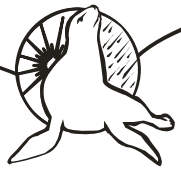
White roofs are cool

Concordia prof Hashem Akbari is on an international mission to convince heat-trapping cities that a building's colour can affect climate change

Source: Montreal Mirror
By: Heather Robb

BOUNCING RAYS AWAY: Akbari
Photo by WILL LEW

While "cool roofs" may seem like a new buzz phrase, the advantages of white roofing are not a recent discovery, notes Concordia Engineering professor and global expert on the topic Hashem Akbari. Folks living in the Mediterranean region have been hip to the concept for 5,000 years. They have long understood that by using light coloured materials to cover the tops of their homes, they would create a cooler interior, a reprieve from the intense Mediterranean rays. Cut to the 21st century city—with its smog reports and its thousands of jacked-up air conditioners threatening blackouts during peak hours. Here in Montreal, memories of the summer's heat waves and of skin sticking to the metro's seats are not so far behind us. And so ideas on cooling down the city seem quite relevant.



Akbari's research takes the ancient idea of white roofs and applies it to a modern context. In essence, a white roof will reflect sunlight rather than absorb it, and thus will stay significantly cooler than a dark one. According to Akbari, during a sunny day, the surface of a black roof can be roughly 38°C warmer than the air temperature, while a white roof is only around 9°C warmer. In turn, the building beneath the white roof is not as hot, thus reducing the energy needed for air conditioning.

"Typically with a white roof you save about 10 per cent of the air conditioning load for the floor directly beneath the roof," Akbari says.

Better yet, citywide installation of white roofs could help take the edge off the urban heat island effect—wherein cities are hotter than surrounding rural areas due to the quantity of heat-retaining materials like asphalt. Cool roofs could lower ambient temperatures in the city by a few degrees, and improve air quality. Besides, less energy used means less carbon emissions, which can help slow down the effects of climate change.

Should we all then be climbing up the eaves with rollers and buckets of paint?

"You have to consider that every building needs to be re-roofed every 10-20 years anyways," says Akbari. "When the time comes, there is an assortment of colours available for new roofing. If you choose the right colour at that time, there would be no additional cost."

Aside from re-roofing, there are various cool roof coating products that can be applied to existing roof surfaces. And for those who prefer the look of a dark roof, there are products that look dark but have "some of the cool roof technology in them," he says.

For many years, Akbari was the leader of the Heat Island research group at Lawrence Berkley National Laboratory (a satellite campus of the University of California). Since then, he has helped many U.S. states to develop cool roof policies, and hopes to take the message further.

"In the international community we've been working with several other countries such as India, some Middle Eastern countries, Pakistan, Taiwan and China in order to help them with the development of standards appropriate for their own climate," he says.

Here in Montreal, Rosemont-La Petite-Patrie mayor François Croteau has started the ball rolling by proposing a bylaw requiring all new roofs in his borough to be cool roofs. Akbari insists that even in a place like Montreal, with long winters and many days of heating, cool roofs are worthwhile, given factors like shorter sunlight hours during winter and snow on the roofs. Croteau's bylaw is expected to pass next month.