Research Shows Cool Roofs Have Benefits at City and Global Levels

Source: Building Operating Management
By: Greg Zimmerman, Executive Editor

One of the goals of the Cool Roofs Roadmap, according to LaFrance, is to answer one of the most fundamental cool roof-related questions: Are cool roofs beneficial in cold climates? Desjarlais and LaFrance both say they think so, if not from strictly an energy standpoint, then from the fact that they can help reduce the urban heat island effect.

"If you put a cool roof on a building in a cold climate and run the calculator strictly on energy, it may not save energy because of the heating penalty," says LaFrance. "But if you take into account the urban heat island effect, the indirect benefits may make cool roofs worthwhile."

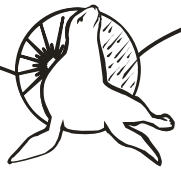
This is often a tough sell for facility managers only worried about their own bottom lines. But research has already shown the effectiveness of cool roofs at reducing urban heat islands, pollution and smog. For instance, the Heat Island Group at LBNL showed that Los Angeles spends about $100 million in extra energy costs to mitigate its urban heat island.

Reducing the temperature citywide means less air conditioning energy is required everywhere, which also means fewer greenhouse gas emissions. For this reason, many northern cities like Chicago, Philadelphia and New York City, have mandated cool roofs in their building codes. Utilities in northern states like Wyoming, Minnesota and Oregon offer rebates for the use of cool roofs. And the voluntary LEED rating system specifies cool roofs for a point explicitly for "urban heat island reduction." LaFrance says he hopes the research planned in the Cool Roofs Roadmap will more firmly establish a link between widespread use of cool roofs and reduced air conditioning energy use, pollution and greenhouse gas emissions.

One specific initiative, on which DOE is already working in conjunction with two other organizations (the White Roofs Alliance and Local Governments for Sustainability), is called the 100 Cool Cities initiative. DOE hopes to engage 100 cities around the world to commit to widespread installation of reflective surfaces by 2020. New York City, Taipei and Athens are the first three cities to sign up.

Global Level: Cooling the Planet

On an even larger scale, cool roofs and other reflective surfaces could help mitigate global warming by physically cooling the planet. The LBNL study Secretary Chu cited concluded that increasing the reflectivity of roofs and pavements in all North American cities with populations



greater than 1 million would achieve a one-time offset of 57 gigatons of carbon dioxide emissions — double the worldwide carbon dioxide emissions total of 2006.

"Cool roofs are one of the quickest and lowest cost ways we can reduce our global carbon emissions and begin the hard work of slowing climate change," Secretary Chu said during last summer's announcement.

The advantage of reflective surfaces as a method of physically cooling the planet is that it's actually a double-barreled attack. By reducing the temperature in urban areas, less air conditioning energy is used, and therefore fewer carbon dioxide emissions are produced. In addition, because cool surfaces reflect the sun's energy back to space, the actual temperature of the planet is lowered.

An LBNL study found that raising the Earth's average albedo (or reflectance) by 0.003 would result in an average temperature decrease of 0.01 degrees Celsius. That may sound like a modest temperature change, but it's also a relatively modest albedo change. And, as Desjarlais says, "every little bit helps."

The Cool Roofs Roadmap lays out plans to work with India and China on research to try to determine how cool surfaces can not only cool the planet, but also reduce pollution.

"If we do the research, and if the research shows what we suspect in terms of urban heat island mitigation and global cooling, policy can be based on this research," says LaFrance.

WEB SOURCES

Cool Roofing Resources

At the same time Secretary Chu made his announcement regarding cool roofs being mandatory on DOE facilities, DOE also released its "Guidelines For Selecting Cool Roofs" document. The document provides tips, case studies and research related to cool roofing, and is available as a free download at www1.eere.energy.gov/femp/pdfs/coolroofguide.pdf.

Version 2.0 of the Cool Roofs Roadmap draft is available for free download by searching "Cool Roofs Roadmap" at www.eereblogs.energy.gov/buildingenvelope/.

The Roof Savings Calculator is available at www.roofcalc.com.

For a list of cool roof products bearing the Energy Star label, search "roofing" at www.energystar.gov