



## 'Cool' roofs – a hot idea?

**This hidden-in-plain-sight upgrade can mean saving on your electricity bills and enjoying a much more comfortable home during hot summers.**

Source: [MSN Real Estate](#)

By: Christopher Solomon



Linda Hanson is accustomed to long, hot summers, and she wanted to find a new way to reduce her cooling costs.

Hanson owns a home in Canyon Lake, Calif. "The average temperatures out here are well in the 100s all summer long, so our (electricity) bills were \$800 a month. It was pretty outrageous. We could not cool the house down. We'd run the air conditioner all the time."

A big problem was the original concrete tile roof, which sat on the rafters and radiated that heat right into the house.

Then Hanson and her husband swapped out that roof for a so-called "cool roof" of green tiles on their 3,000-square-foot house. (They made other improvements, too, such as upgrading the home's windows and adding [attic insulation](#).)

"We also put a swimming pool in, and even with that swimming pool, with the filter running, our bills in the summer are probably 200 bucks a month less," she says.

The best part, she says, is "my house is comfortable all the time."

Hanson's savings may be dramatic, but they illustrate the point: Installing a cool roof is a hidden-in-plain-sight way to cool your home, shrink your electricity bill and help the planet. It's such a simple, smart idea that Energy Secretary [Steven Chu](#) endorsed the idea in a meeting with Nobel laureates last year.

### **An old idea made new**

Inhabitants of places such as Bermuda and the Greek isle of Santorini have long known that painting their roofs white to reflect sunlight can keep their homes cool. Studies bear that out: While black surfaces such as traditional built-up asphalt shingle roofs can reach 185 degrees, a roof that's white can be up to 70 degrees cooler because it bounces so much sunlight back into space.



"The science of it is very basic," says Hashem Akbari, a leader in the study of cool roofs and a professor at Concordia University in Montreal.

White roofs make sense particularly on commercial buildings because those buildings have their cooling systems on most of the year as computers and other machinery inside them create heat, says Chris Scruton, a project manager in the California Energy Commission's research program in building energy efficiency. With a white roof, "As much as 75 or even higher percent (of sunlight) can be reflected," Scruton says.

## Choose your hue

That's great, you say, but what if you don't want a white roof on your Colonial?

You're in luck. There's a roof for you, too.

Manufacturers can make colored cool roofs that stay much cooler than traditional colored roofs. They add pigments or glazing to [roofing materials](#) that reflect infrared light back into space. That unseen infrared light makes up 52% of light that falls to Earth; we can't see it, but we feel it in the form of heat.

These cool roofs can take the form of tiles, shingles or metal. California's [MCA Clay Roof Tile](#), for instance, makes [33 cool roof tiles](#), with reflectiveness ranging from just over 30% (for many of the dark-hued tiles) to 76% (for "White Buff"), says Yoshi Suzuki, president and CEO. Traditional dark asphalt roofs only have about 5% to 15% reflectiveness.

[Custom-Bilt Metals](#) of Chino, Calif., [Classic Metal Roofing Systems](#) of Piqua, Ohio, and other [metal roof](#) manufacturers have added pigments to their line of painted metal roof products.

"People are starting to catch on" to the benefits, Suzuki says, but "it's not so much residential yet." In 2007, about one-quarter of the commercial roofing market consisted of Energy Star-rated (that is, highly efficient) roofing products, compared with about 10% of the residential market.

## The pros of a new roof

Experts say cool roofs have several benefits. First, a cooler roof knocks down your need for AC during the times of highest demand, when juice is most expensive. That saves you money.

How much? That's trickier to answer. Studies have shown wide variation in electricity savings. A 2004 report that looked at more than 25 articles about the cooling energy used by buildings with cool roofs found the [energy savings](#) ranged from 2% to more than 40%; the average savings was about 20%.

A more realistic number to expect is a 6% annual reduction in your electrical bill, says William Miller, a research scientist for the Building Envelopes Program at the Oak Ridge National Laboratory in Tennessee. "That's a fair number for a building that already has code levels of insulation," Miller says. (You can increase the effectiveness of

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a cool roof by making other improvements, such as adding [attic insulation](#) and radiant barriers and relocating ductwork from the attic, he says.) There are other benefits to a cool roof, too. Less of the sunlight that hits a cool roof is transformed to heat, and so less heat is transmitted to the air. That reduces smog and makes you and everyone else healthier. Akbari has calculated that every 100 square feet of roofing that's converted from dark to white is equivalent to offsetting the emission of one ton of carbon dioxide. For a 2,000-square-foot roof, that's like 20 tons of atmospheric carbon offset. "It's a win-win-win," he says.

"A worldwide installation of white roofs on low-sloped and colored roofs on sloped roofs in hot and temperate cities of the world will offset the emissions of all the cars in the world for the next 10 to 12 years," Akbari says.

Furthermore, a study released earlier this year — the first computer modeling of the effects of painting all the roofs white in urban areas worldwide — found that doing so would reduce the "urban heat island" effect in cities by an average of about 0.7 degrees Fahrenheit. The greater New York area would cool on summer afternoons by nearly 2 degrees, the model showed. Talk about neighbors helping neighbors.

## So what's it gonna cost me?

Anything that works so well is going to be expensive, right? Not so fast.

Cool roof products can cost little to no more than old-school products, Akbari says. The [Environmental Protection Agency](#) estimates that the cost premium for cool-roof products ranges from zero to 20 cents per square foot. Custom-Bilt Metals, for one, says that the reflective pigments add only about five cents per square foot to the finished product, which pays for itself within three years because of the building energy savings.

There is, however, a so-called "heating penalty" for having a white or cool roof, because in winter the roof doesn't keep the house as warm. "The wintertime penalties of a white roof can become as much as 30% of the summertime savings," Akbari says.

Still, he says, the odds pencil out in your favor. "Here is the bottom line: In any building that requires AC in the summer and heating in the winter, by having a cool-colored roof or a white roof, you'll save money," he says. "If you do not need any air conditioning at all — such as some residences in northern Alaska — and comfort is not an issue for you, you do not need a white roof."

Some utilities and groups — such as California's [PG&E](#), the [Sacramento Municipal Utility District](#) and [Florida Power & Light](#) — offer rebates or incentives for installation of cool roofs. And [federal tax credits](#) are available for those who install approved [Energy Star](#) metal and asphalt roofs on an existing, principal home.