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Hashem Akbari's cool anti-global-warming plan

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If Hashem Akbari's plan to stave off global warming is realized, it will come one rooftop at a time.

Akbari, a senior scientist at the Lawrence Berkeley National Laboratory, and a group of fellow geoengineers who are trying to counter the effects of climate change, have developed a relatively simple idea to offset carbon emissions and cool the Earth's urban surfaces: Make all rooftops and paved surfaces white.

Or at the very least, convert them to cool gray colors to reflect the sun's rays, instead of attracting and absorbing heat.

"We won't be solving the problem of global warming, by any means," Akbari said, "but we will be buying ourselves a little bit of breathing time."

Akbari, 59, who has published several papers and studies on the cooling effects of white surfaces, is hoping to launch a 100 Cool Cities program in which the hottest urban municipalities internationally would convert government-owned buildings to white roofs and offer homeowners incentives to make the switch.

"There are billions of roofs out there we'd have to change," Akbari said inside his office at the Lawrence Berkeley campus, beneath a roof that converted two years ago at Akbari's suggestion. "So this cannot be purely an informational program. This would have to be an action program, where the entire world organizes under one winning flag."

The concept of painting homes and buildings light colors to reflect heat is an old one, Akbari said. Growing up in Tehran, Akbari recalled large white structures in the desert that captured night wind to cool the building, keeping the people inside comfortable. Homes built along the banks of the balmy Mediterranean are still painted white to this day, Akbari noted.

In one study of a "heat island" - a densely packed urban area - Akbari and his team focused on the Los Angeles Basin and found that if all black surfaces were converted to white, the surface temperature could drop as much as 5 degrees. With cooler and cleaner air, a domino effect would occur: Less smog and pollution means fewer health problems, which lead to savings in medical bills. A cooler temperature also means less air conditioning, lower energy use, lower utility bills and so on.

In September, Akbari and his team published a study in the academic journal *Climatic Change*, which found for every 100 square feet of black rooftop converted to white, a building owner could offset about 1 ton of carbon dioxide.

Add to that all the world's paved urban surfaces (Akbari recommends converting black asphalt to an aged concrete color instead of white), and the team concluded enough cooling benefits to offset 44 billion tons of CO₂.

Put another way, that's roughly the same amount of CO₂ the planet emits every 18 months.

Arthur Rosenfeld, a co-author of the study and a commissioner with the California Energy Commission, said the team estimated a worldwide conversion to white rooftops would take at least 20 years.

Rosenfeld added that California is the only state to embrace white roofing, at least on commercial projects.

In 2005, with the aid of Akbari's research, the state passed Title 24, a new building standards law that requires all builders and owners of commercial flattop roofs to first consider cool colors for major retrofits or new buildings.

The roofing industry has responded well, Akbari said, designing new materials and cooler colors to appeal to builders and home owners who are seeking cost savings and ecological benefits.

Some homeowners may wonder if they can paint their roof white today, and if it will have immediate benefits.

"I wouldn't stop you if you wanted to paint your rooftop white right now," Akbari said with a smile, adding that the proper materials may be more cost-effective in the long run.

"However, it will be good for you, it will be good for your neighbors, and it will be good for society."

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