



An Old Fallacy About the Energy Efficiency of a Dark Roof

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If you live in a four-season climate you have probably heard that a dark roof will cut winter energy costs. It ain't necessarily so.

The oft-stated theory is that the dark roofs will absorb heat from the sun's rays, heating the house and cutting down on the amount of gas, oil, or electricity needed to heat it in the winter months.

With the new push for white roofs – Department of Energy Secretary and Nobel Prize winning physicist Steven Chu is a big proponent – it is time to look at this widely held belief and the harm it may actually be causing.

There are a number of reasons that dark roofing materials are not as energy efficient as advertised. First, hot air always rises. Thus, whatever heat is transmitted into the attic or into living areas from a dark roof will stay very near the ceiling trying to get back out again instead of circulating through the house.

And the dark roof effect is the least effective where it is most needed. The length of the sunlit day diminishes greatly during the part of the year when the heat is needed the most and, by definition the least sunlight is received in the coldest areas. In parts of America there is as much as six hours difference between the length of the day in the summer and in the winter. The sun, again especially in those regions, is at such an oblique angle during the winter that it has little effect in heating the roof.

Finally roofs in those parts of the country are covered with a blanket of bright white snow during many winter heating days so they could be pink with purple stripes for all the difference they make.

However, in even the coldest parts of the continental United States there are in the summer when air conditioning, if not required is at least desirable. And it is on those days, of course, when the days are the longest, the sun is most direct, and there is rarely any snow cover. On those occasions a dark roof is doing just what it is supposed to do – absorbing heat and transmitting it into the structure.

So forget the old wives' tale about dark roofs lowering your energy bills. But there is a real downside on a global scale. These roofs (and this also applies to asphalt surfaces like driveways, streets, and parking lots) do absorb heat as advertised but then it is radiated back out into the atmosphere, increasing the ambient air temperature during both the day and the night and contributing to the "urban heat island" effect. Urban areas can have a temperature differential of 3° to 8° over surrounding non-urban areas. Even more seriously, these surfaces are contributing to diminishing the earth's *albedo*. I suspect the latter word is new to you, but unfortunately you will be hearing a lot about in coming years if the world doesn't change.