Vol. 8 No. 1 September 24, 2002

HIRI NEWS

PSU Green Roof Research, USGBC's UHI-Related LEED Points, Cool Roof Project in Baltimore, a Green Building Announcement, and Tucson's Updated Standard!

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LEED Overview and UHI Application

Peter Templeton, of the US Green Building Council (USGBC), spoke on the call about Leadership in Energy and Environmental Design (LEED™). USGBC's LEED program is a national green building rating system that is consensus-based and market-driven. LEED aims to accelerate the development and implementation of green building practices. The system provides credits, or points, for green design and construction, including technology and landscaping that reduces the heat island effect.

Put into practice, LEED serves as a framework for the design, construction, and certification of green buildings. USGBC supports these functions by offering training workshops, professional accreditation, resource support, and third-party certification of building performance. The current version of the system is LEED 2.0, which was launched in March 2000 after being reviewed by the USGBC membership and undergoing a national pilot testing program.

Peter said that LEED 2.0 is designed for rating new and existing commercial, institutional and high-rise residential buildings. Currently, member committees are developing criteria to address new certification-types.

The benefits of green buildings are numerous, according to Peter. LEED-rated buildings are work places that enhance productivity, promote environmental sustainability, and increase employee health and well-being.

Peter added that the LEED certification serves three main purposes. These are to:

- *Integrate* building industry sectors
- *Lead* market transformation
- *Educate* owners and practitioners

In terms of capturing heat island mitigation benefits, the relevant LEED credits include:

Landscape and Exterior Design to Reduce Heat Islands. The intent of this credit is to, "Reduce heat islands... to minimize impact on microclimate and human and wildlife habitat."

Optimize Energy Performance. Cool roofs can be used to, "Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use."

Urban Redevelopment. Because dense building patterns lessen the heat island effect, LEED provides a credit for builders who, "Channel development to urban areas with existing infrastructures, protecting greenfields and preserving habitat and natural resources."

See USGBC's website for more information: www.usgbc.org

PSU Green Roof Research

Dave Beattie, Professor of Ornamental Horticulture, gave a presentation of green roofs and led a discussion of Penn State University's (PSU) related research project.

Dave started off by asking the question, "Why should we plant green roofs?" He gave the following reasons – that green roofs are:

- aesthetically pleasing
- reduce the "heat island" effect
- reduce CO2 impact
- reduce summer air conditioning cost
- reduce winter heat demand
- lengthen roof life 2-3X
- remove nitrogen pollution in rain
- negate acid rain concentrations
- reduce stormwater runoff

Dave also discussed why developers have been slow to embrace green roofs. The reasons include climatic differences across the country, a lack of information about the benefits, land-use and population considerations, incomplete financial payback data, and a lack of policy incentives.

In contrast, Germans have been installing green roofs for decades. Industry figures suggest that 10% of German roofs are greened. Between 1989 and 1999, German roofing companies installed nearly 350 million square feet of green roofs, and the rate is increasing.

Dave said that transferring lessons from Germany to the US is complicated, as our roof conditions are different. For example, a roof environment in Frankfurt is quite different from one in Atlanta or Phoenix. Dave hopes his research will build upon basic German principles and provide Americans with information about our specific conditions.

However, there are notable green roof projects in the US, including Chicago's City Hall and Ford's River Rouge plant in Detroit.

To address the lack of information about green roof's in the US, PSU began its program in 1999 with funding from JSP International. It also now receives backing from

the Growing Greener program of PA's Department of Environmental Protection.

Penn State's research on green roofs looks at performance variables like heat flux, thermal loading, and energy balance. It also investigates storm water mitigation, including water volume reduction and nutrient and pH mitigation. Specific to green roof ecology, Dave's research involves collecting information about plant physiology, selection, and production. Related to soils, growth media development and evaluation are being evaluated.

Facilities at the Center for Green Roof Research consist of 6 buildings, 3 with green roofs and 3 with conventional roofs. A weather station on all 6 collects data on rainfall, solar radiation, temperature, and wind speed and direction. Each building is also fitted with thermisters in the walls, roof, and floor. In total, each green roofed building has 39 total sensors and each conventionally roofed building has 14 sensors.

Future directions for green roof research at the center include plant physiology, genetic engineering, medium evaluation, sloped roof applications, and the development of testing standards.

For additional information, see: http://hortweb.cas.psu.edu/research/greenroofcenter/index.html

Cool Roof Pilot in Baltimore, MD

David Brosch, of Baltimore's Weatherization Assistance Program, joined the call to inform the group about a cool roof implementation program he recently initiated in Baltimore, MD. With this effort, David intends to improve the durability of residential, commercial, and institutional building roofs while addressing the housing, energy, and environmental issues associated with urban heat islands.

The program will address a range of functions important to the broader adoption of cool roofs in MD. These include an education and awareness campaign, construction workshops, and demonstration projects. The latter involves the installation of elastomeric roof coatings on approximately 20 row houses. It is anticipated that these systems will lower summer indoor temperature with minimal maintenance at competitive cost, especially over the product's lifecycle.

David noted that the Baltimore metropolitan area has thousands of residents living in row homes with deteriorating rooftops – a situation well-suited to mitigation with cool roof systems.

After roofs are selected for the demonstration, each one will be visited by David's team. A determination of roof condition and the appropriate treatment will be agreed upon, with input from the roof contractor. After completion of the coating applications, the surface may be tested with a thermal gravimetric analysis.

David made another important point during the call: that cool roofs can decrease waste going to Maryland landfills. While traditional petroleum-based roofing systems make up about one percent of the nation's building material, they represent six percent of total landfill space. Cool roof systems can increase the lifespan of traditional products and reducing the amount of roofing waste send to landfills. David's program seeks to address this local problem while contributing to the rejuvenation of central Baltimore.

Green Buildings on Brownfields

Ken Sandler, who coordinates green building activities at EPA, spoke on the call about an initiative designed to promote the construction of environmentally friendly buildings on brownfields properties across the country.

Brownfields are abandoned, idled or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

EPA recently launched the pilot program, "Green Buildings on Brownfields," in eight states. Ken said that his office supports green building activities because they conserve energy, water, and materials and create healthy indoor and outdoor environments. Under the pilot, EPA is providing technical assistance to each of the brownfields projects in the form of services totaling $15,000.

The Agency is providing expertise in areas such as design and water efficiency. Ken said he is hopeful that the pilots will provide an incentive to localities and developers to construct green buildings on brownfields in other US cities. The pilot projects are located in: Springfield, Mass.; Toledo, Ohio; Kauai, Hawaii; Mt. Shasta, Calif.; Spartanburg, S.C.; Little Rock, Ark.; St. Louis, Mo.; and Baltimore, Md.

For information about green building, see EPA's green buildings web page at: http://www.epa.gov/greenbuilding; for more information on EPA's Brownfields Program, see: http://www.epa.gov/brownfields

Tucson Roof Standard

Vinne Hunt, Tucson's Energy Manager, briefed the call participants on Tucson's cool roofing standard. The City of Tucson recently update their building construction standards to state that all roofs on air conditioned buildings will install an Energy Star Labeled Cool Roofing product when they are renovated or newly constructed. Vinnie explained that the results of a cool roofing demonstration project, conducted on a City building in 2000, showed that cool roofs can achieve substantial energy savings. The success of this demonstration project helped motivate the city to adopt the cool roof standard. The City constructs approximately 50,000 ft2 of new air conditioned space per year.

The next conference call is TBD. Stay tuned for the date, call-in number, and access code.