

## Scientists say white roofs promote “Global Cooling”

*Below is a press release from the California Energy Commission dated September 9, 2008.*

SACRAMENTO — California scientists today announced a formula to calculate how much carbon dioxide (CO<sub>2</sub>) can be offset by increasing the reflectivity of urban surfaces like rooftops. The news was announced at the California Energy Commission’s Fifth Annual Climate Change Research Conference.

“White roofs can cut a building’s energy use by 20 percent and save consumers money,” says California Energy Commissioner Art Rosenfeld. “The potential energy savings in the U.S. is in excess of \$1 billion annually. Additionally, by conserving electricity we are emitting less CO<sub>2</sub> from power plants,” Rosenfeld added.

Together with Rosenfeld, Lawrence Berkeley National Laboratory (LBNL) scientists Hashem Akbari and Surabi Menon have successfully quantified the effects of white roofs in populated settings in terms of CO<sub>2</sub> offset. In a study to be published in the scientific journal “Climate Change,” Akbari, Menon, and Rosenfeld estimate that replacing nonreflective, dark roofing materials with white ones on an average house with 1,000 square feet of roof would result in an equivalent CO<sub>2</sub> offset of 10 metric tons annually. With an offset value of \$25 per metric ton, that could be worth \$250, according to European CO<sub>2</sub> markets.

Scientists have known for centuries that putting white roofs on homes and buildings is a simple and effective way to reflect the sun’s powerful rays. Similarly, cool-colored pavements aid in the reduction of “urban heat

islands.” When rooftops and pavements are more reflective, global warming can be reduced.

Since 2005, commercial buildings with flat roofs in California have been required to have white roofs. Residential sloped roofs are also becoming more efficient. Beginning in 2009, new residential roofs and retrofit constructions in California will be required to have “cool-colored” roofs which reflect a higher fraction of the sun’s rays than current roofing materials of the same color.

Because white roofs act as a geo-engineering technique to cool the earth on a global scale, Akbari, Menon, and Rosenfeld propose an international campaign to organize 40 of the world’s largest cities in tropical and temperate zones to develop programs to require white roofs and “cool pavements” when roofs are initially constructed and pavements installed. The projected estimate for worldwide CO<sub>2</sub> emissions in 2025 is 37 billion metric tons; a proposed global CO<sub>2</sub> offset would be 44 billion metric tons, valued at \$1,100 billion, and enough to offset more than one year of the total global CO<sub>2</sub> emissions.

“This idea of a ‘cool cities’ campaign could lead to significant energy savings, improved air quality, reduce the heat island effect in summer, and more importantly, cool the globe,” says Hashem Akbari. “This simple and effective idea can organize the world into taking measured steps to mitigate global warming. Our findings will help city leaders and urban planners quantify the amount of CO<sub>2</sub> they can offset using white roofs and cool pavements.” ■