TOGETHERWESAVE EASY ENERGY TIPS

Simple Ways to Save Energy and Money at Home!

Shelby Energy Cooperative

A Touchstone Energy® Cooperative

18 Simple Ways to Save Energy – and Money – at Home

We're all looking for ways to save energy and money. Your co-op has created this booklet to help you make your home more efficient. Follow these tips to reduce your monthly electric bill and save, month after month, year after year, no matter the season.

Kentucky's Touchstone Energy Cooperatives also offer rebate and incentive programs. To learn more, visit your local co-op's website.

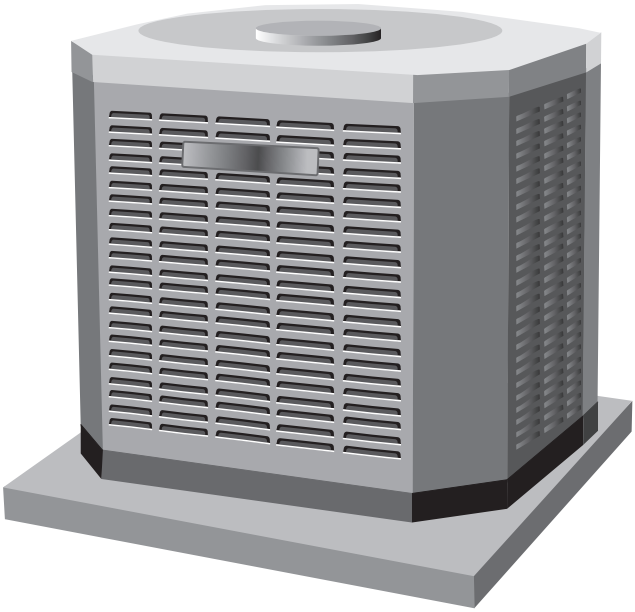
Contents

AC or Heat Pump Maintenance

Doing proper maintenance on your home's air conditioner or heat pump will ensure that your system is operating as efficiently as possible.

It helps to improve your home's air quality, and it can save a lot of grief. A well-maintained system has a much longer operating life. Proper maintenance will also lower your energy consumption during the cold and warm months of the year.

You likely will want to hire a licensed HVAC technician to perform the following key jobs each year.



Central air or heat pump units

Have the refrigerant level checked.
If your system is running low, it will not provide maximum performance. There is also a test that your technician can do to confirm whether refrigerant is leaking out of your system.

Inspect both the indoor and outdoor coils.
The coils look similar to the metal fins on your car radiator. If the coils are dirty, a cleaning job involves turning off the power at the disconnect or breaker, gently spraying on a coil cleaner (soapy water is usually adequate) and then using a hose to spray off the cleaner with a gentle stream of water. Never use a pressure washer or intense rinse as this will bend the fins of the coil, damaging your unit. If the technician does the job right, your unit will be free of the dirt and dust that cause it to work extra hard.

Check supply and return air temperatures.
There should be at least 18 degrees of difference from the air coming out of your registers and the air going into your HVAC system returns. Without that difference, your AC unit will run longer than needed and that will increase your bill. You can check the air temperature by placing a thermometer inside a register supplying cool, conditioned air, and then placing the thermometer inside a return register.

Inspect your ducts for leaks.
Most ducts leak 30 percent of a home's heating and cooling. To fix that, apply foil duct tape to every duct joint in the system then cover the tape with a permanent substance called duct mastic. The mastic should be applied so that is the thickness of a nickel. Do not use what is commonly referred to as "duct tape" because this material will quickly dry out and will not stick to ductwork.

Other key steps.
Always change your filters, vacuum your registers and vents, and keep all vegetation trimmed at least 18 inches from your outside unit.

Window units

Clean the filter.
Unplug the unit and remove it from its case. Remove the filter from the grill. Clean the filter with a vacuum or warm soapy water. Do this every-other-week during hot weather.

Clean the coils.
Clean the dirt and grime off the coils using a spray cleaner. Avoid getting any water on electrical components, and only use a gentle spray when rinsing off the cleaner.

Make sure the unit drains properly. When you return the unit to the window, make sure it's slightly tilted downward on the outside so the condensation can drain.

Conclusion

A homeowner who takes the time and care to do annual maintenance will have a system that functions better, lasts longer and uses less energy.

Attic Insulation

Proper attic insulation is critical to your home's energy efficiency. A well-insulated attic keeps warm air out during summers and inside during winters.

Fortunately, attics are one of the easiest places in the house to insulate.

There are two types of attic insulation: loose-fill and batt. Costs vary, but loose-fill insulation generally is less expensive to install than batt, and when installed properly, loose-fill insulation also tends to provide better coverage.

If loose-fill insulation is chosen, make sure it is distributed evenly as any gaps will decrease its effectiveness. The goal in Kentucky is to achieve an R-38. R-value per inch varies significantly across manufacturers and product types. R-38 can be reached with loose-fill insulation by installing the manufacturer's minimum settled thickness found on the product packaging.

If batts are installed, use a utility knife to cut pieces to size and lay them between the joists. If installing R-19 batts, place a second unfaced layer of R-19 batts on top of the first layer at right angles to achieve coverage of the ceiling joists. This will bring the insulation level to R-38.

Prepare Your Attic Beforehand

Before installing any type of attic insulation, do the following:

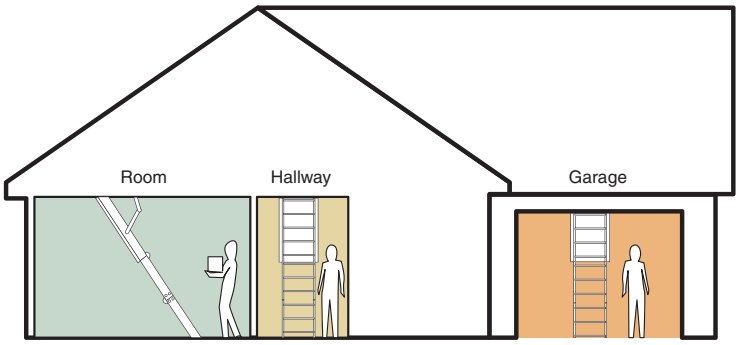
- Seal any attic air leaks. Check the spaces around duct exhaust fans, chimneys, interior walls and openings such as dropped ceilings, soffits and bulkheads.
- To prevent fires, install metal flashing around heat-producing equipment such as flues, chimneys, exhaust fans and light fixtures. If your lighting fixtures are IC – or "insulation-contact" – rated, they can be covered with insulation.
- To allow for proper ventilation, never cover attic vents, and leave at least 1 inch of airflow between the insulation and the roof. If your home has no attic vents, be sure to add several before installing the insulation.

Federal housing officials recommend one square foot of attic ventilation (both intake and exhaust) for every 300 square feet of attic space. For example, if your attic is 900 square feet, you need a total of 3 square feet of ventilation. This amount is usually evenly divided between intake and exhaust.

Nearly all homeowners can realize great gains in energy efficiency by having a properly insulated attic.

(*see illustration on next page*)

Staircases and Scuttle Holes



Install an attic hatch/stair in a convenient location that provides ease of access. Follow manufacturers instructions for installation and plan how you will air seal and insulate this big hole in your ceiling. Attic access covers are essential; solutions range from factory-made covers for insulating and sealing, to do-it-yourself strategies that are easy to fabricate.

COST BENEFIT

You can purchase a prefabricated attic access sealing system for around $100 depending on the product or you can build your own for less than $50 in materials. A prefabricated system can be installed in minutes and building your own is an easy afternoon project. Improving air sealing and insulation is a low cost upgrade with a big impact because the attic access can be one of the biggest sources of heat loss across the boundary between the attic and conditioned space.

Attic Access

In many cases, a home's attic access, such as an attic hatch, pull-down stairs, or knee-wall door, is installed without being insulated and sealed, resulting in one of the biggest holes in the thermal and air barrier between the attic and conditioned space. This results in higher energy bills and reduced comfort.

Action Steps

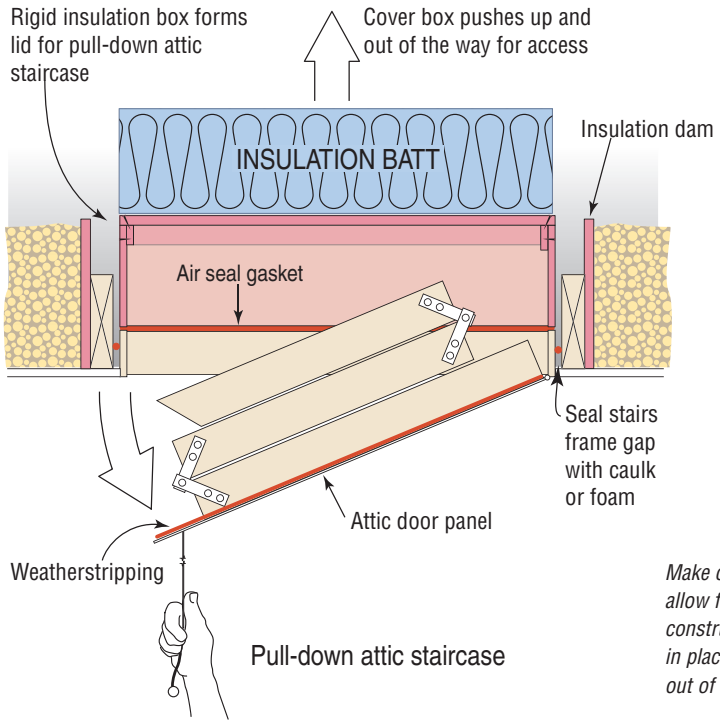
Improving the insulation and air sealing of your attic access will depend on the type of attic access in your home – an attic hatch or pull-down stairs and whether you use a prefabricated system or do it yourself solution.

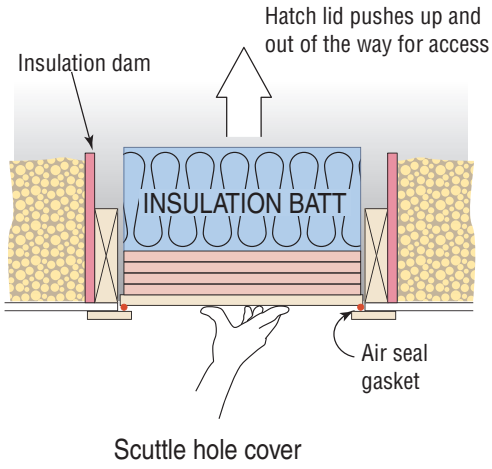
Attic Hatch

An inexpensive and common type of access is referred to as a scuttle hole or attic hatch which is simply a removable portion of the ceiling. An attic hatch is typically located in a closet or main hallway. Existing attic hatches can be improved through the addition of weather-stripping to create an air-tight seal and insulation to match the R-value of insulation in the attic.

Add weatherstripping – To ensure a tight fit, care should be taken while installing the trim to make sure that it is flat and level. An uneven base may lead to greater air leakage. Weatherstripping can be installed on the hatch itself or on the inside of the trim or on the base of the hatch.

Add insulation – To the back of the access hatch using either fiberglass batts, rigid foam insulation or a combination of the two. Rigid insulated sheathing such as extruded polystyrene (R-5 per inch) is recommended. Cut the insulated sheathing ¼ inch less than the hatch size to allow for clearance when moving the access panel. Apply 2-inches or more of insulation with construction adhesive and screws. As an added measure, glue the kraft-paper side of fiberglass batt insulation to the top of the last layer of rigid insulation. Try to achieve the same total R-value of the ceiling.





Make cover box and scuttle coverings snug, yet with enough slack to allow for easy movement. Construct with rigid insulation board, nails, construction glue and duct tape. Insulation dams help to keep insulation in place. Consider installing a secure landing spot for movement in and out of the attic.

Pull-Down Stairs

Pull-down attic stairs are another type of access which include a larger access opening and integrated folding stairs. The air seal on existing attic pull-down stairs should be improved and then augmented with a cover to increase the insulation value.

Seal rough opening – The frame for the stairs fits in a rough opening and leaves a gap much like that for a door or window and must be sealed. When the gap is small (less than ½ inch), caulk can be used as the sealant. If a larger opening exists, it is recommended to apply non-expanding foam or a backing material (backer rod) in conjunction with caulk. Expanding foam can be used with caution due to its highly expansive nature; it could warp the frame and interfere with the ability of the stairs to open or close properly.

Add weather stripping – To ensure a tight fit between the stair panel and frame, weather-stripping or gasketing material should be added to the frame or panel.

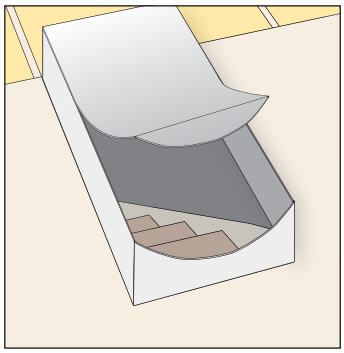
Add cover box or prefabricated insulation kit – To insulate attic stairs, a lightweight, moveable box can be fabricated from rigid foam or fibrous ductboard to fit over the stairs from the attic side. Insulating kits are also available through weatherization suppliers or local hardware stores. As with all home projects, follow manufacturer's instructions for proper installation.

Attic stairs cover box – You can build your own attic stairs cover box out of rigid insulation or ductboard. Measure the interior dimensions of the frame opening for the pull-down stairs and build the cover box to fit tightly within the opening. Add a stop for the box to rest on using 1x4 board that runs the entire interior edge of the opening and weather-strip the top edge of the stop to ensure a tight seal. As an added measure, glue the kraft-paper side of fiberglass batt insulation to the top of the last layer of rigid insulation. Try to achieve the same total R-value of the ceiling.

Prefabricated Insulation Kit Options

Attic tent – An attic tent sits above the attic pull-down stairs sealed to the rough opening or attic decking. While attic tent products don't offer the same insulation value as other options, they have the added benefit of improved air sealing from a zippered opening, providing greater accessibility than cover box options.

Cover box – Similar in design to the do it yourself box described above, these prefabricated kits come in a number of sizes and insulation values depending on your application.



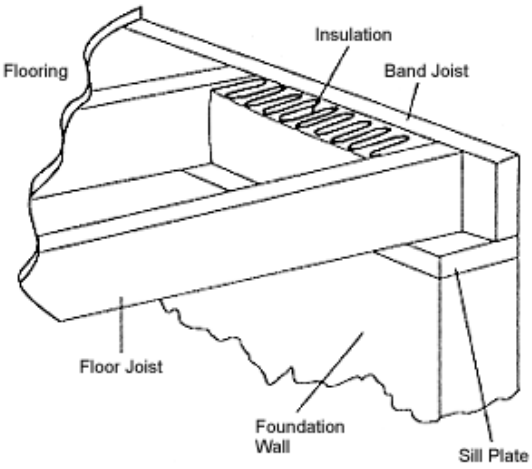
Attic "tents" come in sizes to fit standard openings and close with a zipper

Basements

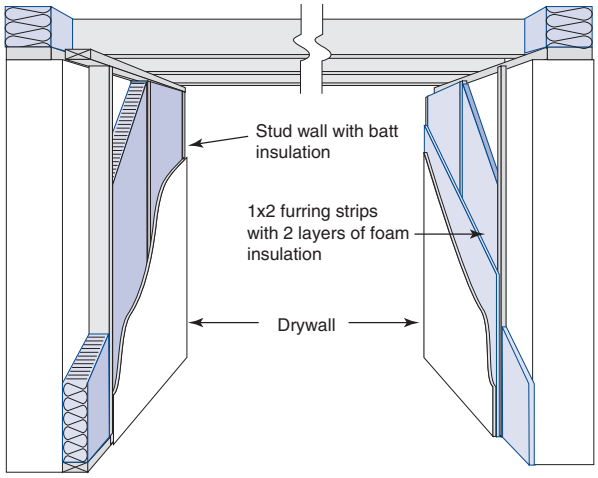
The energy efficiency of many homes is diminished because of un-insulated basement walls. In fact, it's common to lose up to 30 percent of a home's heat basement through un-insulated basement walls. That loss causes the home's heating and cooling equipment to work much harder, which can contribute to significantly higher utility bills. Here are three key suggestions for improving the basement's energy efficiency.

Seal the Band Joist

One of the most effective steps you can take is to seal the band joist in your basement. The band joist is the wooden beam just above your home's foundation. It sits atop the entire perimeter of the poured concrete or concrete-block foundation. It's the major beam that all the first floor joists are connected with.



Cut 1- or 2-inch-thick foam board pieces to a rectangular size and insert between the floor joists, just above the foundation. Make sure to leave a ¼ inch gap around all sides.The edges are then sealed on all four sides with a bead of expanding foam.



Insulate the Basement's Walls

In some cases, insulating your basement's walls can be more effective than insulating its ceiling.

Insulating the walls will make even unconditioned basements significantly warmer in winter. This also places the ductwork inside the thermal envelope of the home, again increasing efficiency.

There are several options to insulate these walls. One way is to build stud frames around the wall and add batt insulation. This is then covered with drywall.

Another option is to glue sheets of foam board directly to the walls without adding studs.

A third option is to have closed cell (2 lb) foam* sprayed on the basement walls, which effectively seals all gaps and crevices in one step.

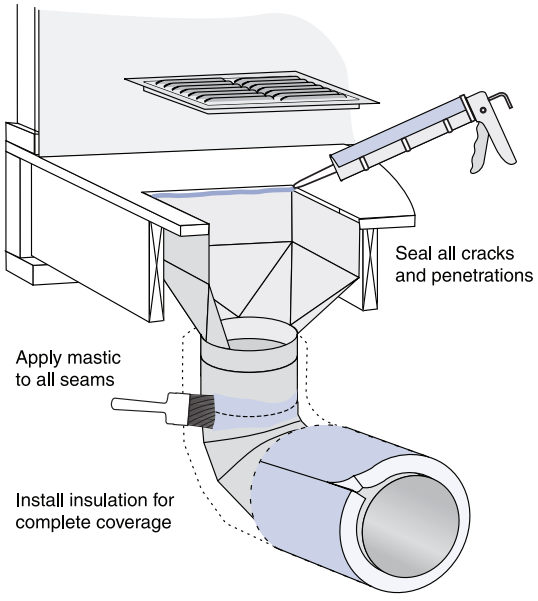
**Insulation product type must pass the guidelines for flame-spread and smoke-developed index of the current KY residential building code.*

Seal the Ductwork

When ductwork leakage is reduced substantially, it makes an immediate improvement in air circulation throughout the house. If the ductwork is accessible, sealing it is a relatively simple procedure.

This is accomplished by by sealing every joint with foil duct tape then applying a substance called mastic with a brush to every duct seam. Sealing return side duct leaks can have the biggest impact on energy savings.

Mastic is a gray paste-like substance containing fiber, which is easily spread across the seams of the ductwork. It dries to a solid, cement-like quality, providing a permanent solution to unwanted leakage on both the return and supply side of the ductwork.



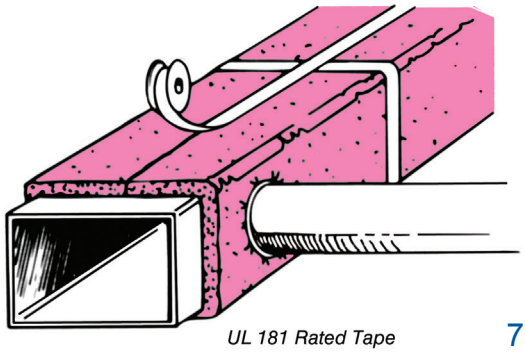
Mastic can be purchased at companies that sell wholesale supplies to heating, ventilation and air conditioning contractors and is often referred to as “duct butter.”

Once the leaks are sealed with mastic, more savings can be realized by insulating the ducts located in unheated areas with foil-faced fiberglass duct insulation or foil-faced “bubble wrap.” The insulation is simply wrapped around the duct and taped at the seams.

If the ducts are inaccessible, a contractor may need to be hired to conduct a pressure test with a special fan. This “blower door” test can determine if there is serious leakage. Some duct connections may simply have come apart.

In most cases, a little time spent addressing this issue can make a major difference in the efficiency and longevity of the heating and air conditioning system.

Each home is unique, but most homeowners can realize great gains in energy efficiency by sealing the band joist, insulating the basement walls and sealing the holes in the ductwork.



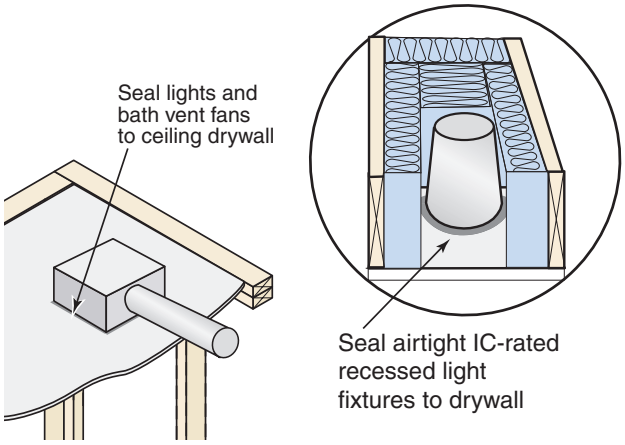
UL 181 Rated Tape

Ceiling Leaks

Homeowners often think the surest way to control energy loss in their house is to install insulation in the attic. However, if air leaks in the ceilings aren't sealed first, the money spent on insulation may be wasted because insulation doesn't usually block air flow. Here are tips for fixing some common problems.

Recessed lights:
Recessed lights, when installed in rooms below an unheated attic, can allow big air leaks. Unless recessed lights are clearly labeled as safe for installation beneath insulation, (I.C., or "Insulated Cover") such lights must be surrounded by an air space at least 3 inches wide. Ideally, lights designated as I.C.A.T. or "Insulated Cover, Air Tight" will provide the least heat loss through the ceiling. Recessed lights typically have a large gap between the fixture and the drywall. Air seal this gap with high-temperature caulk.

Bathroom fans: Caulk around these from below with high-temperature caulk.



Chimneys:
A chimney that runs from the basement through the attic should be sealed at both the basement ceiling and attic floor by use of sheet metal and fire-rated caulk. Never use combustible materials within 2 inches of chimneys.

Sewer vent pipes:
A sewer vent pipe typically runs vertically from the basement through the attic and should be sealed at both the basement ceiling and attic floor with wood, sheet metal and expanding foam.

Other leaks:
Seal holes around pipes or wiring that go through the ceilings with caulk or expanding foam.

Pull-down doors:
Make attic access doors and stairs airtight by using latch bolts and weather-stripping. Add an insulated cover to the back of the pull-down door.

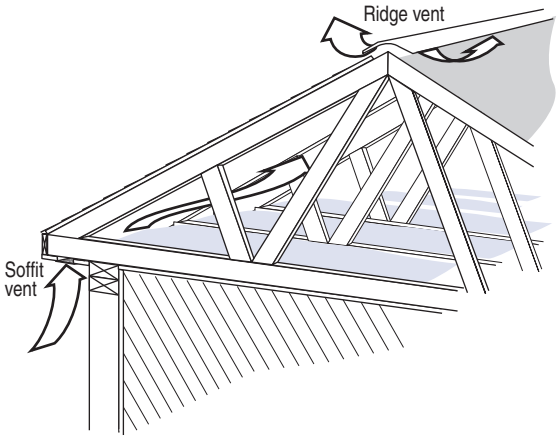
A word about a condition called "stack effect." Anytime there is conditioned air exiting through the ceiling, that air is being pulled in from somewhere, and with many homes that means either a crawl space or unconditioned basement. To avoid air loss through the attic, be mindful of holes down below that allow this condition to exist.

By repairing these common ceiling air leaks, up to one-third of a home's overall energy loss can be prevented.

Attic Ventilation

Most building codes require roof vents because the increased airflow expels moisture that can degrade insulation. In hot weather, proper ventilation reduces roof temperatures, which saves on cooling costs and lengthens the life of your roof.

A continuous ridge vent along the peak of your roof, combined with soffit vents at the eave, will provide the most effective ventilation.



The vented area should be divided equally between the ridge and soffits.

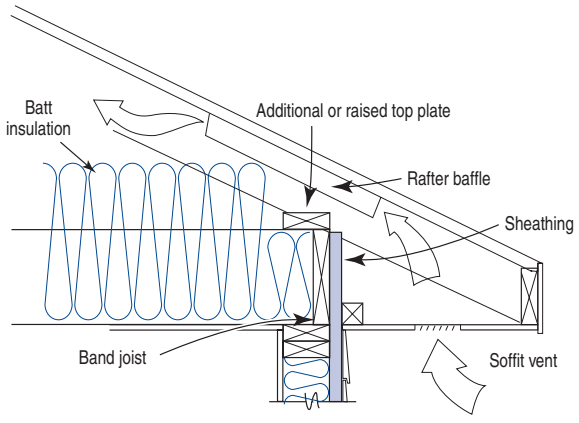
If your home has insufficient ridge venting, cap vents, turbines and gable vents can supplement your roof design.

Power roof ventilators are not recommended because of the energy consumption, and the units also create negative pressure that may pull conditioned room air into your attic.

A common problem occurs at the eave. Many roof designs leave insufficient space for full insulation without blocking airflow from the soffit vents. Compressed insulation is much less effective.

In stick-built roofs, where rafters and ceiling joists are cut and installed on the construction site, an additional top plate that lays across the top of the ceiling joists at the eave will prevent compression of the attic insulation and also allow for ventilation.

Federal housing officials recommend one square foot of attic ventilation (both intake and exhaust) for every 300 square feet of attic space. For example, if your attic is 900 square feet, you need a total of 3 square feet of ventilation. This amount is usually evenly divided between intake and exhaust. Your energy advisor can help you to assess whether you have adequate ventilation and offer tips on how to correct typical attic ventilation problems.

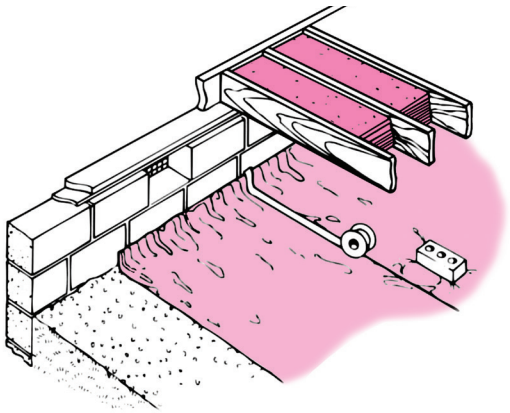


A raised top plate increases the area for insulation and ventilation at the eaves.

Crawl Space

A poorly-weatherized crawlspace can drive up home energy costs. Insulating your home's crawl space can be a wise investment. The best way to do the job varies, depending on whether the crawl space is ventilated or unventilated.

Insulating a Ventilated Crawl Space
Seal holes in the floor above with expanding foam or caulk, especially the openings where plumbing and ductwork enter the conditioned part of the house.



Insulate between the floor joists with R-19 batt insulation, making sure the paper side (vapor air retarder) is touching the underside of the floor, and that the insulation extends snugly against the band joist. Remember with paper-faced batts, the pink side should face toward the ground.

Make sure to install a sheet of 10 mil plastic over the dirt floor as a vapor barrier with 12 inches turned up onto the walls and sealed with adhesive. The plastic on the inside walls needs to be above outside ground level. All seams should be taped. A typical dirt crawl space releases 12 gallons of moisture per day. Damp air is more difficult to heat and cool and puts an extra load on the HVAC system. Installing a well-sealed vapor barrier keeps moisture out.

Encapsulating a Crawl Space
In most cases, the most energy efficient approach to a crawlspace is to insulate the foundation walls rather than the floor. This strategy is most commonly referred to as "encapsulating the crawlspace." This option places the ducts within the house's conditioned area and reduces the strain on the heating and cooling system. Again, make sure to seal around pipes, ducts and openings into the living area. Also, seal around openings that come through the foundation walls.

For safety, make sure that combustion furnaces and water heaters located in the crawl space are sealed-combustion units.

Install a termite shield between the band joist and the masonry foundation. This is a strip of metal, bent down at the edges and placed between the foundation of a house and a timber floor, around pipes, and other places where termites can pass.

Another key step is to air seal the band joist. The band joist is the wooden beam just above the home's foundation. It sits atop the entire perimeter of the foundation. It's a major beam that all the first floor joists are connected to.

To do the job, cut 1- or 2-inch thick foam board pieces to insert between the floor joists, just above the foundation. Then seal the edges of the foam board pieces on all four sides with a bead of expanding foam.

Access doors to a crawl space should be insulated and weatherstripped.

To insulate the foundation walls, fasten 2-inch rigid foam board along all the walls, leaving a 3-inch gap at the top of the foam board to allow monitoring of any termite activity.

Each home is unique, but most homeowners can realize great gains in energy efficiency by sealing the crawl space beneath their house.

Additionally, if encapsulation of the crawlspace sounds like too big of a DIY job for your skillset, there are professionals who can do the job using spray foam products.

Finally, encapsulating a crawlspace means that you now plan to heat and cool this space. Follow the guidelines of the state residential building code and provide at least 1 cubic feet per minute of supply air per 50ft$_2$ of under floor area.

Heat Pump Guide

Sometimes, you have to spend money to save in the long run. If you're looking for comfort, efficiency and savings from your heating and cooling system, you can't beat today's high efficiency heat pumps.

A heat pump offers superior performance – and savings – compared with both a gas furnace and an electric furnace. Natural gas prices are never consistent.

And compared with an electric furnace, heat pumps offer far greater advantages. Because a heat pump operates much more efficiently, a homeowner can cut the cost of operating their furnace in half by upgrading from an electric furnace to a heat pump.

For a manufactured home, the slightly higher up front cost for a heat pump compared with an electric furnace can provide substantial savings year after year.

Here's why a heat pump is one of the most trouble-free, low-cost systems available today.

How it works

A heat pump provides both heating and cooling. It's called a heat pump because it pumps heat out of your house in the summer, and pumps heat into your house during the winter.

Because air does not lose all heat content even when temperatures fall, a heat pump can extract warmth from the outside air during the winter and transfer it into your home.

In summer, the process works in reverse. The heat pump pulls hot air from inside your home, and moves it outside.

Trouble shooting

The few problems that homeowners have with heat pumps can usually be traced to existing issues, including leaking ductwork, dirty furnace filters and dirty coils. These problems are often easy to find and fix.

All duct joints that have separated or leaking seams should be repaired. A substance called duct mastic or duct butter should be applied with a paintbrush to every seam on metal ducts. For more information on duct sealing, see the togetherwesaveky bulletin titled "Duct Sealing." Do not use what is commonly referred to as "duct tape." Contrary to the name, duct tape is not an acceptable product for use on ducts.

Dirty coils also can seriously reduce operating efficiency. The indoor and outdoor coils look similar to the metal fins on your car radiator. Cleaning the coils usually involves hiring a licensed service technician. The technician will turn off the power at the disconnect or breaker, spray on a coil cleaner and then using a hose they will spray off the cleaner with a gentle stream of water. Never use a pressure washer or intense rinse as this will bend the fins of the coil, permanently damaging your unit. If the HVAC technician does the job right, your unit will be free of the dirt and dust that cause it to work extra hard.

Dirt or dust can easily accumulate on a coil and reduce the effectiveness of a heat pump. Regularly changing the filter for your heat pump will prevent this build up and help keep the indoor coil clean.

System controls

Improper use of a thermostat can lead to high bills. When operating a heat pump, it's best to leave the thermostat alone, rather than continually adjusting it. That can cause the supplemental heaters in the system to cycle on and can quadruple increase operating costs. If a homeowner wants to setback heating or cooling, programmable thermostats specially designed for use with heat pumps are recommended.

The emergency heat setting should only be used in rare cases such as when the compressor (outside unit) isn't working properly. Using the emergency heat is expensive. Some systems have a light on the thermostat that indicates when the emergency heat is operating to help avoid accidentally leaving it on.

Conclusion

A high efficiency heat pump is a great investment. You'll enjoy great savings and many years of efficient comfort in your home.

Knee Walls

A knee wall is a wall that is often located upstairs in a home and has conditioned living space on one side and attic space behind it. It is usually 3 to 5 feet high with the top ending along the roof line.

However, a knee wall is most accurately described as any wall inside living space that backs up to an attic. In larger homes, it is not uncommon to find knee walls that are 10 to 20 feet high in a den or family room.

If not insulated or built properly, however, a knee wall can become a major break in your home's thermal shell and can cause high monthly bills. Without being properly air sealed, the extremely hot and cold air of the attic can leak into your living space, resulting in higher electricity usage to heat or cool your home.

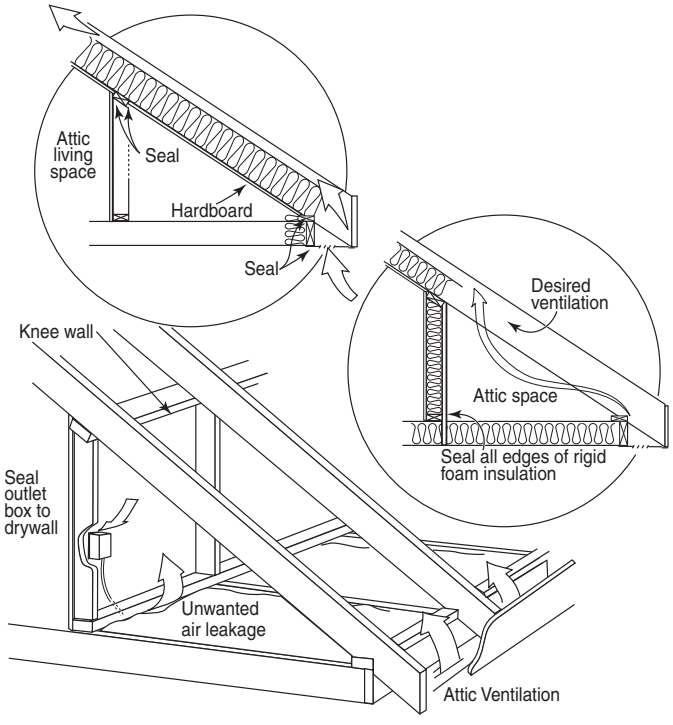
Unfortunately, many homes do not have properly-constructed knee walls. In most cases, they have no rigid board enclosing the attic side of the wall. Another common issue is that the space just below the knee wall is left open and creates a break in the air barrier of the home.

A very effective step homeowners can take is to nail rigid foil-faced foam board, drywall or foil-faced hardboard to the studs. Nail this material to the back of the attic knee wall and enclose the existing wall insulation inside the attic space and cover the R-13 insulation completely and enclose the existing wall insulation.

Tape each seam and place a bead of caulk or expanding foam along the top and bottom plates.

Also, if you can access the space just below the knee wall between the joists, make the area below the bottom plate air-tight so that cold or hot attic air does not leak under the floor of the living space. Foam board pieces should be cut and fit into each cavity between joists and then sealed around the edges with caulk or expanding foam.

The key concept is to keep the home's thermal envelope intact. Heat always seeks cold. That's why it is important to have a good thermal barrier that keeps extremely hot or cold air out of living space.



Appendix
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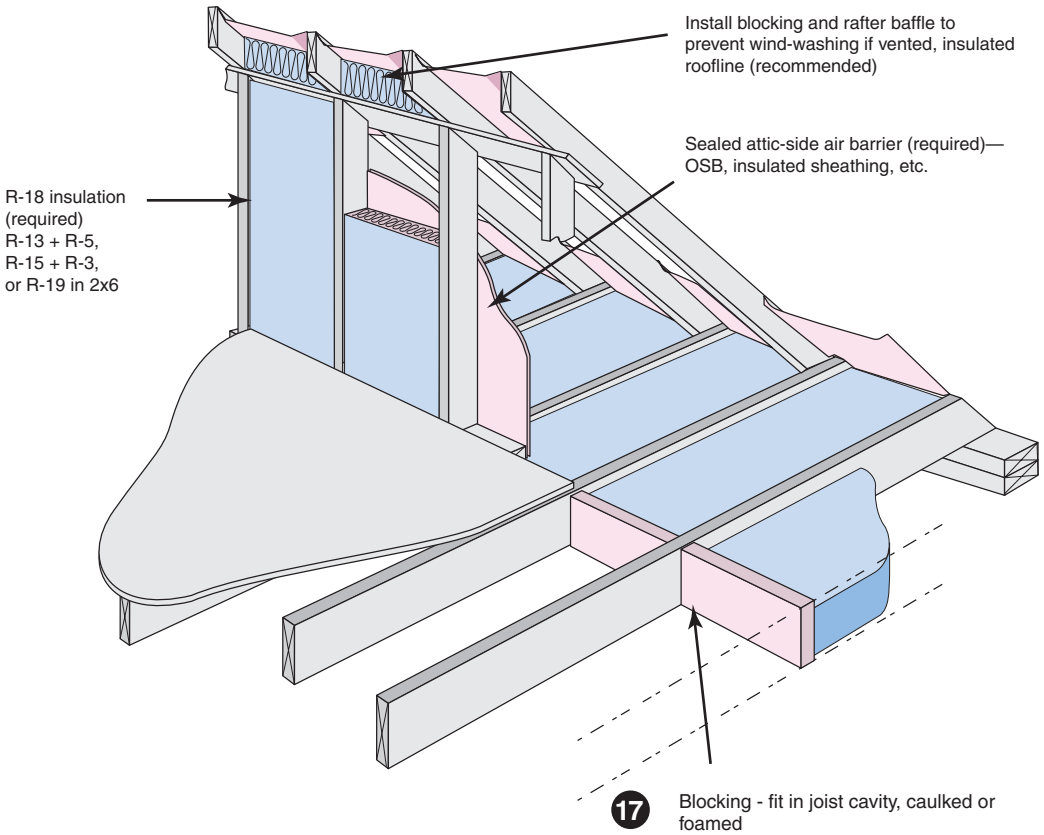
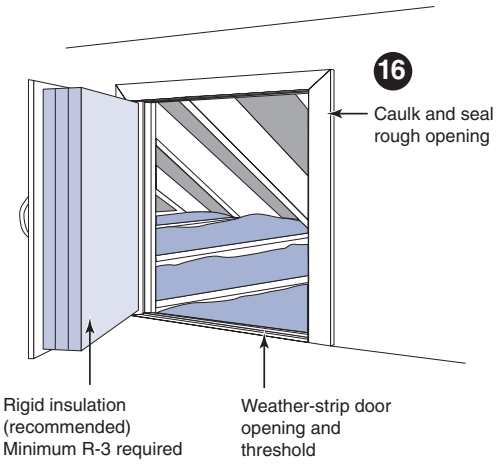
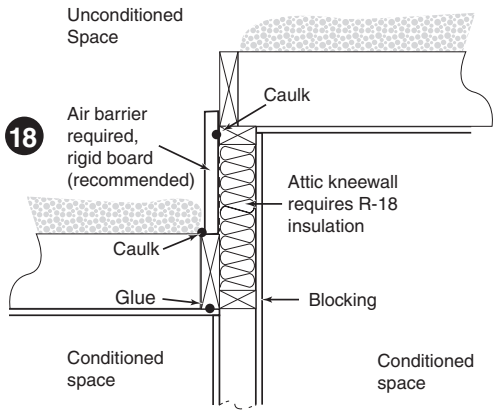
Air sealing key points *continued*



Attic knee-walls



Two-level attic



Disclaimer:
This document is intended solely to help graphically demonstrate the air leakage provisions of section 402.4 of the 2006 IECC. It does not cover all airsealing locations or techniques. Other code provisions may be applicable as well.

Knee Wall Doors

A knee wall is a wall that is often located upstairs in a home and has conditioned living space on one side and attic space behind it.

However, a knee wall is most accurately described as any wall inside living space that backs up to an attic. In larger homes, it is not uncommon to find knee walls that are 10 to 20 feet high in a den or family room.

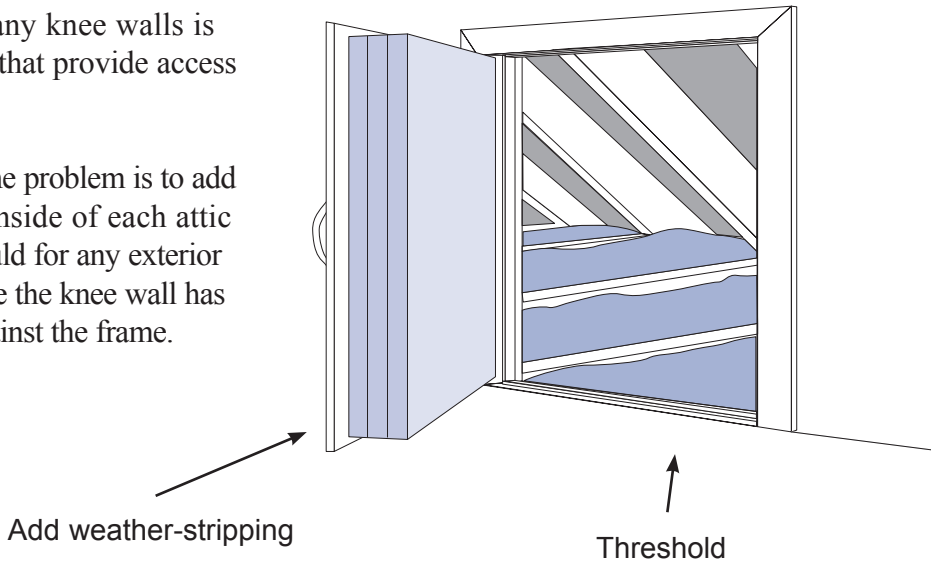
Without a proper seal, the extremely hot and cold air of the attic can leak into the living space, resulting in higher electricity usage to heat or cool the home.

A major problem with many knee walls is improper sealing of doors that provide access to the attic.

A good first step to solve the problem is to add weather-stripping to the inside of each attic access door just as one would for any exterior door. In addition, make sure the knee wall has a latch that pulls tightly against the frame.

Next, add a threshold to ensure that unconditioned attic air is not infiltrating beneath the access door.

Finally, stop the heat conduction through the door by insulating it. Do so by attaching rigid insulation or foam board to the attic side of the door, using construction adhesive and screws to attach these items.



Pool Pumps

You wouldn't leave home with every light in your house burning. But running your swimming pool's pump harder than it needs to run is a lot like leaving all the lights on. It burns extra energy and costs you money. A typical pool pump can consume the same amount of energy as (25) 60-watt light bulbs.

As a result, it's important to make sure your pool pump is operating as efficiently as possible. The U. S. Department of Energy cites a study which found that making just two adjustments —reducing the amount of time pumps run and installing smaller-sized pumps—saved Florida homeowners up to 75 percent of their original pump energy cost.

Here are some suggestions for decreasing your energy costs:

Cut the pump's operating time.
If the water is circulating as the pool's chemicals are added, they should remain mixed, and most debris can be removed with a skimmer or a vacuum. So reduce your pump's running time to 3 to 6 hours a day, and don't use those hours all at once. Instead, install a timer that will automatically divide those hours into shorter cycles.

Install a high-efficiency motor.
Modern high-efficiency motors consume 20 percent less electricity than standard motors.

Buy a smaller pump.
The larger the pump, the greater the electrical and maintenance costs. Buy the smallest size pump needed for the volume of your pool. The Florida study showed that a .75 horsepower or smaller pump usually is sufficient for residential pools. Consult a pool supplier's design chart to find the smallest pump that will suffice.

If you prefer a large pump to improve vacuum capability, choose a two-speed pump. Most two-speed pumps use 75 watts on low and 1,500 watts on high.

Decrease the water circulation system's hydraulic resistance.
Use wider pipes or decrease the length of pipes, and replace 90-degree elbow pipes with 45-degree ones or flexible pipes. Also consider installing a larger filter.

Clean drains and filters regularly.
Keep drains clear of debris. Clogs make the pump work harder, which wastes energy. Backwash the filter appropriately. Too much backwashing wastes water, but not backwashing enough requires more effort from the pump.

Whole House Fan

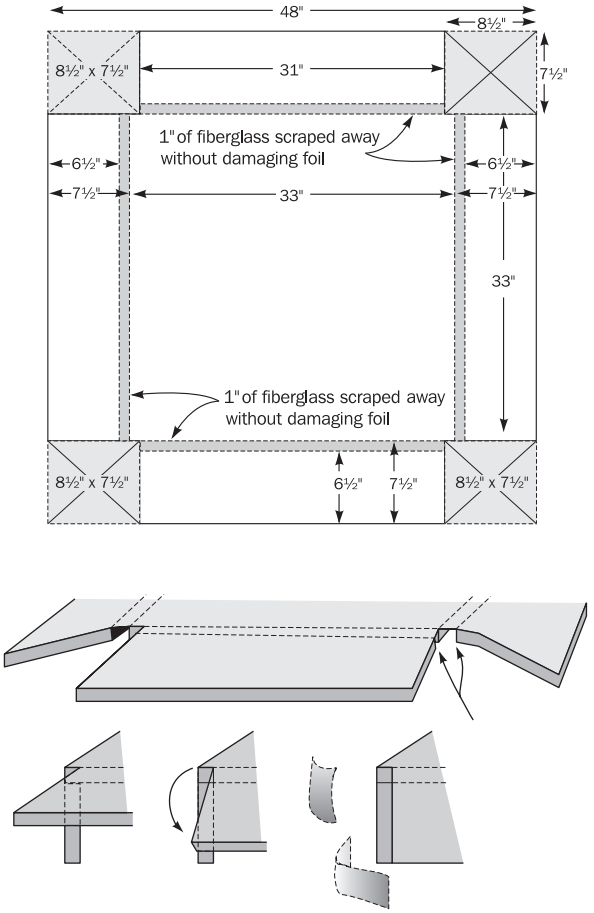
Prior to central air conditioning, whole house ventilations fans were a widely-used strategy to cool off a house at day's end. With central air conditioning becoming the norm for most homes today, use of whole house fans have been abandoned leaving a relic in the hallway ceiling of many homes. This left behind appliance in your ceiling may seem harmless but in fact, it is harmful to your energy bill.

During the winter and summer months, a whole house fan represents a potential energy loss because it is essentially a large, uninsulated hole in the ceiling. Standard fan louvers do not insulate or seal tightly.

To stop the leak, it is best to have the whole house fan removed and the area drywalled. If that is not possible, or if you plan to use the fan in spring and fall, a cover should be built to air seal and insulate this hole during the seasons when the fan is not in operation. The cover may be installed from the attic side, if attic access is easily available, or from the house side. Both covers could be included in excessively hot or cold climates. Homeowners must remember to remove covers before operating the fan and to replace covers during seasons when the fan is not in use.

A typical whole house fan has a 30-inch diameter blade with an additional inch needed for blade clearance. The box can be built from 4-x-4 pieces of one-inch thick rigid fiberglass duct board. The box will typically be a 33-inch square with 1-inch thick walls and be 6 and one-half inches deep. Measure carefully to make sure the box will fit.

Building the box is not difficult, and it can help tremendously with the energy efficiency of a home by sealing the hole in the ceiling.



Weather-strip Doors

If homeowners were aware of a hole larger than a softball in their front door, they would certainly plug it up. Yet there are thousands of homes in which a 1/8-inch-wide crack exists all the way around a door, and that's the equivalent air loss of a 6-inch-square hole.

Weather-stripping doors can dramatically increase a home's energy efficiency while stopping those cold drafts that leave one feeling chilled.

A simple rule of thumb is if daylight can be observed on a closed outside door, there is leakage that needs to be addressed.

Poorly set hinges cause most door problems. First, tighten all hinge screws. If air is still felt coming in, add weather-stripping.

There are many types of stripping materials, each with its own level of effectiveness, durability and degree of installation difficulty.

The following types are installed on the top and sides of a door, but not on the door-bottom.

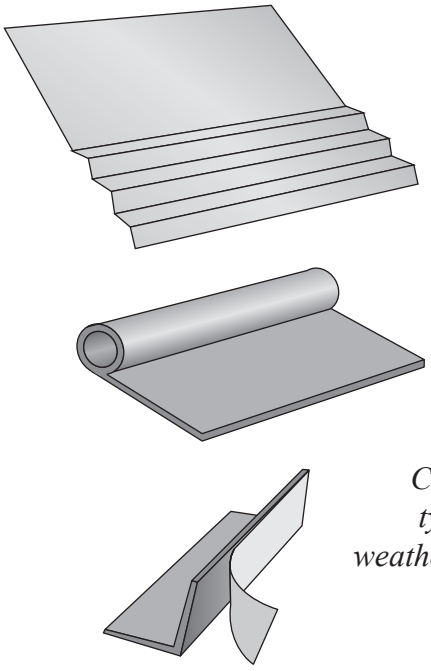
Pressure-sensitive, adhesive-backed foam is cheap and the easiest to apply. Available in both rubber and plastic, it seals out the air and also silences slamming. Other kinds of weather-stripping include rolled vinyl with aluminum channel backing, felt, foam rubber with wood backing, spring metal and interlocking metal channels.

The wood or metal hump on the floor along the bottom of the door is called the threshold. Wooden thresholds can wear down and could need to be replaced.

There are many types of replacement thresholds from which to choose. Many are aluminum and come in standard door widths.

Once the threshold is repaired, install a door sweep to seal the gap between it and the door. Most sweeps are attached to the inside of doors with nails or screws.

In short, weather-stripping doors and replacing worn thresholds can help keep one comfortable in bad weather. These are inexpensive improvements than can be done without having to call a professional.



Common types of weather-stripping

Water Heaters

Heating water for your home can be expensive, accounting for up to 25 percent of your household's total energy costs. That is second only to the heating and cooling system. We want to help you trim these costs.

If you are installing a new water heater, we recommend an electric water heater, which can be more efficient than natural gas or propane. Electric water heater efficiency ratings range from .90 for conventional tank storage units all the way to 3.80 for high efficiency heat pump water heaters.

The traditional water-heating system used in most homes is a storage tank heater. Usually a 50-gallon capacity is sufficient. Your co-op recommends a traditional water heater over the tankless, instantaneous systems, which may require extensive electrical upgrades to your home which causes a very high upfront cost. You can save on heating water by taking several easy steps:

- Reduce energy losses from your tank and pipes. Turn the water heater's thermostat down to 120 degrees Fahrenheit, and insulate conventional tanks with a water-heater blanket and the pipes with insulation. Heat pump water heaters should not be insulated with a blanket. Adding insulation to the tank reduces heat losses by up to 45 percent, which can cut overall water-heating costs up to 10 percent. Pre-cut blankets are available at home-improvement stores for as little as $35. Choose one with an insulating value of at least R-8. Insulate all accessible hot-water pipes, especially within 3 feet of the water heater, using pipe sleeves made with polyethylene or neoprene foam.

Approximate Savings: Hot-Water Retrofits

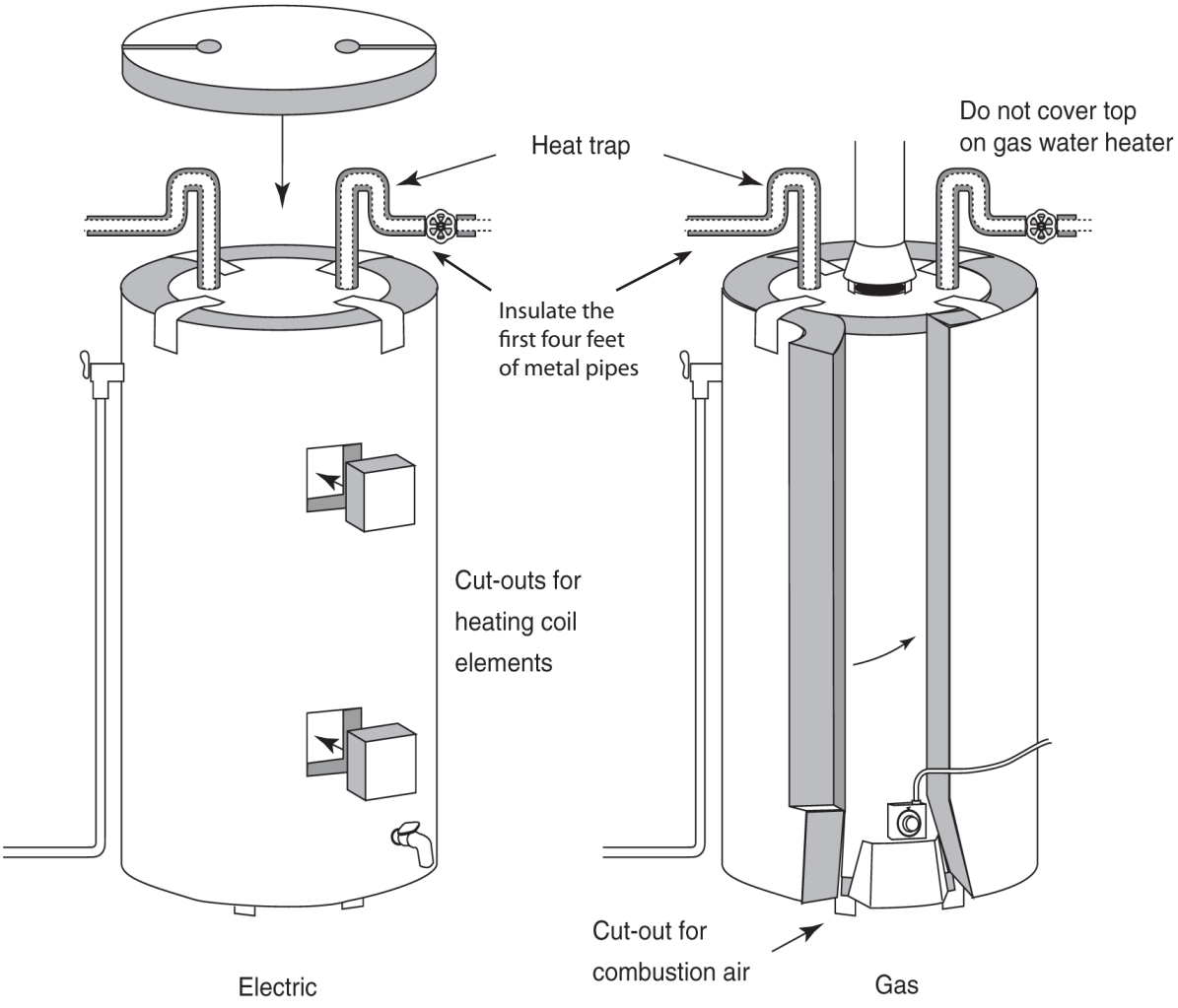
Retrofit	Electricity (kWh)
Reduce tank temperature	100-200
Exterior insulation blanket	150-450
Water-saving shower head	200-400

- Reduce use or waste of hot water by installing low-flow shower heads and faucet aerators to cut hot water consumption by as much as 25 percent. Use cold water for washing clothes whenever possible. Do not turn on the hot water at the sink unless you really need it. When you leave home for a vacation or an extended period, turn off the breaker to the water heater.

New heat-pump hot-water systems can lower water heating costs significantly. If you have a geothermal system, make sure you are using the water-heating capability of the system.

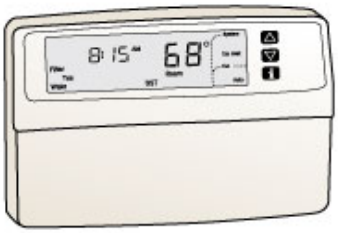
Finally, here's information about instantaneous water heaters, which have no tank and heat water on demand. These units generally cost twice as much as traditional water heaters,

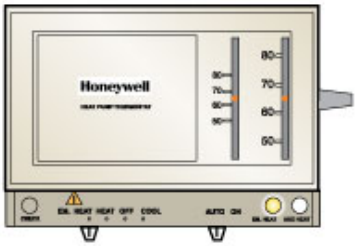
electric service to your home to use them. In order to heat water instantly, the units cause a sharp spike in your home's electric demand. The positive news is that you aren't heating water round-the-clock. The units may be worth considering for vacation homes or buildings with limited use. For further water-heating savings, make sure to look for the ENERGY STAR label when you purchase a new washing machine or dishwasher.



Above are diagrams showing the installation of insulating jackets for electric and gas water heaters.

Heat Pump Thermostats





Among the most effective ways to save money on home energy costs is also one of the simplest: try to leave the thermostat alone.

Many homeowners don't understand how their heating and air conditioning systems really work. Consequently, they waste electricity by pushing the thermostat up or down every time they feel a bit cold or slightly stuffy. This is counter-productive. It wastes energy and drives up your costs.

Here are some ways to use your heating/air conditioning system more effectively.

Set the thermostat at a moderate temperature at the beginning of each season and leave it there. EPA's recommendation is that your winter time setting be around 68 degrees. Many people believe that if they turn their thermostats down at night during the winter, they're saving. But if you own an electric heat pump, you're doing just the opposite.

When you return your thermostat straight to its normal setting the next morning, the thermostat will not use the efficient heat pump to heat the air. Instead it will use the more costly auxiliary/ emergency heat to recover to your normal setting.

When you move the thermostat up more than 1 degree, most thermostats will engage the expensive auxiliary heat.

In general, the average heat pump costs about 45 to 50 cents an hour to operate. But auxiliary heat can cost $1.50 or more an hour.

In the summer, this is less of an issue because no auxiliary power comes on with your heat pump's air conditioner.

Space Heaters

If you use an electric space heater in your home, please be aware of two key issues. Using a space heater can cause a significant increase in your monthly bill. Also, many house fires that occur each winter are caused by improper use of space heaters.

On energy consumption, be aware that space heaters are energy hogs. If you do the calculation on the cost of operation, you'll often be surprised how much your space heater can increase your monthly electric bill.

A typical portable electric space heater consumes anywhere from 1,000 to 1,500 watts per hour. Some people run space heaters during day and night hours. By the time your bill arrives, the hourly costs add up.

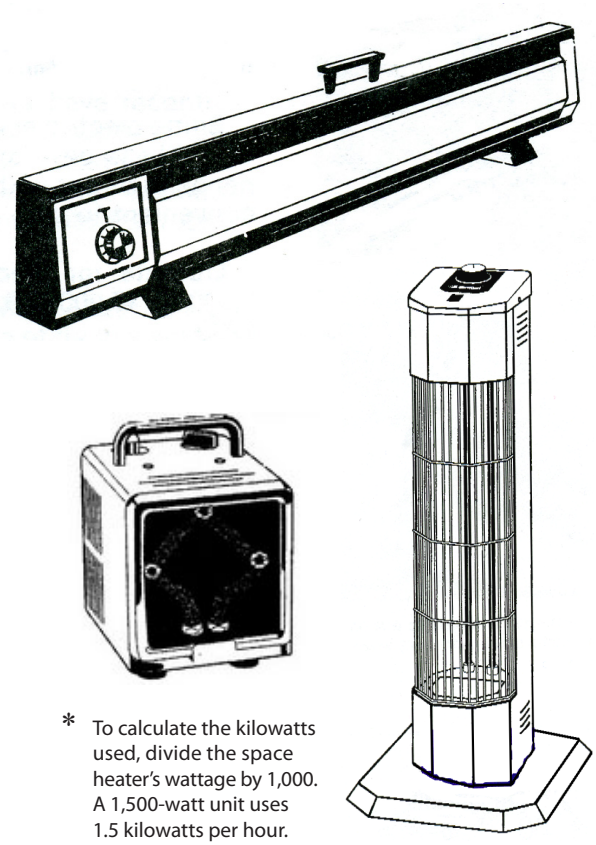
For example, a 1,000-watt space heater operating 12 hours per day at a cost of 11 cents per hour will add $40 more to your monthly electric bill.

If you use a 1,500-watt space heater for the same amount of time, your bill would jump more than $60 each month.

To figure out the cost of operating a space heater you need to multiply the kilowatts used per hour times the cost per kilowatt hour for electricity. Multiply that by the number of hours that the heater is actually on.*

If the cost does not deter you, remember it is critically important to use space heaters safely. Make sure your unit is equipped with automatic shut-off features and heating element guards. Place your space heater out of high-traffic areas and on level, hard, non-flammable floor surfaces — NOT on carpets, furniture or countertops.

Remember to keep space heaters at least three feet from all flammable items such as draperies, blankets and sofas.



* To calculate the kilowatts used, divide the space heater's wattage by 1,000. A 1,500-watt unit uses 1.5 kilowatts per hour.

Sealing Ductwork

Many Kentucky homes are wasting energy and valuable dollars because of air leaks in the duct system.

In forced-air heating and cooling systems, efficiency can be improved by as much as 30 percent by sealing these air leaks.

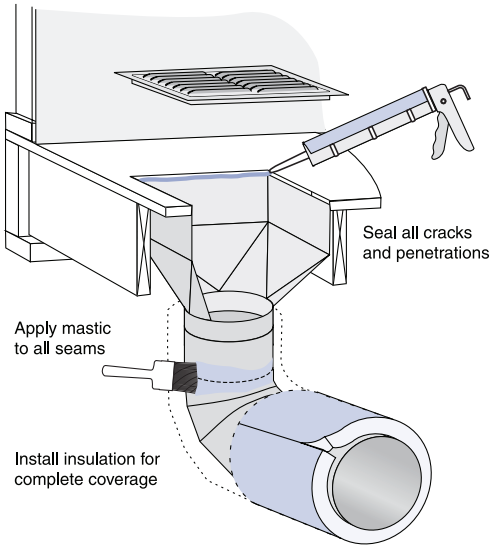
By eliminating leakage in the ducts, the home's heating and air conditioning system can provide improved comfort with decreased run-time. This will result in lower utility bills and improved air quality. It will also extend the life of the equipment.

In most homes, the ducts are usually located in the attic, crawl space or basement.

Provided the ductwork is accessible, sealing it is a relatively simple procedure and often makes an immediate improvement in the circulation of conditioned air throughout the house.

This is accomplished by applying a substance called mastic with a paintbrush to every duct seam, with special attention paid to the return side of the system.

Mastic is a gray (or sometimes white) paste-like substance containing fiber, which is easily spread across the seams of the ductwork. It dries to a solid cement-like quality, providing a permanent solution to unwanted leakage on both the return and supply side of the ductwork.



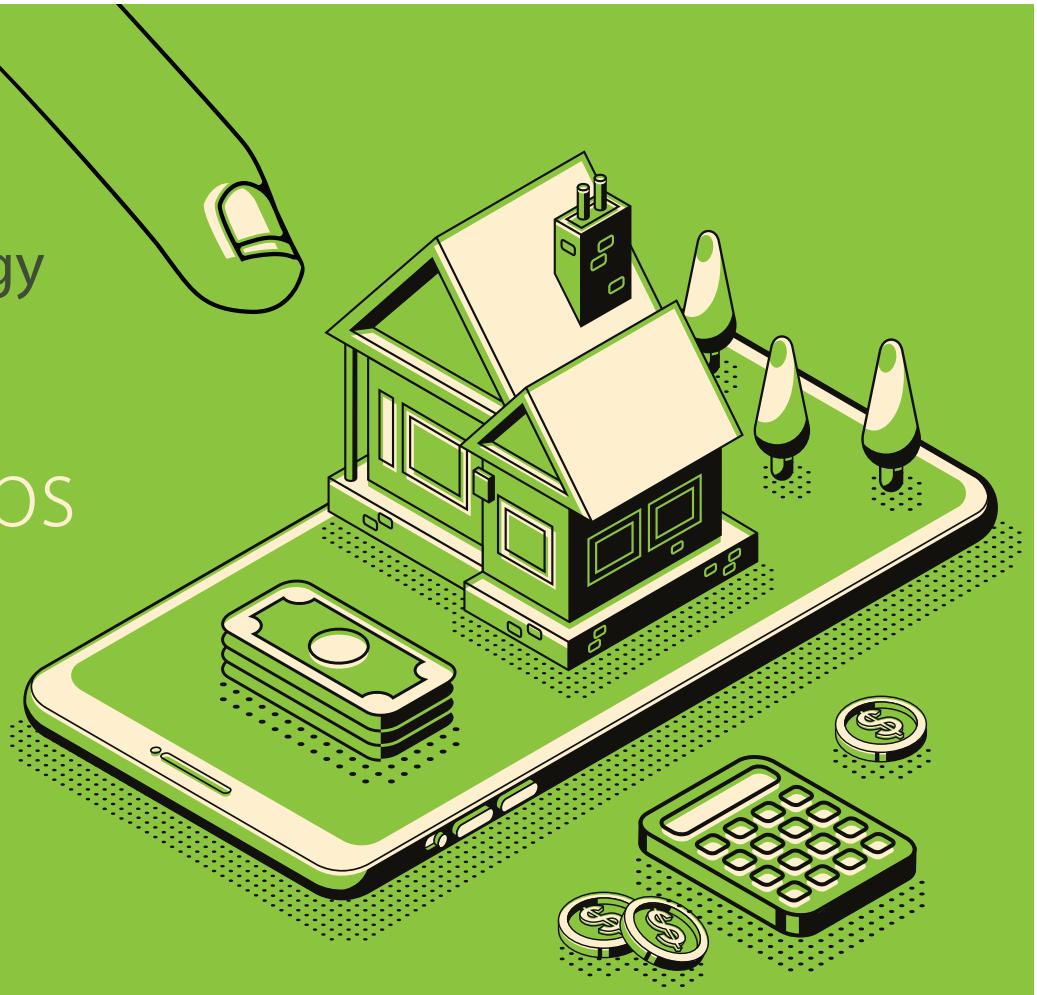
Mastic can be purchased at companies that sell wholesale supplies to heating, ventilation and air conditioning contractors and is commonly known as "duct butter."

Once the leaks are fixed with mastic, additional savings can be achieved by insulating the ducts located in unheated areas with either foil-faced fiberglass duct insulation or foil-faced "bubble wrap." The insulation is simply wrapped around the duct and tied or taped into place.

If the ducts are inaccessible, it's advisable to hire a contractor to conduct a pressure test with a special fan. This duct leakage test can determine if you have serious leakage.

In most cases, a little time spent addressing this issue can make a major difference in the energy efficiency of your home.

Home Energy Solutions... at your fingertips



Complete a no-cost online analysis of your home today. Answer a few questions about your home and we can help to identify opportunities to save on your energy bills. Your personalized energy report allows you to budget home expenses and make informed decisions when it comes to buying energy-efficient appliances. Plus you can feel good about doing your part in saving the planet by cutting down on energy usage.

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