Do-It-Yourself Energy Efficiency Projects eBook

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Do-It-Yourself Energy Efficiency Projects

Many people struggling through the tough economy are not going to be able to take advantage of the 2009-2010 Energy Efficiency Tax Credit simply because they can't afford new windows and doors, water heaters, or more insulation. However, there are a few things you can do around your home to air seal it to save money during the winter months and during the summer.

Because of the price and use of energy, architects and builders now design a home to be a "thermal envelope". This is the sum total of the home's insulation systems including walls, ceilings, foundation, floors, windows, and doors. These work more effectively with good, tight fits that seal out the weather and air. By having a tight seal on your home's thermal envelope, the less energy you waste or lose by exchanging it too often with the air outside.

So, with this in mind, let's start at ground level and work our way up to seal your house.

Moisture Barrier

A moisture barrier (usually plastic sheeting) covers the earth beneath a structure to prevent moisture from infiltrating the structure from the ground. All-wooden structures last years longer if they are kept dry and out of contact with the ground. For a house, not only does it help prevent rot but it also helps keep the living space drier. Because moisture in the air holds heat, even during the most humid months, a moisture barrier will make your Texas home feel drier and cooler.

Most Texas homes are built on either a slab or have crawl spaces under them. Newer houses with slab foundations typically have concrete poured on top of a plastic moisture barrier. This limits the infiltration of moisture into the thermal envelope of the house. Homes with crawl spaces, meanwhile, feature a moisture barrier in their crawl spaces. Some older homes do not have a moisture barrier and these can be installed by the home owner very easily.

A moisture barrier is plastic sheeting, usually about 6-8 mils thick and is available at any hardware store, typically in sizes ranging from 25 × 25 feet to 100 × 100 feet. It also need not be one single piece of plastic. As long as the sheets overlap each other by about 6 inches or so, it will be effective.

To install, you will need to know the dimensions of your crawl space and buy enough plastic sheeting to cover the ground in that space. Simply cut the plastic sheeting to cover the earth from wall to wall, laying it flat. You can use either black or clear plastic, but I would use clear because black plastic would make your crawl space feel like a cramped version of Batman's lair.

You should notice the difference within 24 hours. If your house feels too dry, simply fold back some of the plastic sheeting to expose the earth underneath. Continue adjusting until your home feels the most comfortable to you.

As mentioned, moisture barriers limit the infiltration of moisture into the thermal envelope of the house. The house feels drier: It will be easier to cool in the summer and less likely to develop mold or contribute to wood rot in the winter.

Mudsill and Rim Joists

The next place to check out is the mudsill. The mudsill is the board that is bolted flat on to the top of the foundation wall. An example of one is a 2×8 board bolted onto the final course of cement blocks. It provides a bed to attach the flooring joists and banding boards for the first floor of the house. Depending on how well it is installed, it can let in a lot of cold air and moisture.

Places to look for gaps are where the mudsill is fastened to the foundation. A common building practice now is to put down a plastic foam gasket over the foundation before attaching the pressure-treated lumber that will be the mudsill. In older homes, a paper-backed cellulose material or tar paper was put down. Sometimes, nothing was used. To find gaps, get as close as possible to the mudsill from the inside and look for daylight shining through between the mudsill and the foundation wall. You can also feel for a draft of cool air. Wetting your hand with water will make this easier because a draft will feel colder.

If your foundation is made of cement blocks, examine the vertical joints between the blocks. When these blocks are put into place, the mortar between the blocks often slumps leaving thin mortar or none at all. Over time as the house settles, holes can appear. These might be tiny holes that let through tiny amounts of air, but if your home has 10 or 20 of them then you're letting in a lot of weather plus insects. Seal every hole you find with mortar or silicon caulk or expanding foam. Also, be sure to seal any gaps where plumbing or wiring enters the house.

Another place along the mudsill to look for is where the rim joists attach. The rim joist (sometimes called “banding joist”) is the piece of wood that closes off the end of the flooring joist or is the last floor joist underneath the exterior wall. The bottom edge is not necessarily an air-tight seal. In fact, I lived in one older house where there was a half-inch gap between the rim joist and mudsill. Now, while this seems small, the gap ran for the entire length of the house: 25 feet. It was the equivalent of leaving a 24 x 24 inch window open all the time. Some expandable foam quickly sealed this gap and there was a noticeable improvement in comfort and cost right away.

Windows

If you have double-hung wooden sash windows with storm windows that are drafty, there are several ways to make them more energy efficient.

Make sure the glazing on the glass panes of the sash windows is not cracked or crumbling. The glazing helps hold and seal the glass to the wooden window and thus blocks drafts and quiets rattling – especially from traffic. It also lessens the likelihood that the glass will break if a pet or a child presses against it. Glazing is something of a skilled art. That being said, it's not that hard to do. Re-glazing a window yourself can save you $50 to $100 or more. All you need is glazing putty ($5), a putty knife ($2), some glaziers' points ($2 for a box of 100) and some time.

First, remove any old, cracked, or crumbling glazing with a putty knife. Glazing putty dries to be very, very hard and will last decades. It can be loosened with a heat gun, but keep the gun moving or the heat will crack the glass.

When the old putty has been removed, remove all the old glaziers' points. Now, lift out the pane and set it aside. Sand the channel where the pane fits on the wooden sash. Usually, I apply a thin bead of silicone caulk in this channel before replacing the glass. This helps to seat and seal the glass pane. This especially helps when working on multiple small panes (called "lights") separated by thin or fragile wooden mullions (also called "muntins"). Next, insert new glaziers points. This is done by using the putty knife to press points into the wooden sash along the glass pane to keep it in place. Take your time so that you don't break the glass.

Glazing putty can be purchased in either a can or a tube with a shaped tip that fits in a caulking gun. However, it does take some practice to get just the right angle and right amount of putty on the glass. When using the tube mix, keep the 45 degree angled tip steadily against the glass and lay a bead of putty the length of bottom of the pane. If you're using the putty from the can, roll the putty into long snake (or rope) and place it along the edge of the pane and along the wood. Gently press it into position so that it forms a nice 45 degree angle with the putty knife. The putty is shaped this way so that water runs off the glass to the edge of the window sash instead of into the window pane channel where it can rot the wood.

The next thing to look for is if your windows close snugly. Both the top and bottom window have what is called a "meeting rail". On the upper window, it is the bottom of the window and on the bottom window it is the top. These meeting rails are shaped so that they mesh together when they close. This helps seat and seal the window properly. Check to see if the bottom window runs firmly --but not too tightly-- along the window jamb as you close the window. If it's too loose and wiggles back and forth, it probably won't seat very snugly when it's closed. You can use a putty knife to pry out the window jambs and then re-position them to fix this. You might try adding felt or self-adhesive foam weather stripping. Also, make sure you clean out any debris from the window to ensure the window will seat and seal snugly.

As metal storm windows age, the harder they seem to close. This usually happens because of dirt and corrosion. Make sure the window tracks are clean and free of dirt and debris so the window runs smoothly.

Outside, check that the storm window frame is held tightly in place against the wooden window frame. Screws that hold this frame in place might be loose and might need to be replaced or moved to a new spot. Most drafts from storms windows come from where the storm window frame meets the wooden window frame. Once you're certain the storm window frame is secure, lay a bead of caulk into the seam where the metal storm window frame meets the wooden window frame. Typically, there are two slots cut into the bottom apron of the storm window frame. Do not seal these. These are weep holes that allow condensation to escape.

If you have modern, double glazed windows (windows with inner and outer panes of glass), one of the things to look out for is fogging between the panes. Double glazed windows are made by attaching a pane of glass with adhesive to either side of a half-inch wide aluminum frame either in a vacuum or a hot, dry environment. It is then a single glass unit and is installed into a standardized window frame with adhesive. Fogging is a sign that the seal on the glass unit has failed and water vapor has penetrated into the space between the panes. If the fogging is still present in summer, it's a good guess that acids have also leeched in with the water vapor and have permanently etched the window glass.

If the fogging disappears when the window warms, then it's not too late to treat it. Examine the wood of the window for any discoloration from moisture. Look for peeling, flaking paint or soft, gray-colored wood. If you find some, sand it smooth and then seal it with an oil-based enamel or polyurethane. If the wood is very soft, you might try using an epoxy formulated to penetrate and preserve rotten wood. Be sure to mask the glass first with painter's tape.

Presenting the Doors!

We all want our doors to be attractive, secure, and weather proof. Like windows, when they are properly installed and kept in good condition, they can save you energy and money. If your door is hard to close or open, moves the whole door frame when you open or close the door, rattles when it is closed, or you see daylight and feel a draft coming from around it, then your door needs work.

When a door doesn't close correctly, it obviously fails to seal. If your exterior door is difficult to open or close, look for something caught in the door or if something is sticking out from the door frame, such as a screw head not fully tightened against the hinge. Next, determine with a carpenter's level whether the door is hanging plumb (straight up and down) and if the door jambs are parallel to each other. Sometimes, a screw head not tightened into the hinge can prevent a door from closing properly and over time deform and loosen the door frame or the door. Also, check to see if any hinges move toward or away from the door jamb or if they wiggle. Hinges should be tightly fastened to the door and the door jamb with no other movement except at the hinge joint.

Once I lived in an old house and the back door was hard to close because the whole frame moved with it. It was one of those things I kept putting off to fix. Then one night, I pulled the door shut so hard that the entire door and door frame came off from the wall of the house. I tacked it back in place for the night but the next morning, I settled down to repair it. The original nails had rusted down to the thickness of thread. Meanwhile, the wooden shims that kept the door seated properly had rotted because moisture got inside the door frame.

If your door frame moves when you open or close the door, don't delay repairing it like I did. Fix it now.

First, remove the casing from both the inside of the door and the exterior. Be careful - often in older homes, door casing and other moldings are unique or are no longer available. Sharp-edged casing pry bars are perfect for this. With a little patience and care, you can remove the casing without damaging it too much. A putty knife and a claw hammer are also useful. Again, be patient and careful - you are disassembling not destroying.

After you remove the casing, look for any damage to the wood making up the door frame; such rot or splitting. If the wood is damaged, you might need to replace it. Check to see if the shims are in place and intact. If everything looks right, check the frame to see if it is plumb. Add shims as needed and check that the door opens and closes correctly. Usually, it is easier to tack a scrap 1"x 2" across the door when it's closed to seat the door frame properly. When it's plumb and shimmed, carefully nail the frame into place. Next, vacuum debris from the area and seal up seams and gaps with either caulk or expanding foam. Re-fasten the casing and cover up the old nail holes with color-matched wood putty.

If you can close a tissue in your door and then pull it out easily or if your door rattles from noise or the wind, it means it's just not sealing snuggly. The easiest starting place to for this fix is to add weather stripping. Usually, doors made over the past 25 years have had weather stripping built onto them. But being a door is rough work. Over time, the weather stripping gets stripped from the door. In some cases, the same weather stripping types are still used by the door manufacturer and can be easily replaced. Usually with much older homes, it's not the case. You'll be either replacing worn-out weather stripping someone else applied, or you'll be putting on brand new.

First, measure the gap between the door surface and the door jamb at several places. Add about 1/16 of an inch to this measurement and this will give you a rough thickness of the self-adhesive foam or felt you will need to apply. Typically, I apply the foam stripping to the door jamb. Since the door jamb doesn't go anywhere there's less of a chance for something bumping against it and tearing off the foam. The door, on the other hand, is meant to move and will encounter all sort of things in its travels. As mentioned, you want the door to close firmly. Be sure to buy more foam than you will need so you can add and adjust the foam until you have a good seal.

If your door is in too bad of condition to repair, then it really is no longer a matter of weatherization but security. Seriously consider replacing it. Residential exterior doors come in three standard widths: 30, 32, and 36 inches.

Generally, the most insulating material for an exterior door is wood because it doesn't conduct heat as easily as metal, vinyl, or fiberglass. That being said, most inexpensive wooden doors don't fare well over time. They wear quickly in the areas that have the most contact (door handles and foot area), their mounting screws can loosen or tear, and depending on the harshness of the weather they can dry out and split. Steel doors provide better security and stand up to wear but they conduct heat. Wood-core steel doors and foam core doors last longer, are stronger, and better insulated. Fiberglass doors usually are the strongest, durable, and well insulating but tend to be more expensive.

Door Sweeps and Door Jambs with Vinyl Weather-stripping

A door's most drafty area is along the bottom where it meets the door threshold. Most thresholds are aluminum or wooden ridges that meet the bottom of the door and form a seal. However, since the door is constantly being opened and the threshold is being stepped on, the factory-installed weatherization can wear out quickly. It can be easily replaced with a self-adhesive vinyl strip that attaches to the interior side of the door and hangs down from the bottom edge.

There is another kind of door sweep that uses multiple vinyl strips to block drafts. Somewhat more expensive, but it slips on over the bottom edge of the door and is held on with screws.

One product I have used with great success is PVC door jamb with built-in vinyl weather stripping. Mounted on the outside of your door, these door jambs can either replace your existing jambs or slide over them. The vinyl weather-stripping can be pushed up snugly against the door to keep out drafts when the door is closed. Use a circular miter saw to make the proper angled cuts so they can be mounted attractively in place. When they are in position, they can be quickly nailed or screwed into place and then painted. While I like these, there are many other similar kits that might be more suitable for your particular job.

Wind, Weather, and Storm: Door and Window Tips

A builder installs a door or window with wedges called shims so that the window can float inside a rough opening in the framing. While this lets the door or window open and close freely as it expands and contracts during the year, it also means a lot of outside air can infiltrate your house by getting in around the window frame if it has not been insulated or if it has been damaged. During the summer, it usually isn't a noticeable problem. During the winter, though, if you see moisture or mildew, there could be a problem with the window frame.

Look outside for damage to the siding and window frame. Look for holes or wet, rotten wood, or even a loose piece of siding. It's important to clean and seal problems like these quickly, especially if moisture has been getting inside your wall because the damage will just worsen over time. Rotten or damaged siding can be replaced easily with new pieces from the hardware store. Rotten or damaged window sills should be completely removed and replaced and the inside of the wall inspected for mold, rot, and other damage. However, this is no small job and requires time and skills to complete. It might need the hand of a professional. For an immediate, short-term fix, clean out the rotten wood as best you can and fill the hole with fiberglass auto body putty. This will provide a hard, waterproof barrier against the weather. Be sure to contour and shape it so that it will not interfere with opening and closing the window.

If moisture or rain is getting into your window frame, check to see if any of your rain gutters run over head. Check to see if these are clogged. Also, consider installing drip edging along the top of your windows to help run water around and away from the windows and siding when it rains. Aluminum flashing is great for this job. After you've installed it, be sure to caulk it in place so moisture can't penetrate behind it.

A lot of folks consider it hideous to put over your windows but it will keep the wind out: clear plastic sheeting. This is probably the easiest temporary energy fix owners of older homes use to keep cold, damp winter weather out. There are two approaches: Apply the clear plastic sheeting to the outside of the window by stapling it to the wood window frame and then nailing lathe over the stapled edge to secure the plastic. Or apply the plastic sheeting to double-sided tape on the inside of the window frame (usually available in kits from the home center). To be sure, neither is an attractive solution. However, if you have an older home with double-

hung windows in poor condition, this short-term fix does a lot for only $10 and about 15 minutes of work. In fact, even if your windows close snugly, it might not be a bad idea for a north-facing window that doesn't have much of a view.

Energy Efficient Window Treatments: “It’s Curtains for You!”

Curtains not only add style, color, and privacy to a room, they also act as an insulating blanket for one of the most thermally conductive parts of the house: the windows. Curtains are even more effective at sealing off a window when they have thermal backing. Foam is the typical thermal backing because foam permits water vapor to move through the fabric rather than condensing on the cold side toward the window and causing moisture problems -- like mold and mildew. An additional benefit to thermal curtains is that they help deaden noise from outside that is normally transmitted into the room by the window glass. In the summer, the curtains also block hot sun.

Thermal curtains can be made even more efficient by adding a valance with a top. Usually, window valances conceal the curtain hardware such as the rods and brackets. However, if the valance has a top cover, warm air that would normally circulate down between the cool glass and the back of the curtain is blocked. Consequently, less heat is lost. Valances can be made with plywood and then stained, painted, or covered in fabric.

Another option is a window quilt. These are blanket-like shades that roll down to cover the window. Some are held tightly in place by magnetic strips attached to both the quilt and the window frame.

Finally, one last accessory for the double hung window is the Window Worm. This is a fabric tube about 2 1/2 to 3 inches in diameter and is as long as a window is wide. It is stuffed with quilting foam or cloth scraps and laid along where the top and bottom window sashes meet to help keep out drafts. Longer ones weighted with sand can also be made and placed across the foot of doors (in a pinch, however, rolled-up towels work fine, too). When the weather warms, you will want to wash these.

Throwing in the Towel: The Laundry Center

The big energy users in the laundry area are the washer and the dryer. The typical washer uses about 0.256 kWh per load. The main cost is obviously the amount of hot water that is used during each load. Top loading washers use up to 40 gallons while front loaders use 10-24 gallons. It is easy to cut costs here by washing in warm or cold water. However, the main energy savings comes from drying your clothes. Even though modern washing machines do an excellent job of extracting the water from clothes by spinning them, they still need to be dried.

Dryers tend not to be very energy efficient because they have one job: force dry, heated air into a rotating drum to evaporate water. Dryers use ten to fifteen percent of domestic energy in the United States. Dryers also cause lint. Lint comes from fibers in your clothing coming loose as the clothes tumble across each other in a dryer's hot drum. Lint not only collects in your dryer's lint trap but also through the dryer's duct work. If lint begins to obstruct or clog your dryer's duct work, the evaporated water from your nice, clean clothes will not leave the system. If the water is trapped, it will take longer and longer for the dryer to work. Therefore, once a year, pull your dryer away from the wall, detach the duct from the bottom of your dryer, and pull out as much lint as you can from the dryer and the duct. The first time you do this, you might be surprised how much you pull out. You'll also notice a big improvement in the time it takes for your dryer to dry your clothes.

Having a dry home is a good thing. But, during the winter heating months, you may notice your skin feels dry and itchy or your sinuses feel raw and irritated. Maybe your home is too dry. One way improve this is to disconnect your dryer vent hose from the duct work leading out of the house. Place a nylon sock over the end of the vent tubing and tie it in place with a long twist tie or rubber band. This way, every time you run your drier, you will heat and humidify your house while the sock catches the finer particles of lint. Be sure to block up the ductwork going outside. A trick is to put a couple of big handfuls of lint into a zip-lock bag and shove this just inside the duct opening. Then, put another plastic bag to cover the duct and tie it off with a long twist tie or a rubber band. When the weather warms, pull all this apart and reconnect your drier hose.

Hanging your clothes not only save energy but also helps them last longer. Dry your clothes on a drying rack or clothes line. If you can't hang them outside, you can hang them inside by buying a retractable clothes line (outside models are also available). Set up the line in a hallway of your home and hang your clothes to dry while you are at work. Place a large floor fan in the hallway to help circulate the air. Tumble clothes in the dryer for a few minutes until they are warm. This will relax the fibers and you'll avoid having wrinkled or stiff clothes from hanging.

Getting into Hot Water

The most expensive part of doing laundry is using hot water. And while you might be able to switch to using warm or cold water for your laundry, having hot water for bathing or cooking or washing dishes is an important convenience. Currently, the most efficient way to heat water for a home is an on-demand water heater. While these are increasingly popular in the US, most homes still rely on the cheaper old tank-style water heater. Basically, its a 40 or so gallon tank of water that is heated either by natural gas or electric heating elements. True, the method works well but most of the energy used by tank water heaters is just for maintaining hot water on stand-by and ready for use. That means, its heating water when you are asleep or at work or on vacation. So, a lot of energy is wasted.

However, you can still improve your water heater. While the tank is already wrapped with insulation, adding more will save energy. So, put a water heater blanket around your water heater. These are made of plastic-covered fiberglass and you wrap them around your water heater. Most water heater blankets at the home center tend to be about an inch thick so that they can be sold in one piece but not be too heavy to be held in place around the heater with tape. In terms of R factors of insulation (R-value indicates an insulation's resistance to heat flow), you will be adding about 3 R's worth.

You can make a water heater blanket with higher R-values. One method is to use reflective aluminum foil insulation (a.k.a. foil-clad bubble-wrap) and cut enough strips long enough to go around your water heater twice. You can then add the store-bought water heater blanket and have an R-value of more than 7.5. With this amount of insulation, you should be able to turn down your heater's thermostat and save even more money.

For safety, do not block any of the control panels, block off the bottom, or put any of insulation across the top of your water heater. Never obstruct the pressure release valve.

Keeping your hot water hot doesn't stop at the water heater. Insulating your hot water pipes will also save energy and cut energy costs. Consider this: each time you turn on the tap for your shower, you let the water run until it gets warm. Let's say the pipe from your water heater to your shower is 20 feet long. Now, that might only be a quart but that can turn into a couple of hundred gallons for a family of four in the course of a year. Also, consider that after your shower, there is still hot water in the pipe. By adding insulation, that heated water will cool more slowly. If you insulate your pipes efficiently enough, heat from the water heater will be more efficiently contained in your hot water pipes. You won't need to wait as long for that hot water, you will waste less water, and you will save more money.

Just Venting…

There are several ways you can improve the efficiency of your heating, ventilation, and air conditioning system (HVAC). If you have an old thermostat that isn't programmable, turn off your furnace circuit breaker, carefully disconnect the thermostat from your wall, and throw it out.

Programmable thermostats can be found for under $25, are commonly found in home centers, and are easy to install. They connect to the same four wire leads that hooked up to your old thermostat. By programming temperature settings in your house to be colder during the winter or warmer during the summer when you are asleep or away, you can save energy and money.

Another easy way of increasing efficiency is to monitor your system's air filters regularly. Depending on your lifestyle, you should change the filters regularly. If where you live tends to be dusty from busy nearby streets or if you have pets, change the filters every month. In some homes, it can be done every three months.

While disposable filters are cheaper, their expense builds quickly over time. Consider purchasing two washable air filters. Washable air filters usually cost less than $20 and can be rinsed out in a bathtub with hot, soapy water (in the summer, I hit mine with a pressure washer). By buying two, you can swap in a clean, dry one right way when its time to change out the other dirty filter.

One way to significantly improve your HVAC is to check your duct work thoroughly to be sure the system is sealed. A home owner can save up to $300 from their annual heating and cooling costs by sealing their duct work. Start at your HVAC system and feel for moving air coming from small holes or gaps in the duct work. When you find one, put a piece of aluminum HVAC tape over the hole. Remember: The volume of air leaked adds up; the more leaks you have the less efficient your system is. Check the entire run of your duct work; feel for air leaking from ductwork seams and loose joints. Check at the corners where the metal is folded for leaks, too. Also, make sure that air intake vents are not blocked by furniture or clogged with pet fur.

According to the U.S. Department of Energy Home Energy Saver website, insulating ducts in the typical American home costs about $250. Duct insulation will pay for itself in energy savings in about two and a half years, and continue to save energy and money in years to come. Depending on your duct work, there are many ways of doing this. Some 6 inch and 8 inch diameter sheet-metal ductwork can be replaced with insulated flexible ducting that costs less than $40 for 25 feet at a home center. If you use this, be sure to attach it so that it is snug with the supply ductwork and use aluminum HVAC tape. Other rectangular metal ductwork can be insulated with reflective aluminum foil insulation (foil-clad bubble-wrap), craft-faced fiberglass insulation, and regular gray duct tape.

Remember: you do not need to insulate the HVAC system intake ductwork, just the output side.

The Thing in the Attic

Unless your attic is finished, your attic space is essentially just outside your house's enclosed thermal envelope. Heated air rises and conducts that heat into the structure and air of your attic and from there to space. Only one thing efficiently maintains and spreads the preferred temperature inside your house: insulation.

Heating and air conditioning account for 50 to 70% of the energy used in the average American home. Inadequate insulation and air leakage are leading causes of energy waste in most homes. Air sealing won't benefit a whole lot if there is insufficient insulation for the whole house. Throughout most of the country, the US DOE recommends at least R30 (about 1 foot of blown cellulose or fiberglass) for attic insulation and a minimum of a R13 (a bit more than 3 inches of blown cellulose or fiberglass) in the walls. Unfortunately, most homes built in the past two decades are built with R13 in the walls and attic; few have R30 in the attic.

Let's say your home has R13 of blown cellulose insulation in the attic. The attic measures 1750 square feet and we'll assume that the insulation has settled. To bring it up to at least R30, we need to add a further 17 R-value's of insulation to the attic. The easiest way to do this is to either apply another 5 inches of blown cellulose or put down un-faced R19 fiberglass batts (about 6 inches thick).

To figure the cost for blown cellulose to cover the attic space, multiply the square footage by the thickness. Therefore: 1750 x 5 inches (or .416 feet)= 728 cu ft. The home center sells bags that are 16 cu. ft. Divide the 728 cu. ft. by 16 cu. ft and you get 46 (16 cu ft) bags. Some home centers may include the free rental of their blowing equipment as an incentive; others may not. To make the insulation work effectively, it must be spread evenly throughout the attic so that no thin spots or hollows are formed. Also, to keep the insulation out of soffiting, dams need to

be built and installed at the end of each ceiling joist (or around light fixtures) before turning on the insulation blower.

Fiberglass insulation is typically figured by square foot. Rolls of R19 come in 23 inches wide or 16 inches wide. This is so the insulation fits between the joists. Roll lengths vary, usually between 20 and 77 feet long (though batts are available). What you should watch out for is just how big the roll is. In other words - can you get the blasted roll through the attic's entrance or trap door?

Once you've decided on what size works for you, divide the square footage (our 1750 square feet) by the length and you have the number of rolls you need. Craft-faced insulation has a paper vapor barrier facing. Because insulation is being added on top of other insulation in this case there is no need for the paper vapor barrier facing. While it is more expensive than the blown cellulose, fiberglass batts are convenient sizes that can be positioned and laid in place or trimmed as needed. And it's always better to have extra.

Now, let's say you've figured out how much you need...and that you can't afford more than $50 at a stretch. Not to worry. The great thing about insulating is that it doesn't need to be done all at once. You can take your time and build on it. The best way, though, is to figure out what area of your home you want to insulate first. Consider these two things: where is your thermostat located and where do you spend most of your waking hours in the home? Usually, the thermostat is in the living room and that's were most people spend their time. The solution is simple here: lay in your first bundles of insulation over this room. But if your thermostat is in the living room and you spend your time in another room, such as a home office, you may wish to divide your insulation between the area over the thermostat and the office. In this instance, it's best to take time to choose what priorities fit your lifestyle and how to proceed from there.

The autumn is the best time to install insulation in your attic. After all, during the summer, it could reach as high as 150 degrees F, especially in a poorly ventilated attic. But, if you want to start saving money now during the peak heating season as well as later on during the air conditioning season, now is the best time to do the job. So, here are some tips on how to make the job easy:

- Know your attic's layout and plan how to fit the insulation in place in advance.
- Buy your insulation the day before you plan to install it. Moving around and working in a cramped space takes up an awful lot of time. Start early.
- It's a dirty job. Be sure to wear long sleeves and pants, gloves, safety glasses and respiratory protection against dust.
- Get some help so you can get in and out of the attic faster. The job will go much faster and you both will have someone to complain about the dust to.

- Take some 2 foot by 3 foot pieces of 3/4 inch thick plywood into the attic with you. Use them to stand or kneel on as you move through the attic. Often you'll find it's easier on your shins and knees to rest on the plywood rather than balancing on a joist and risk crashing through the ceiling sheetrock into the bathtub.

- Start at the far end and work your way back to your attic's entrance. Insulation works best if it stays "fluffed up" or not compressed. You don't want spend time putting it down nice and neat and tight only to discover that you must trudge across it.

- When you are done, take a warm shower to remove the fibers, dust, and dirt that adhered to your skin.

- When you've finished insulating the attic, you will also want to make sure your attic trap door seals. As mentioned, your attic is just outside your home's thermal envelope so your attic door is really a door to the outside. Make certain that it closes snugly and seals. Use weather stripping -- it will make a difference.

Your Roof: Heat Shield to Maximum!

Your roof is a heat shield for your house. But in order for it to work at peak efficiency, it needs to be adequately ventilated. The National Roofing Contractors Association recommends 1 square foot of ventilation opening should be provided for every 150 square feet of ceiling area.

If you've ever ventured into an attic on a sunny summer day, you know how hot it can be. Temperatures can easily reach 150 degrees F. Trapped heat increases your air conditioner's heat load. This raises your energy costs. Trapped heat also can damage the plywood sheathing, under-layment, shingles and personal items located inside the attic.

If you are considering re-shingling your home, take a serious look at choosing a light-colored shingle. A white colored shingle can reflect 30% of the heat it absorbs from sunshine. Metal roofing systems also come with finishes that reflect heat as well.

Roof ventilation works with two kinds of vents, an exhaust and an intake. Heated attic air flows out through a vent in the upper part of the roof. This pulls in cooler air to enter through intake vents located down in the soffiting or fascia board. As this air absorbs heat, it leaves through the upper vent and the cycle is repeated. Most houses built in the 1960s onwards use a combination of soffit vents and either gable vents, roof vents, or ridge venting to allow air to flow through the attic. By allowing the attic to breathe and circulate heated air out, the house can let go of the heat it absorbs during the day.

Retrofitting roof vents is not as hard or expensive as it sounds. Nevertheless, it can be daunting to climb onto your roof and cut holes into it. I have found the easiest to install is the ridge vent system. Ridge vents come in plastic or metal vent kits ranging from $1.50 to $4.00 per linear foot. Ridge vents are hollow inside and have either vents along their sides or under a flange. By straddling a slot cut though the sheathing at the roof's ridge or peak, heated attic air can leave without letting rain inside.

The actual installation technique varies slightly depending on the kit you use. Basically, you first remove the top cap of shingles on the roof. Then, cut back the roof sheathing by 1-inch from both side of the roof's ridge with a circular saw. If you're installing full-length venting, you'll be cutting along the entire length of your roof. Afterwards, attach the ridge vent (carefully follow the manufacturer's instructions) and caulk over nail heads and all seams.

Remember, use a new, sharp saw blade and take your time. Using a dull blade while way-up-high just begs for saw kick-back and a tearful ending.

Seal the Envelope

Now that you've seen what to look for in your home thermal envelope, you can start planning where to begin; walls, ceilings, foundation, floors, windows, doors, or the roof. And while it's import to consider how your home works as a whole, approach improving it one step at a time. Remember that all these jobs don't need to be done all together all at once. Dividing the project of sealing your home into smaller, manageable jobs around the house makes it easier to tackle. Tackle ridge vents one weekend, insulation another, or a new thermostat some weeknight after dinner. You should notice more energy efficiency -- however slight -- after each improvement. They will add up: you will save money and your home will feel more comfortable. But be sure to take your time preparing and researching: read the instructions, and use good, sharp tools.

Above all, be careful when considering projects that seem beyond your skill level. If in doubt, hire a professional. After all, sometimes doing-it-yourself can really do-it-to-***you***.