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## How white roofs shine bright green

Painting homes a lighter shade does more than save money on A.C.

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Painting a black asphalt roof with the reflective white coating, however, is obviously more expensive than the black surface alone. But energy savings largely offset the price of painting through reduced air conditioning costs, Dr. Rosenfeld says.

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In the southwest, cool-roof pastel colors or bright white tile can cost a bit more than the standard reddish color – although there are tile suppliers that charge about the same cost for cool colors, roofing industry experts say.

“I went through their calculations and got roughly the same numbers,” says Michael MacCracken, former director of climate-change research under President Bill Clinton.

“Some of it is a bit idealized. But what they say is a valid thing to do for any single building ... and seems valuable for an urban area to try to reduce heat-island effects while realizing some contributions for the globe as well.”

Still, not everyone is enthusiastic. Roofing contractors who specialize in solid black asphalt-based roofs and roofing materials have told Akbari they think the idea is for the birds. Even those who like the idea worry it will run into resistance from homeowners who don't like white.

Right now in California the Old World “vintage look” in clay tile – dark reds or browns – is more popular, not the light greens, blues, and pinks that some cool-roof tile companies offer.

“I personally think all-white rooftops and walls are beautiful,” says Yoshi Suzuki, president of MCA Clay Tile in Corona, Calif. “But not everyone likes white.... Even with a rebate we are finding the cool-roof colors can be a tough sell.”

But that reticence will change in July 2009 when California begins requiring sloping rooftops (mostly residential) to be light-colored cool-roof colors, if not white, Rosenfeld says.

One reason: The mandate will be an economic boon to homeowners, he says. Past studies have shown that white roofs' net energy savings (cooling-energy savings minus heating-energy penalties) are around 20 percent. Such savings would save the United States more than \$1 billion a year on air conditioning, the study says. Getting the white-roof ethos rolling could be a challenge. But two paths could spread white roofs worldwide, Rosenfeld says. In the US, growing economic incentives for cool-roof standards to lessen homeowner cooling costs will promote the spread of California building standards. Outside the US, he and Akbari say they will push to develop a program at the UN or the Clinton Foundation.

#### Are the benefits 'overstated'?

While geoengineers like Alvia Gaskill say the research was worthwhile to focus attention on the issue, the study “greatly overstates the benefits,” he wrote in e-mailed response to the study.

Mr. Gaskill, president of Environmental Reference Materials, a consulting firm in Research Triangle Park, N.C., argues that something much larger and more direct is needed. For example, aircraft could spray sulfur-based compounds into the high atmosphere to reflect sunlight back into space. The effect would be similar to what clouds from volcanic eruptions have done over history. (He also had proposed the idea of plastic sheeting for the Sahara.)

“I'm in favor of doing these types of calculations and proposals,” Gaskill says. “But I'm not sure you can really apply a Los Angeles type model to Lagos, Nigeria, or places in China.”

But Rosenfeld says many obstacles will dissolve in the face of the profit motive.

India and China are already eligible under Kyoto's Clean Development Mechanism (CDM) to be paid for projects that qualify as carbon offsets. Prices for CDM offsets for CO2 now run \$25 per ton, Rosenfeld says. Putting cool-roof standards into building codes could mean CDM payments of \$250 for every 1,000 square feet of white roof area. "That's a pretty good incentive," Rosenfeld notes.



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