



Getting Ready For The Cooling Season

It's springtime and, while the weather may not have you thinking about summer cooling quite yet, now is the time to start preparing to save on this season's cooling costs. And even if you don't air condition your home, at least this advice will help reduce overheating and increase your comfort level.

Most of the heat that we pay to remove from our homes in summer comes from three sources – air leakage, the roof and windows. If we can block that heat from entering the house in the first place, we can dramatically reduce the cost of removing it! Increasing the efficiency of your air conditioning system is another way to reduce costs.

Reduce leakage of hot air into your home

Hot air leaks into our home through little cracks and crevices in the exterior roof, walls and floor. Start by sealing the small leaks with caulking and the larger leaks with expanding foam.

For homes with ducting in the attic, hot attic air is pulled into our home through leaks in the return duct whenever the fan is running. Several past articles here in the Home Seller Showcase addressed how to seal all of these leaks but most people will be better off hiring a Building Performance Contractor. They can not only measure the before and after leakage rates but they are experts at finding and sealing these leaks most effectively.

Reduce solar heat gain from your roof

Heat from the roof can be a significant contributor to air conditioning costs, especially in cases where the insulation isn't very thick. Let's look at the two types of roofs, those with attics and those without, and see what we can do in each case.

There are more (and lower cost) options in the case of a roof with an attic below than there are with a vaulted roof. The most cost-effective approach for a roof with an attic is to add insulation. This will not only reduce summer cooling costs but winter heating costs as well.

The next most cost-effective solution is a radiant barrier. Detailed monitoring of summer afternoon temperatures in attics have shown the temperature several inches down into the insulation in the attic floor to be hotter than the attic air! A radiant barrier is a foil-faced material that reflects the radiation from the roof sheathing away from the attic floor. The barrier should be installed either on the underside of the plywood sheathing (new construction) or hung between the rafters (existing buildings). A continuous ridge vent, soffit/eave vents, or both must be added to ventilate the trapped heat away.

I don't recommend a radiant barrier simply be laid out on top of the ceiling insulation because they will gather dust and, over the long term, become less effective; it's worthy to note that California's energy code allows an energy credit when the barrier is properly installed, but not when it's laid out on the attic floor.

An analysis we did recently for a home with R-19 fiberglass ceiling insulation (about 6" deep) found that bringing the attic insulation up to R-30 saved about \$70 per year whereas the radiant barrier saved about \$40/yr. As a general rule, the greater the R-value in the ceiling the less savings one can expect from a radiant barrier. In new construction, where the roof sheathing can be purchased with a radiant barrier already glued onto the side facing the attic, a radiant barrier should always be specified.

Another approach to cooling down your roof is to use a "cool roof" roofing product. Cool roof products use special pigments in the coloring designed to reflect more solar energy than typical colors do. A cool roof will reflect a portion of the solar heat away from the roof surface before it can be absorbed and conducted into the home.

While attic ventilation is important for eliminating the potential for moisture to accumulate in winter it does very little to reduce air conditioning costs in summer. Contrary to popular belief, attic fans are not recommended as a cost-effective strategy for reducing cooling costs. Many studies of actual attics, using sophisticated measurement and monitoring techniques, have shown a small to insignificant reduction in air conditioning costs resulting from the use of an attic fan. This is because attic

ventilation does nothing to stop the radiant heat transfer between the underside of the roof sheathing and the attic floor, which is the predominant mechanism through which solar energy heats the attic floor and, in turn, the home.

In the case of an existing vaulted roof, insulation levels can be increased at the time the roof is re-roofed by adding rigid board insulation on top of the existing roof after the old roofing is removed. A cool roofing product can also be added to reflect away a portion of the solar that would otherwise be absorbed by the surface.

Reduce solar heat gain from your windows

Any windows allowing direct sun to enter the home in the summer are another source of heat gain that's best stopped before it gets in because, once it's in, it'll cost money to remove with your air conditioner!

Solar screens on the outside of your windows are about twice as effective as anything you could put on the inside. Do-it-yourself solar screens can be made from solar shade screen available at most hardware or nursery supply stores and attached with grommets or installed in a frame. Professionally fitted and framed solar screens start at about \$4.25/sf and go up from there depending on the mounting and operating system (some systems use motors to automatically roll screening up and down).

More efficient cooling

If your air conditioner is 15 or 20 years old it's closing in on the end of its useful life and it should be replaced. High efficiency units are now available to help reduce costs and are rated with what's called a SEER (Seasonal Energy Efficiency Ratio). The minimum SEER for a replacement unit is 13 whereas an older existing unit might be 9. The ratio of 9/13, or 0.69 as a fraction, means the replacement unit will use 69% of the energy of the old unit for a savings of 31%.

An alternative to standard (compressor-based) air conditioning is evaporative cooling, aka a "swamp cooler." We use the term "evaporative air conditioner" or "evaporative cooler" now instead of "swamp cooler" because the technology has advanced significantly beyond the old aspen-pad coolers. These high-tech evaporative coolers are, to borrow the jingle from the Oldsmobile ads, "not your father's swamp-mobile!"

The SEER of these new coolers is around 40 or higher, meaning they use less than 25% of the energy of an air conditioner. These coolers can deliver air at 65 F under worst-case design conditions in our climate but, because they require more air flow than an air conditioner, the ducts must be larger. To assure the indoor air doesn't become "swampy," we use automatic ceiling vents to give the large volume of air coming into the home a path out of the home, avoiding the need to open and close windows. They're also helpful for night-cooling your home with outside air (no moisture), further reducing the need for cooling the following day.

If you've ever tried to find an air conditioning contractor available during a heat wave, you know it's best to act proactively and not wait until the last minute. So, now that you're "armed and ready" to fend off high summer air-conditioning bills, there's plenty of time to prepare before the heat hits!



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