

Home Cooling Tips

Most homes in Hawaii are hot during the summer months and in order to stay cool homeowners typically install air conditioners and pay the resulting utility bill or they seek the shade, lie quietly and sweat it out. Are there any other choices?

There are at least two basic strategies to consider:

1. Reduce the heat gain
2. Explore alternative cooling methods

Reduce the Heat Gain

The best strategy for keeping a dwelling cool is to keep it from getting hot in the first place. This means preventing outside heat from getting inside, and reducing the amount of heat generated inside by inefficient appliances like incandescent lights, unwrapped water heaters, or older refrigerators.

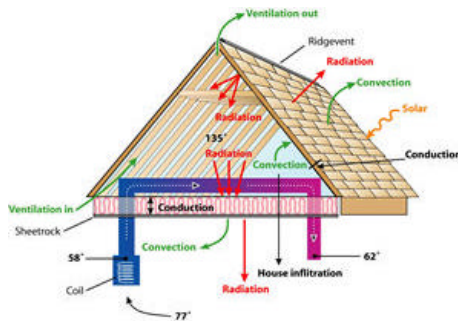
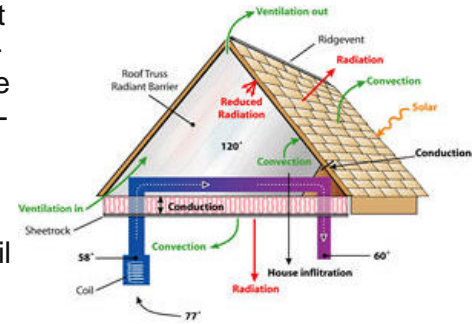
Eighty to ninety percent (80%-90%) of the heat inside of a house comes from the roof. The heat from the sun radiates on the

surface of the roof where it is conducted to the underside of the roofing system. From there it re-radiates into the attic space (or in the case of a cathedral ceiling into the airspace between the rafters, drywall and roof deck). It is again conducted into the drywall to re-radiate into the interior of the home. The radiant heat from the ceiling is the primary reason why cooler outside air is heated up inside of the house as it moves through the windows and across the surface of the walls and ceiling, AND the main reason why

homeowners in Hawaii turn to air-conditioning.

The very best building product to stop the heat from getting into the house from the roof is a Reflective Foil Radiant Barrier. Made of

99% aluminum, a radiant barrier can block 95-97% of the radiant heat that passes through the roof – which is the best strategy for keeping a dwelling cool. Such barriers are typically stapled to the underside of attic rafters to lower summer-time attic temperatures. Laying these barriers on the attic floor is also an option, but it is more effective under the rafters. Lowering attic temperatures—which can easily reach 160°F on a sunny day—reduces heat penetration into the living space below and is also a very cost-effective measure to lower air conditioning bills. A study by the Florida Solar Energy Center found that properly installed radiant barriers reduced cooling loads by up to 21%. The study also found that temperatures of the roofing materials were only increased by 2°F to 10°F, which will have little or no impact on the life expectancy of a shingle.



Explore Alternative Cooling Methods

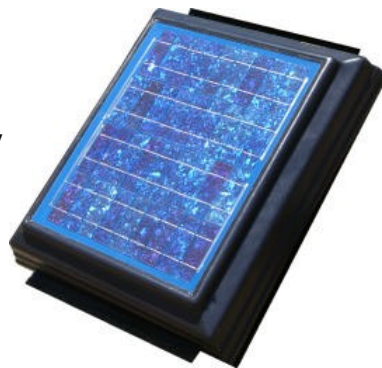
Shading that blocks summer sun on the east, south, and west sides of your house, but not summer breezes, is another effective way to keep your home cooler. Planting shade trees, particularly on the west and south sides of your house can greatly increase comfort and coolness. Awnings, porches, or trellises on those same sides of a building will reduce solar gain through the walls as well as through the windows. A home's inside temperature can rise as much as

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20°F or more if the east and west windows and walls are not shaded.

Windows, for too long, have been a hole in the wall that lets light and heat through. Windows, even so-called "thermopane" windows, have very low R-values. Single-pane units have an R-value of 1. Thermopane, or dual-glazed windows have an R-value of 2. Both are pretty miserable. Conventional windows conduct heat through the glass and frame, permit warm, moist air to leak in around the edges, and let in lots of unwanted heat in the form of solar radiation. South-facing or West-facing windows with properly sized roof overhangs or awnings won't take in the high summer sun. Using and energy rated glass (such as Low-E) for reducing heat gain through the glass is an option for new homes or for homes that are willing to retrofit their older windows.

Ventilating your attic is important for keeping cool as well. Roofs can reach temperatures of 180°F, and attics can easily exceed 160°F. If there is no radiant barrier installed, this heat will eventually conduct through the ceiling even if you have insulation installed above the ceiling (Fiberglass Insulation can only slow down radiant heat, NOT stop it). There are several ventilation products on the market to include solar powered attic fans, ridge and gable vents. Solar-powered vent fans are a very cost-effective way to remove unwanted heat and they operate all day free. Any heat that is removed from the attic space is heat that is not conducted by the ceiling. ALSO, the solar-powered vent fan is an excellent product for remov-



Solar Fan

ing the heat radiated from an open-beam ceiling. More passive ventilation products include gable and ridge vents that provide greater cross ventilation within an attic.



Ridge Vent

Weatherization, usually done in northern climates to keep heat in, can also effectively keep out heat and humidity in the hot, humid climates or seasons. Cutting air infiltration by half, which is easily done, can cut air conditioning bills and save \$50 to \$100 or more per year in the average house. Much of the work done by an air conditioner in humid climates goes into removing moisture, which increases comfort. Reducing air infiltration is more important in humid climates than in dry ones.

In summary—If you are building a new home, there are several things to take into consideration before you lay your foundation. First, understand how the trade winds move in the area you plan on building. Next orient the home and the interior walls, if possible, to allow for the trade winds to move freely through the home. In either case, install reflective foil radiant barrier in the roof system and on the exterior walls. Allow for as much ventilation in the roof system as possible.

If your home is already built, you can lower the interior temperature significantly by installing a reflective foil radiant barrier in your attic and increasing the attic ventilation as much as possible with a solar fan, ridge or gable vents. In homes with open beam or cathedral ceiling use a solar fan to remove the interior heat. For professional assistance call an Energy Analyst at Pacific Solar Technologies 808-330-1194