

Cool It: White Rooftops and the Urban Heat Island

Source: greenismything.com

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I recently came across a [clip](#) online that stated a cumulative 24 billion metric tons of carbon dioxide (the amount emitted by the entire world in 2010) could be kept from the air by painting every roof in the world white. How is this possible? And, why are the two facts related?



The simple explanation is that dark colors like black absorb heat, while lighter colors like white reflect heat. If every roof were painted white, more sunlight would be reflected (rather than absorbed), which would then lessen the need to crank up air conditioners and other demands on energy.

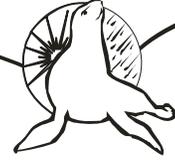
The principle behind this phenomenon is called the Urban Heat Island. According to the EPA, [pavement temperatures](#) can be between 50 and 90°F hotter than air temperatures. Cities are home to higher amounts of pavement than more rural areas, and this concentration of pavement causes the air temperature in cities to be as much as 22°F warmer than the air in less developed neighboring areas. Naturally, the hotter temperatures lead to increased energy consumption (and thus increased carbon emissions). In fact, [White Roof Project estimates](#) that 10% of urban electricity demand is compensation for the Urban Heat Island effect.

In a stunning comparison between a white roof and a dark roof, [White Roof Project](#) reveals that when the air temperature is 90°F, the surface of a dark roof is 180°F, while a white roof is only 100°F! The inside temperature of those buildings (without air conditioning) is 115°F vs. 80°F, respectively. That is a huge difference! This enormous difference in temperature is due to the fact that dark roofs only reflect 20% of sunlight that hits them, while white roofs reflect 85% of sunlight. Who knew that such a simple action could have such a measurable difference?!

Along with more reflective roofs, [EPA lists](#) several other ways to reduce the Urban Heat Island effect, including:

Energy Seal Coatings

Acrylic Coatings for Roof and Wall Applications



1. Planting trees and other vegetation near buildings to provide shade and cool the air through evapotranspiration (the process of using heat to evaporate water and thus cool the air).
2. Planting rooftop gardens (called green roofs) also provide shade and evapotranspiration, but they have a greater direct effect on individual buildings because they cover the rooftop's dark surface.
3. "Cool pavements," which are new paving technologies designed to reflect more solar energy and enhance water evaporation.

I love the idea of more reflective rooftops. It is such a simple way to make a big difference. Having lived in a big city on the East Coast for a few years, I can attest to how miserable summer heat in the city can be. I have one big question, though: this seems to be a great solution for large apartment buildings and office buildings, but what about houses with slanted roofs? You can't plant a rooftop garden on a slant, and shingles would be pretty tough to paint white. I guess planting tall trees and increasing vegetation around the house is the way to go until they come up with "cool shingle" technology. Any entrepreneurs interested?