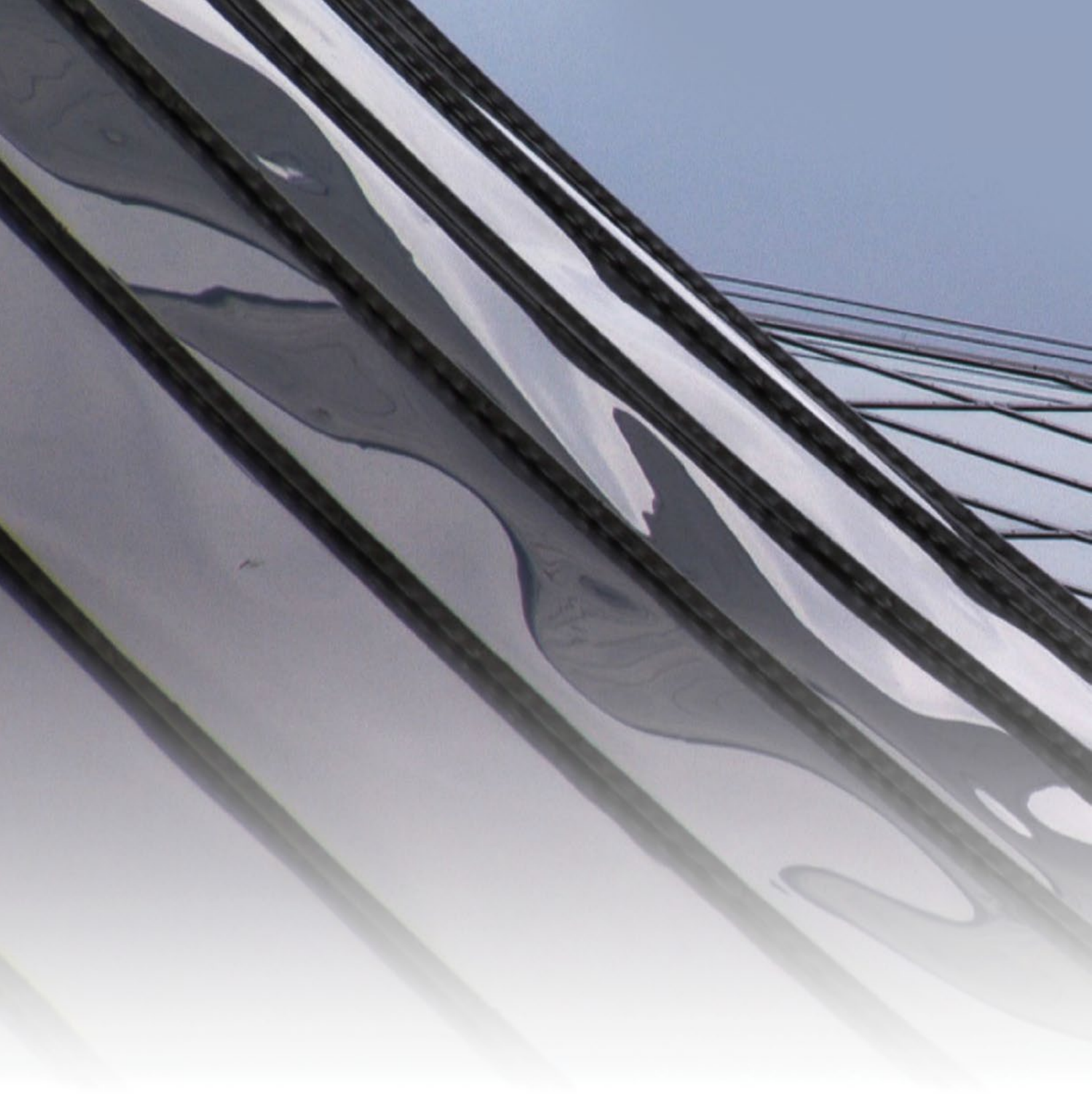

THE SOLAR REFLECTANCE OF STAINLESS STEEL

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Briefly outlined within the Contrarian Metal Resources feature, was the solar reflectance of stainless steel, particularly their Invarilux product. In this special companion piece, we spoke with CMR President Jim Halliday, Vice President Fred Deushel, and Dr. Michael McGuire to learn more about this unique quality, which benefits both insulation values and global temperatures.

Sharing how the discovery was first made while installing InvariMatte ATI 2003 Stainless Steel on the Hamad International Airport in Doha, Qatar. Much to his surprise, the roof was giving off far less heat than was expected. Of the discovery, Halliday says, "We were up on that roof, Fred and I, with some of our customers' people that were installing the roof made of our material. I

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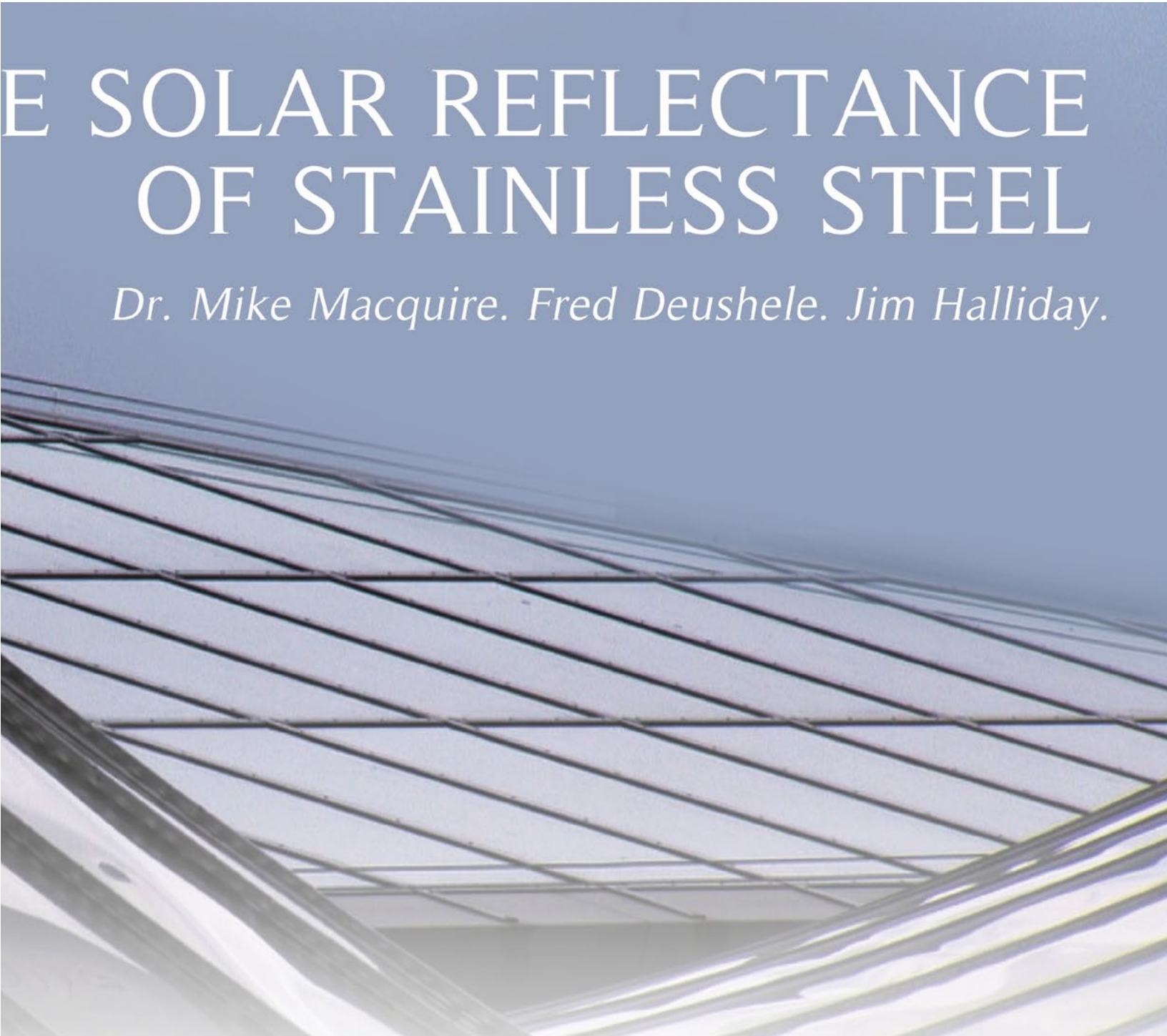
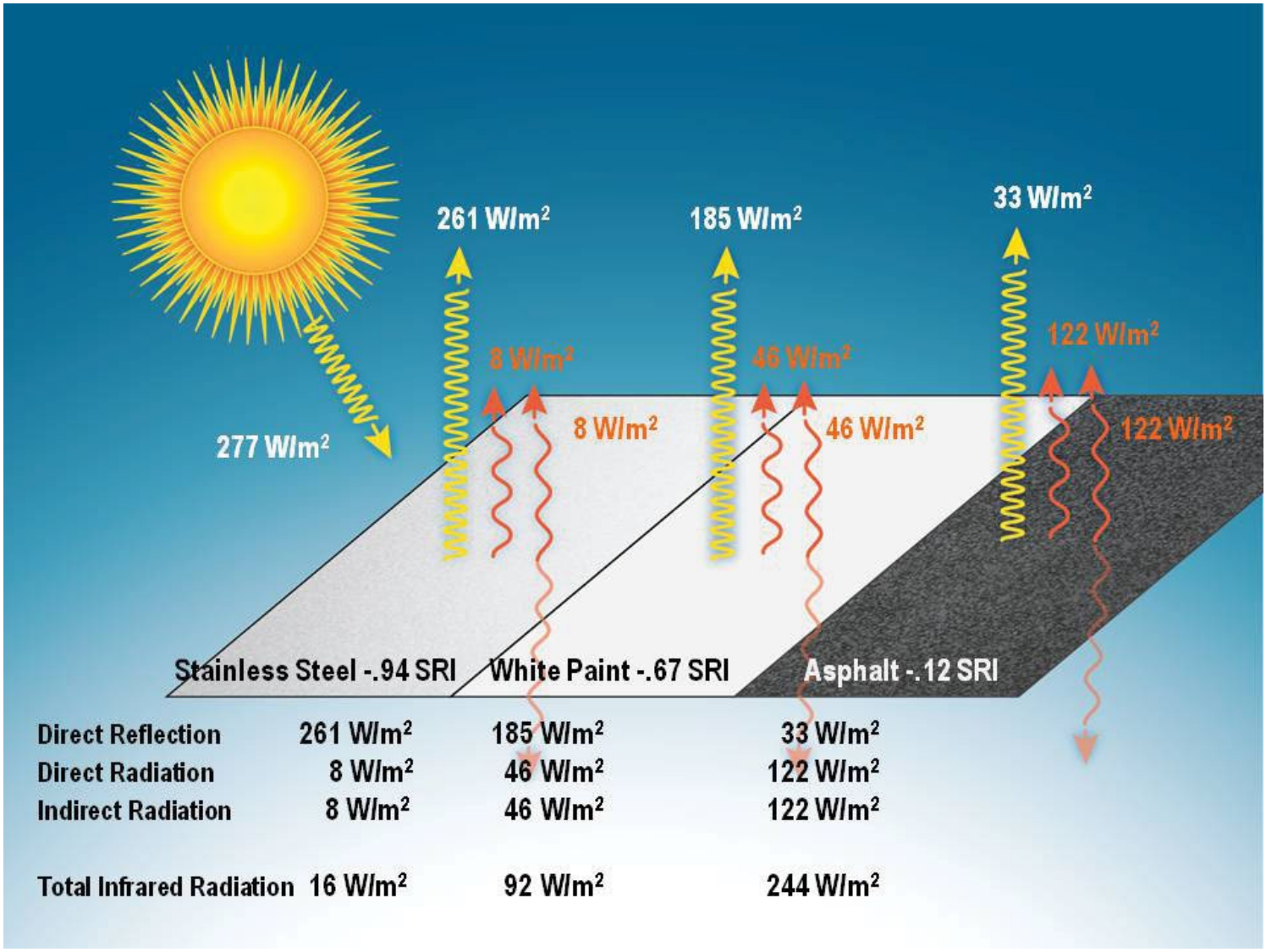
Dr. Mike Macquire. Fred Deushele. Jim Halliday.



couldn't notice the degree by which any radiant heat was being generated from the roofs surface."

"I thought that was curious," he continues. "I knelt down and actually put the palm of my hand against the surface of the roof. That day it was 118 degrees Fahrenheit in full sun and I had my hand comfortably on the surface of the stainless steel and it was no hotter than the air around me. It blew my mind that that could be true."

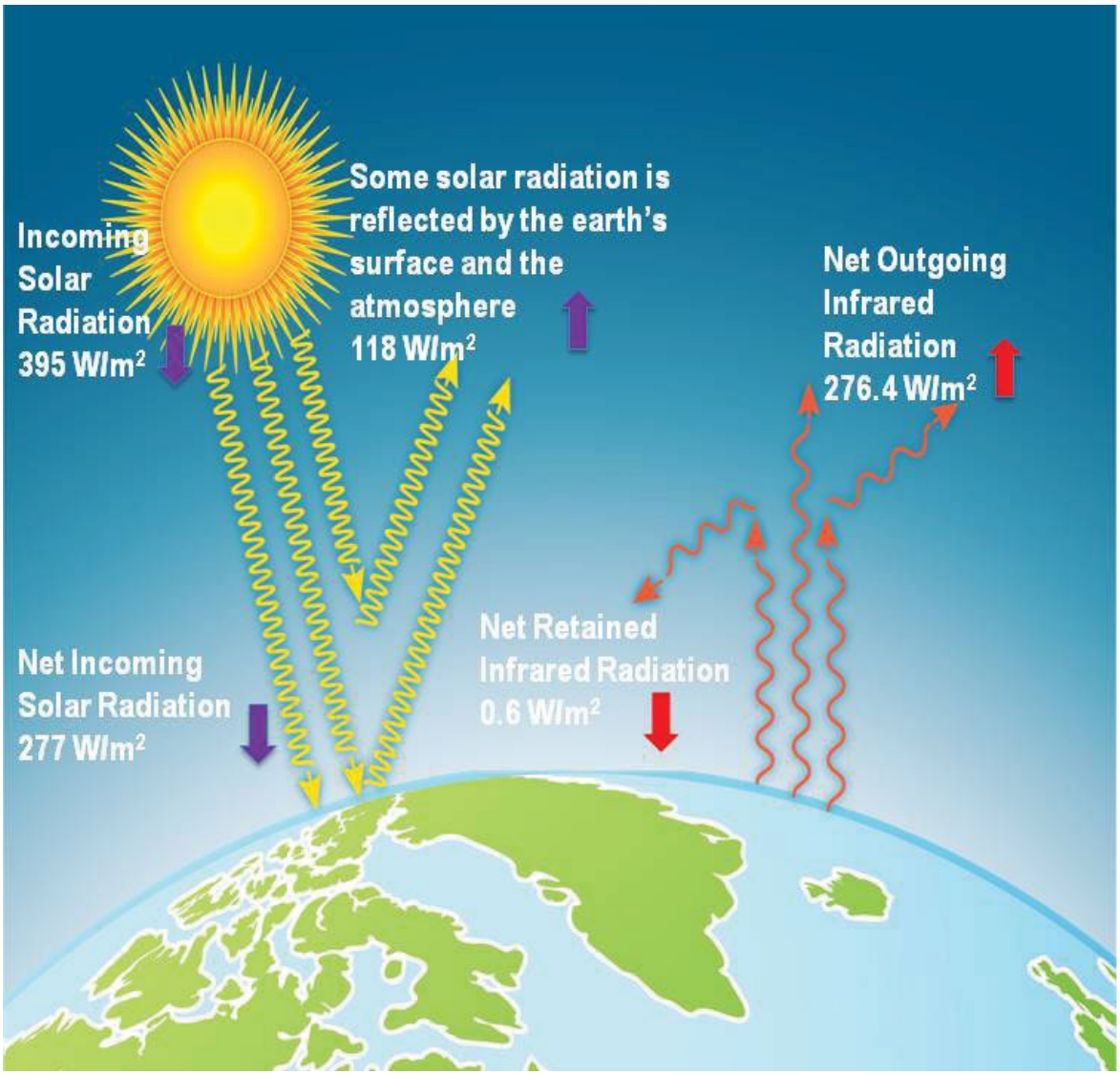
Fred and Jim then came to the conclusion that research on this phenomena needed to be done, "We agreed that we needed to study this," Halliday explains. "Somehow this has to be very, very important to the environ-



ment as well as the construction industry. Which ultimately led us to Dr. McGuire, we thought it was best to have more of an independent viewpoint on the topic."

Dr. Michael McGuire, PHD in Metallurgical Engineering, was brought in to further examine the positive effects of stainless steel in both functionality for the building itself as well as the environmental benefits. Explaining the qualities of metal in greater detail, Dr. McGuire says, "Metals are very different than paints and organic materials, they do not accept radiation, they reflect it. However most metals are covered with a thick enough oxide that when they're hit by light, they absorb all the energy."

"Stainless steel is very unusual in that it's oxide layer is only a few atoms of oxygen thick," Dr. McGuire continues. "So it acts like a bare metal all the time and reflects all kind of energy that's beamed at it, whether it be a radio wave, a light wave or an x-ray, it's reflected."



Solar radiation passes through the clear atmosphere

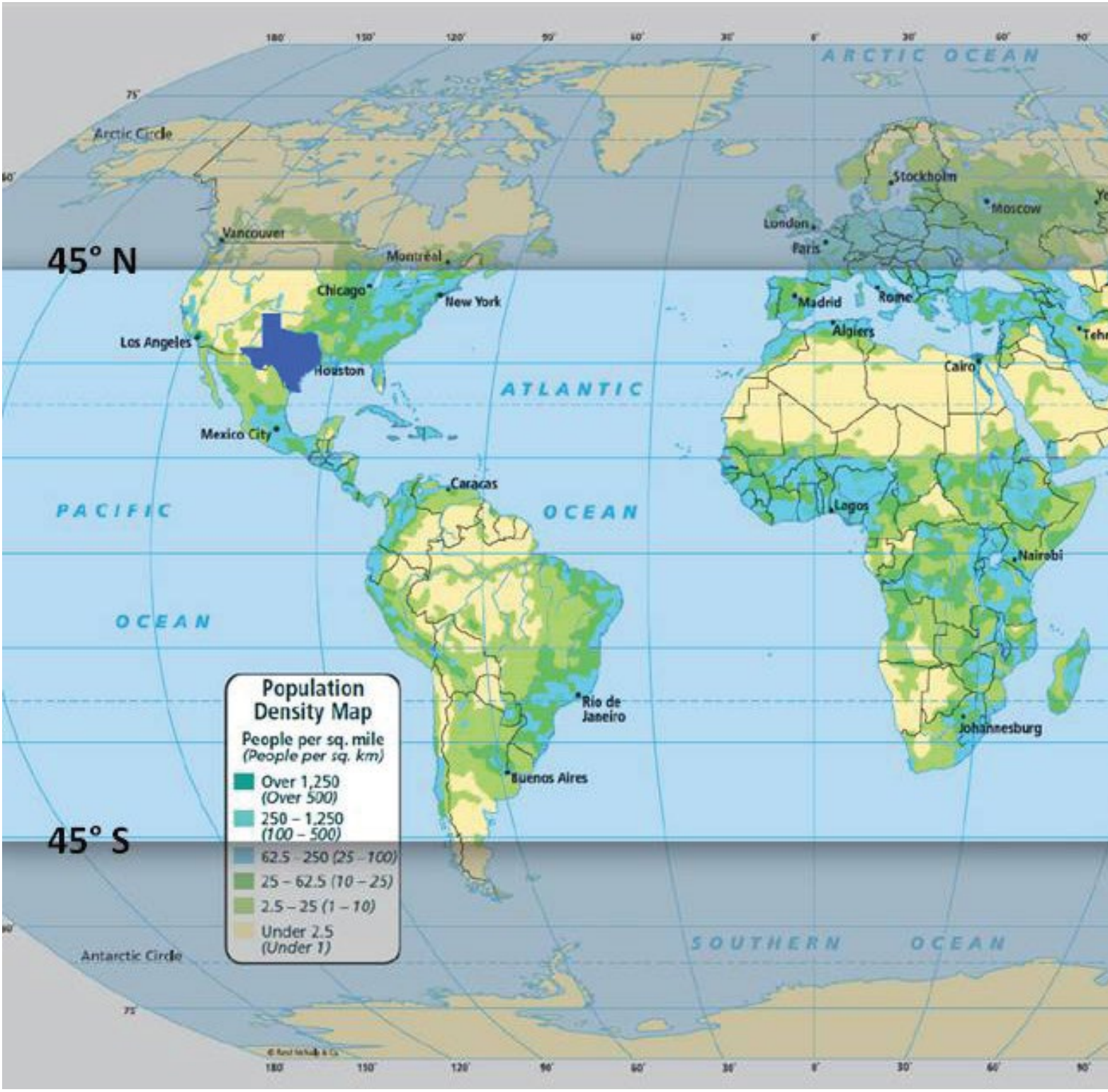
More solar radiation is absorbed by the surface

Some of the infrared radiation is absorbed and re-emitted by the greenhouse gases. The effect of this is to warm the surface and the troposphere.

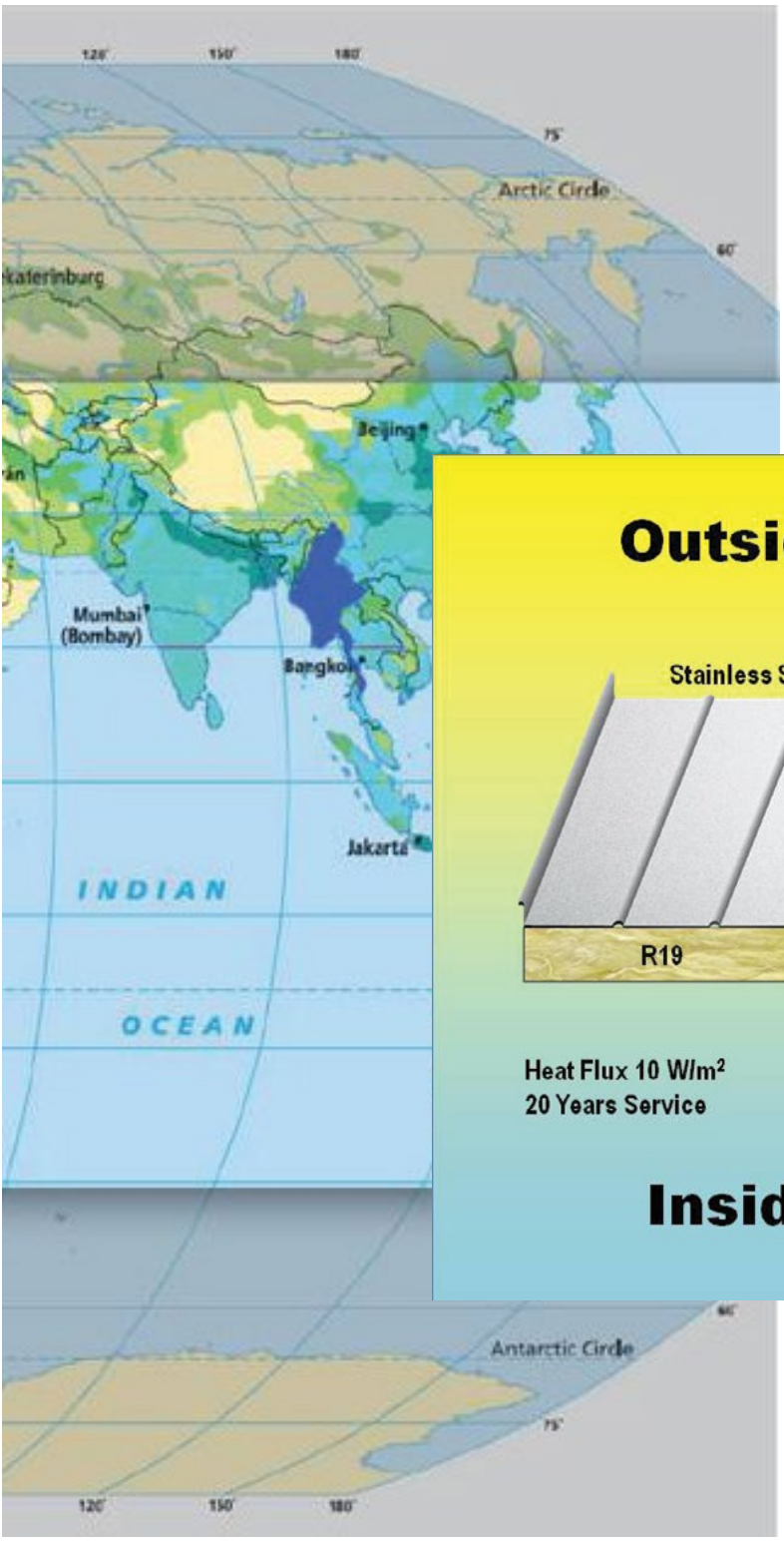
The benefit of having a more reflective surface is that radiation is reflected back into space instead of heating up the planet, which also impacts insulation costs and energy efficiency of the structure itself. A quality that is only bolstered by the dirt-resistant qualities of the stainless steel.

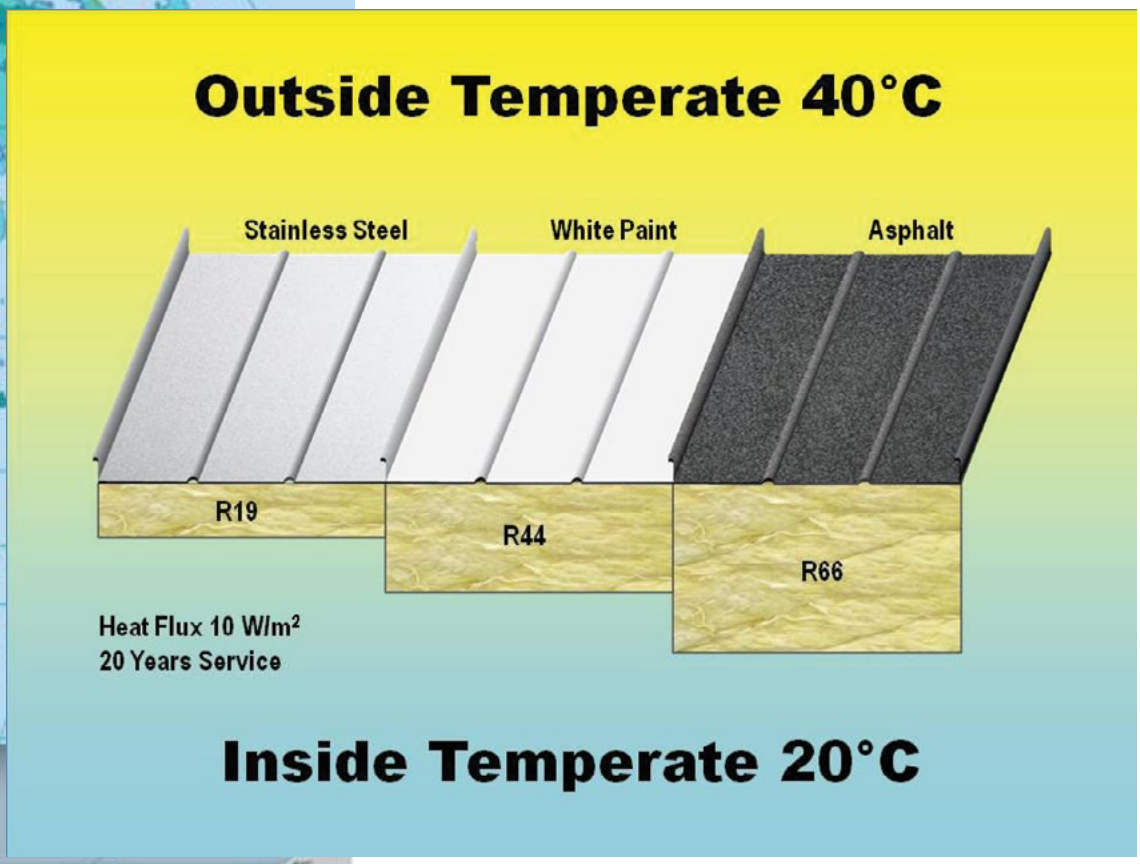
"The immediate impact is if that roof is reflecting most of the energy generated toward it by the sun," Dr. McGuire says. "Then all the systems below that roof -insulation, heating and air conditioning- have to work a lot less. There's a huge energy impact for the internal envelope and there's also a secondary impact for the urban heat in effect. Meaning that since the roof is not retaining as much energy, it doesn't take very long for it to radiate that energy once the sun goes away. So it can help in keeping urban heat in check."

How, scientifically, does this process occur? The radiation emitted from the sun makes its way through Earth's atmosphere until it



reaches a n end point such a s the ground, water, o r structures a nd r oads. When t his occurs, the radiation is absorbed by the material, causing a rising heat level for the material as well as the Earth's atmosphere. But with stainless steel, the process is greatly reduced says Dr. McGuire. "The suns radiation is partly absorbed by the atmosphere on the way down, and that which isn't hits the stainless steel and is reflected back at the same wave lengths that were able to penetrate the atmosphere. The energy that hits the roof





goes back into space, it is not heating our atmosphere."

"With any other material," he continues. "The energy would be mostly absorbed, cause the roof to warm up, and then radiate the heat back at wave lengths that are absorbed by the atmosphere, therefore the greenhouse effect and global warming. "

"It's a true antagonist to global warming," concludes Dr. McGuire.

Fred: "The metal is reflecting a lot more of the energy that's being beamed at it than some other common painted carbon, aluminum or even bare aluminum by itself. Those metals would be absorbing a lot of, or a fair percentage of it, causing the metal to heat up and become uncomfortable to the touch."