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**A Green roof system atop a campus building at the University of Wisconsin.**

**A recent survey asked facility managers around the United States about their knowledge of Green roofs. The respondents answered a variety of questions about the different types of Green roofs, their costs, their benefits, and their overall impact — or lack thereof — in contributing to "Greening" a facility and protecting the environment.**

**In some instances, the facility managers' understanding of Green roofs was accurate. However, other areas — specifically the important role Green roofs play in helping to Green an entire facility and protect the environment — were far less understood. For example, 70 percent reported that they know a Green roof "helps filter dust and dust particulates from the air." Yet, the balance of the respondents were not sure Green roofs really help protect the environment, and many believed that it is simply too early in the development of this technology to determine what benefits Green roofs may or may not provide.**

**The truth is that Green roofs, though just now garnering greater attention in the United States, have been a common fixture atop homes and commercial buildings in many parts of Europe for decades. During this time, their features and benefits have been analyzed and studied numerous times, and the findings are clear: Green roofs play a significant role in helping a facility become Green and protecting the environment. Indeed, many architects and building developers now believe the first step in Greening a facility actually starts at the top — with the installation of a Green roofing system.**

#### **LEED= GREEN= LEED**

**Several architects and building planners now realize that Green roofs are one of the key components necessary when building or renovating a facility to be Green. In fact, the U.S. Green Building Council's (USGBC) Leadership in Energy & Environmental Design (LEED) Green Building Rating System allows building owners to earn several certification points once a Green roof has been installed atop a commercial facility.**

**And nothing says "Green" more for a facility than earning LEED certification.**

**LEED is a certification process that registers buildings newly constructed or renovated with energy and environmental performance, operating efficiency, and occupant health and well-being as their primary goals. Buildings receive "points" towards varying levels of certification based on the set of categories established by the USGBC.**

**According to Jim Lindell, a market professional associate with Weston Solutions, manufacturers of the GreenGrid Green roofing system, facilities earning LEED certification allows building owners to take advantage of a growing number of state and local government incentives, be used as a marketing tool to promote and market a facility, and even allows owners to charge higher rents for office space.**

**"Points can be earned if 50 percent or more of a commercial building's roof area is a Green roof," says Jim Lindell, a marketing professional associate with GreenGrid, a business of Weston Solutions, Philadelphia, Penn and manufactures of modular Green roofing systems. "And it just builds from there."**

**According to Lindell, some of the other ways a Green roof can earn LEED certification points include:**

**Reduced Site Disturbance: One of the criteria to earn LEED certification points is to take steps "protecting/restoring open space lost to a building's construction to provide habitat and promote**

**biodiversity.** **This has the potential of earning the developer/owner points for installing a Green roof. This benefit of a Green roof may have even more significance around the world. In Switzerland, for example, all new buildings are required by law to relocate the green space taken up by a building's footprint. A Green roof installation is one of the easiest ways to do this. Stormwater Management: Green roofs have long been known to reduce stormwater discharge after a rainfall event. This puts less stress on local water treatment facilities and helps prevent polluted rainwater from entering local water ways. Heat Island**

**Effect: Installation of a Green roof can significantly reduce roof temperatures in the summertime. In the summer months, a conventional roof can reach temperatures of more than 175 degrees. The heat "radiates," causing core urban areas to be as much as 10 degrees warmer than surrounding forested areas. Water-Efficient Landscaping: Excess stormwater from the Green roof can be combined with other "gray water" systems to collect runoff that can then be used to irrigate the Green roof vegetation as well as other building landscaping without pretreatment. Optimize Energy Performance: Green roofs have been documented to reduce energy demand by more than 50 percent annually in certain types of structures. Reduced demand and increased efficiency may also lead to smaller cooling systems and lower capital costs. Building Reuse: A Green roof can double the useful life of a building's existing roof and contribute to the reuse objective. Extracted Locally: Many of the components of modular Green roofing systems, such as the plants and vegetation, modules, pavers, and a building's materials are manufactured within a 500-mile radius of the site installation.**

**This can contribute to the 50 percent extracted regionally credit.**

**"If the goal of a Green building is to incorporate designs, construction materials, and maintenance practices that significantly reduce the negative impact of a building on its occupants and the environment, the contribution of Green roofs becomes all the more apparent."**

**Useable Open Space: Office facilities have used Green roof for meetings and relaxation. In fact, the first Green roof in the United States, atop Rockefeller Center in New York City, was installed to provide building workers a "green retreat." This allows the building owner to earn one or two points under LEED's Innovation and Design Process criteria.**

#### **Specific Environmental Benefits**

**Receiving LEED certification points for the installation of a Green roof is recognized by many building professionals as proof that a Green roof is indeed a plus for the environment. However, a recent study conducted by the Harvard University Green Campus Initiative has taken this a step further, attempting to clarify exactly why and how a Green roof benefits the environment. According to the report, these are some of the major environmental benefits of Green roofing systems:**

#### **Air**

**The carbon dioxide/oxygen exchange of Green roof vegetation produces enough oxygen per year to supply one human with his or her yearly oxygen intake requirement. A 1-sq.-m. (10.76-sq.-ft.) Green roof installation can remove as much as 0.2 kg. of airborne particulates from the air every year, resulting in cleaner air.**

#### **Water**

**As much as 95 percent of the cadmium, copper, and lead in storm water runoff can be removed with a Green roofing system. Not only do Green roofs absorb as much as 95 percent of storm water runoff, they reduce the volume of runoff to a much slower water flow, allowing local treatment facilities to better handle the runoff.**

#### **Resource Conservation**

**Green roofs replace impervious roof surfaces with living, breathing, and permeable green space. Green roofs provide a habitat for wildlife. They improve views for neighboring building occupants, allowing them to view a "green space" instead of asphalt or mechanical equipment.**

#### **Doing Their Part**

**"If the goal of a Green building is to incorporate designs, construction materials, and maintenance practices that significantly reduce the negative impact of a building on its occupants and the environment, the contribution of Green roofs becomes all the more apparent," says Lindell. "They help improve water efficiency, save energy by reducing heating and cooling needs, conserve natural resources by doubling the existing roof's life span, and help improve indoor environmental quality as well."**

**Even though Green roofs are often used and enjoyed by building occupants, Lindell says many do not use them and may not even know they are installed on a facility. "This is one reason many people are unaware of the role Green roofs play in Greening a facility and protecting our environment," he says. "But just as many building occupants have become aware of how Green cleaning products can contribute to improving their health and welfare and protecting the environment, the benefits of Green roofs are now becoming better known and are likely the reason we expect to see a dramatic increase in Green roof installations in coming years."**

**Robert Kravitz is a former building service contractor that now provides communication services for the building and cleaning industries.**

**Most commonly listed benefits of Green roofs include:**

**Reduce negative impacts of storm water runoff Reduce urban heat island effects Enhance aesthetics Extend life of the underlying roof system by preventing sunlight and heat degradation Create microclimates Provide habitat for wildlife Increase oxygen Reduce carbon monoxide Reduce noise Reduce air pollution**

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