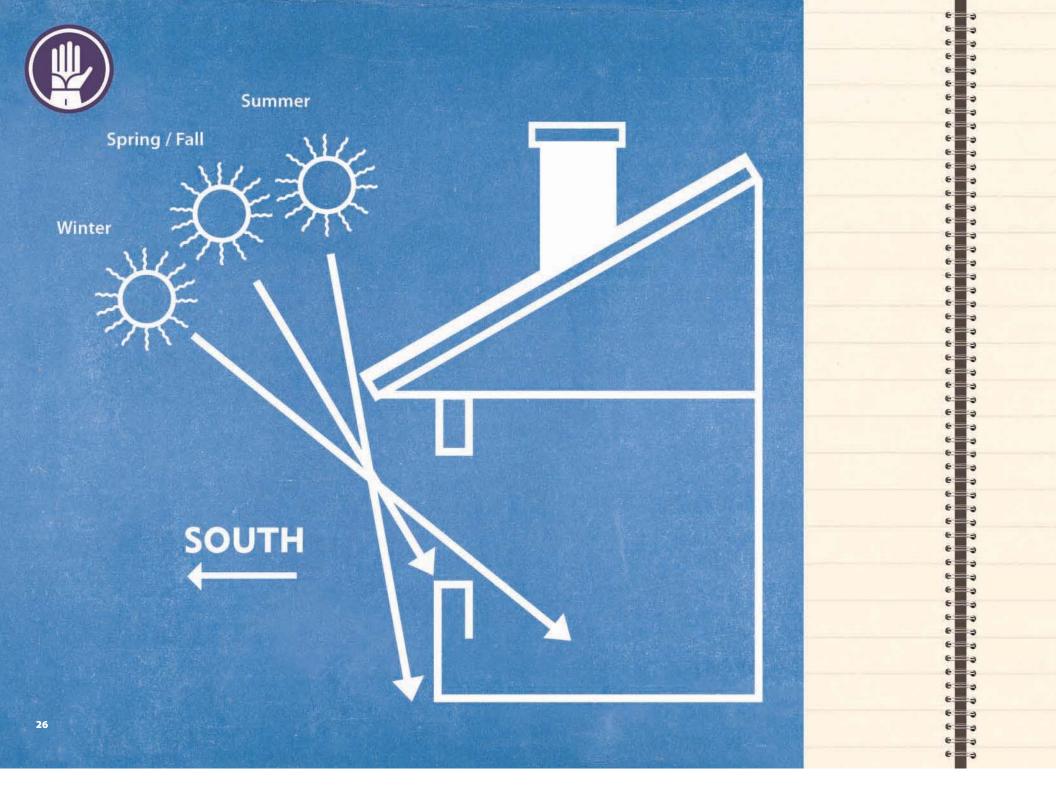
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**Fiberglass:** R-value for batts = 3.1 to 4.3 per inch. Fiberglass batts can be installed by an experienced do-it-yourselfer. Manufacturer instructions must be followed because compression of batts will cause a reduction in R-value. For blown insulation, see the R-value charts on insulation bags. Be sure to measure R-value by the number of bags installed per 1000 square feet of attic floor, because blown insulation can fluff and settle. Fiberglass insulation provides little reduction in air leakage, but when combined with extensive air sealing can be very effective. Gloves, a respirator, and protective clothing must be worn by the installer, because loose fibers may irritate skin and can present a respiratory health risk.

**Spray-in-place foam:** R-Value is 3.4 to 7.0 per inch Spray-in-place foam insulation is now becoming more common in the southeastern United States. Foams have high R-values for insulating, and have excellent air sealing properties. However, spray-in-place foam must be professionally installed and is more expensive. The sealed attic concept, spraying foam on rafters and wall ends of an enclosed, air sealed attic, rather than on the floor of a vented attic, has become a common application. Flammability and combustion characteristics of foam products vary according to the chemical formulation, combustion temperature, and available air. Many fire codes require a fire barrier covering over foam insulation, such as .5 inch gypsum wallboard.





### **ONLINE ENERGY RESOURCE GUIDE**

### **General Efficiency**

- ENERGY STAR<sup>®</sup> Energy Efficiency Information- Homes & Products: http://www.energystar.gov
- Whole-House Energy Calculator From Lawrence Berkley Lab: http://www.homeenergysaver.lbl.gov/
- Tax Incentives for Energy Efficiency Purchases: http://energytaxincentives.org
- Appliance Selection and General Energy Information: http://www.eere. energy.gov/consumer/
- Home Air Sealing Energy Star: http://www.energystar.gov/ia/partners/ publications/pubdocs/DIY\_Guide\_May\_2008.pdf
- Residential Energy Services Network Home Energy Ratings: http://www1.resnet.us/ratings/overview/default.htm
- Home Energy Guide: http://www.aceee.org/consumer/consumer.htm
- Air Pressure Balancing In Homes: http://www.buildingscience. com/documents/information-sheets/hvac-plumbing-and-electrical/ information-sheet-transfer-grilles-and-ducts/; or page two of http://www. northwestenergystar.com/downloads/Pressure\_Releif\_MPV\_v1.1.pdf
- Combustion Safety:

http://www.habitat.org/env/pdf/combustion\_saftey.pdf

### **Heating and Cooling**

 Duct Sealing "How-To": http://www.doityourself.com/stry/ airleaksduct; or http://www.energydesignedhomes.com/Papers/ DuctSealing.pdf or http://www.energystar.gov/index.cfm?c=home\_ improvement.hm\_improvement\_ducts 3

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• Geothermal Heat Pump Consortium: http://www.geoexchange.org

### Windows

• Window Overhang Calculator: http://www.susdesign.com/tools.php See Window Tools/Overhang Design

**For calculator entries:** Latitude for Gulfport, MS is 30 degrees North; Jackson 32 degrees N; Greenwood 33 degrees N; Tupelo 34 degrees N. Longitude ranges from western MS at 91 degrees West to eastern MS at 88 degrees West.

- Window Selection and Benefits: http://www.efficient-windows.org/ homesexisting\_guidance.cfm
- Window Solar Films: http://www.fsec.ucf.edu/bldg/active/ fenestration/ResOptions/films.htm

### **Other Energy Resources**

Home Energy Magazine; 250 Addison Street Suite 211B Berkeley, CA 94704 - Phone: (510) 524-5405 http://www.homeenergy.org/

Consumer Guide to Home Energy Savings-American Council for an Energy-Efficient Economy http://www.aceee.org/consumerguide/ ; 250 Addison Street Suite 211B Berkeley, CA 94704 | Phone: (510) 524-5405



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