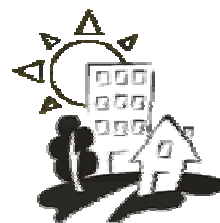


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# HIRI NEWS



HEAT ISLAND REDUCTION  
INITIATIVE

## *Study Shows Cool Roof Savings; Chicago Changes Energy Code; Urban Design Impacts Radiant Flux; and more!*

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### Briefing on FPL Reflective Roof Study

Craig Muccio, in his 19<sup>th</sup> year at Florida Power & Light, started the meeting with a discussion of a recently commissioned study, "Comparative Evaluation of the Impact of Roofing Systems on Residential Cooling Energy Demand in Florida." The project was undertaken in conjunction with the Florida Solar Energy Center (FSEC) and Habitat for Humanity, who provided seven unoccupied side-by-side homes in Lee County, FL.

The homes had identical floor plans, insulation levels, and orientations. The roofing systems varied from home to home, providing data on their capacity to reduce attic heat gain. The seven roofing materials tested were: standard dark shingles (control roof), light colored shingles, terra cotta S-tile roof, white "barrel" S-tile roof, white flat tile roof, white metal roof, and standard dark shingles. The latter home had a sealed attic that was insulated on the underside of the roof deck (rather than the ceiling). It underwent additional analysis to assess how an unvented attic affected system performance.

Each residence was fitted with extensive metering equipment and tests were performed from July 8th-31st, 2000. Building thermal conditions and air conditioning power data were obtained every 15 minutes. The materials' solar reflectance ranged from the 8.2% (control shingle) to 77.3% (flat white tile). A fully instrumented meteorological station collected weather information which a data logger fed to the mainframe computer. Roof top thermal imaging was performed for a

qualitative evaluation of roof- system reflectiveness.

Results demonstrated that all test homes outperformed the control and exceeded the Florida building code's efficiency requirement. Top performing roofs – in terms of total energy savings (in kWh) and demand savings (in kW) – were the white metal, white flat tile, and white S-tile. The metal roof used 29.4% fewer kWh than the control, with demand savings of almost 40%. In comparison, the popular terra cotta tile saved only 6% total kWh and 3.7% demand kW compared to the dark grey control roof.

Craig noted that the metal roof performed surprisingly well and held up over time because of its stain- and weathering-resistant properties. Although there were no pastel colored roofs in the study, Craig said it would be reasonable to interpolate between the observed values of the terra cotta (a reddish color) and the white tiles. Some call participants, however, noted that pigmented roofing products can reflect a large percentage of the sun's energy even with a dark-color. Manufacturers of pigmented, reflective roof products include Classic Products, Inc., Farrow Manufacturing, Inc., and Monier.

Next, call participants discussed the three year Energy Star eligibility requirement. One caller commented that this waiting "penalty" is particularly onerous for new residential products and should be reconsidered by EPA. While the criteria was established to prevent low-quality materials from gaining market share, it makes sense that high-performing products should not have to wait three years for the label. Energy Star has suggested that well-documented weatherization tests have the potential to address the delayed approval process. In the meantime, the three year test period will remain in effect. (See p. 4 for comments from ENERGY STAR.)

Regardless, cool roofs continue to attract the public's interest. Florida Power & Light recently began paying a \$0.10/square-ft rebate on reflective products for use in new residential construction. This savings program has been well received.

For more information on the study, see the Executive Summary:  
<http://www.fsec.ucf.edu/%7Ebda/c/pubs/coolroof/exsum.htm>

## Chicago Changes Energy Code

Brendan Daley, of the City of Chicago's Department of the Environment, updated the group on revisions made to the City of Chicago's energy code. Changes include new language that is intended to mitigate heat island impacts in the city. For example, the new code, "Implements [a] standard requiring light-colored roofs to reduce the urban heat island effect." The terms "green roof" and "thermal wall mass" are also defined.

In addition to code alterations, Brendan mentioned other projects undertaken by the city to offset excess summer heat and achieve related benefits. These include:

- A landscape ordinance that establishes minimum shading requirements for parking lots, including a "tree island" requirement for large lots.
- A campus parks program, in which asphalt is removed from school play lots and replaced by vegetated surfaces.
- A "soft-surface" alley project to convert an

asphalt corridor into a permeable surface which mitigates stormwater runoff and maintains durability.

- The installation of median planters to beautify, cool, and manage stormwater along the city's streets.

Brendan said these projects were made possible to a large extent by Mayor Daley's mandate to green the city. This underscores the importance that influential elected officials can have on local cool community initiatives.

For more information about Chicago's energy code revisions, see:  
<http://www.cityofchicago.org/Buildings/BuildingCode/EnergySummary.html>

## Designing Thermally Efficient Cities

Dr. Brian Stone, of the University of Wisconsin, joined the call to discuss a paper called "Urban Form and Thermal Efficiency: How the Design of Cities Influences the Urban Heat Island Effect." It recently appeared in the *Journal of the American Planning Association*. In his research, Stone used NASA's high resolution thermal imagery data of Atlanta, and parcel level tax records, to look at the relationship between parcel design and the emission of radiant heat.

He found that lower density patterns of residential development contribute *more* radiant energy to heat island formation than do high density developments in the Atlanta area. This counterintuitive finding suggests that a trend towards compact development – including tree planting ordinances – could offset increased energy flux and heat island formation.

Brian noted that because land use is regulated at the parcel level, incentives in this direction can steer

development away from traditional, highly emissive patterns. Gordon Kenna, from Atlanta, presented Dr. Stone's findings to the Mayor of Gwinnett County, Georgia who responded positively.

Other recent heat island-related news from Georgia is that NASA's Project Atlanta has been extended. Dr. Jeff Luvall, of NASA, said that 2 meter data will be used in the upcoming analysis.

Interestingly, Jeff also mentioned that NASA developed a methodology to more accurately characterize the surface-to-air heat interface. While modelers have historically wrestled with radiant energy transfer between the two mediums, NASA now looks toward silica content as an indicator of emissivity, and thus heat transfer.

## SLOC Partners with Utah Power

Jerriann Ernsten, of the Salt Lake City Energy Office, talked about the Salt Lake Organizing Committee's (SLOC) tree planting partnership with Utah Power and the Energy Office, "Cool Spaces 2002." For their contribution to the program, Utah Power has agreed to plant 500 trees in the SLC area. On September 20<sup>th</sup>, they kicked off the initiative – along with the Energy Office and Olympic hopeful, Mark Hogalin – by planting 50 trees in the Olympic Village.

To complement the tree planting program, Jerriann is performing a GIS analysis of the projected benefits using American Forests' City Green software. This process involves using built-in estimates and on-the-ground data inputs to estimate parameters such as carbon storage and sequestration, air pollution uptake, and stormwater runoff avoided. So far, Jerriann has collected building data and fed it into the model to yield energy savings from existing trees.

City Green estimated that the building owners save 10% of the overall cost

of summertime cooling as a direct result of tree shading. The model will also predict the future benefits of the recently planted trees at the kickoff news conference.

The SLOC press release is available at the olympic website by clicking on September "news." Go to:  
<http://www.saltlake2002.com/>

More on American Forests' City Green software can be found at:  
<http://www.americanforests.org/productsandpubs/citygreen/>

## California Cool Savings Roll On

Dr. Lisa Gartland, of PositivEnergy, discussed the ongoing cool roof rebate program in California. As prescribed in the Cool Savings Program guidelines, new lower rebate levels will soon take effect. However, projects fully completed – i.e., the cool roof is installed and reflecting sunlight – by October 31<sup>st</sup> are still eligible for the higher rebate levels.

Lisa believes that the program is currently "undersubscribed." That is, not enough customers are taking advantage of the government sponsored rebate. As a result, the goal of the legislation – reducing statewide peak electricity demand – is not being achieved to the extent Lisa believes possible. Out of \$24.5 M available for disbursement (the original \$10 M from AB 970 and a subsequent allotment of \$14.5 M from SB 5X), less than \$5 M has been distributed.

According to Lisa, program visibility has been an issue. She thinks better publicity in the future will ensure higher participation.

Lisa also made two personal announcements on the call. One is that she will be leaving her position as Regional Administrator to pursue further career interests. Kris Kiehne, of the Sacramento Cool Community Program, will take over Lisa's responsibilities. Kris has been working with Lisa for some time and knows the program well.

Lisa's second announcement is that she will be having a baby this winter. Congratulations and good luck in your new job!

## ICLEI To Launch New Initiative

ICLEI's Cities for Climate Protection (CCP) Campaign, with support from HIRI, has issued a solicitation for participation of US cities and counties in the upcoming Urban Heat Island Mitigation Policy Adoption and Peer Exchange Initiative. ICLEI is encouraging local governments committed to the development, adoption, and implementation of cool community measures within their jurisdictions to apply.

The Initiative will facilitate the policy adoption process by providing customized technical assistance, peer exchange workshops, and access to national expertise on implementing cool community strategies. Up to five communities will be selected to participate in the Initiative.

Selected local governments will benefit from the following:

- Two peer exchange workshops -- one in Chicago, November 30, 2001, and one in Seattle in early February 2002.
- Travel costs covered for attendance at the two workshops.
- Access to experts and local government staff involved

in heat island reduction efforts.

- Customized research for participants to support their policy adoption efforts.
- Assistance in communicating with the press and developing public outreach materials on urban heat island issues.

Feel free to contact Maria with any questions on the Initiative.

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**The next conference call will be in December. Stay tuned for the date, call-in number, and access code.**

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### ✓Note from ENERGY STAR Roof Products:

"ENERGY STAR for Roof Products currently requires manufacturers to test their products after they have been installed in the field for three years or more. This requirements was instituted to ensure that not only the solar reflectance of that product is maintained, but also to ensure some level of product quality, albeit minimal - that the roof product is still there after three years. Past problems in the roofing industry where minimal product quality was not maintained led to include this type of requirement. However, since the program began there have been concerns raised that this requirement actually stifles innovation among manufacturers. For example, if a reformulated product meets the initial solar reflectance requirement, the manufacturer must wait three years to test the product to see if it even qualifies for the ENERGY STAR label. ENERGY STAR understands this concern and would like to arrive at a solution. At least a year ago, we requested data from various members of the roofing industry including several of the industry associations, that would illustrate some reasonable correlation between the in-field testing and an accelerated weathering/aging test that can be performed in a laboratory. We have since received data from only one manufacturer representing one sub-set of products. As such, we have not been able to justify a change to the program requirements.