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Green Roofs 101: Understanding the Basics & Benefits

By Tom Hanzely
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EPA building in Denver. Photo courtesy of GreenGrid Green Roof Systems.

NATIONAL REPORT—Hotels are emerging as leaders in the Green movement. Many are now building more environmentally responsible properties and are even seeking LEED (Leadership in Energy and Environmental Design) certification.

For instance, the soon-to-open Hilton Baltimore Convention Center Hotel will incorporate a number of energy- and water-conservation systems as well as several sustainable operating practices. And when construction is completed in August, the 750-room, $301 million hotel beside the Baltimore Convention Center will contain the area's largest green roof—32,000 square feet, to be exact.

So what does that mean? The Hilton Hotel's gigantic roof is expected to reap big benefits for its property managers and building owners. To find out why, we must get a better understanding of green roofs.

What Is a Green Roof?

Rooftop gardens were being designed as far back as the late 1800s by architect Frederick Law Olmsted, designer of New York City's Central Park and landscape designer for the Vanderbilt family's Biltmore estate. As early as the 1930s, New York's Rockefeller Center was providing a calming oasis for building workers thanks to its green roof.

But many of these early green roofs were really garden roofs, termed intensive green roofs today. Similar to a backyard garden, these roofs contain as much as 40 or more inches of soil and are installed directly on top of the building's roof. These types of roofs also include grass, shrubs, flowers, and even trees planted in the soil. As one might imagine, just as gardens require special attention and a substantial amount of maintenance, so too do these roofs. Plus, they're heavy, weighing as much as 60 pounds per square foot. As a result, facilities must be specially designed to accommodate them.

On the other hand, aside from a little weeding and checking on it every three or four months, the extensive green roof, which is the most common type of green roof today, doesn't require much maintenance after the initial installation and establishment period. It needs only two to six inches of soil and involves placing drought tolerant, hearty plants, such as succulents, along with grasses and other smaller plant species on top of the existing roof membrane. Additionally, extensive green roof systems are much lighter, weighing only 11 to 22 pounds per square foot when wet.

New Green Roof Technologies

When building owners and developers were first installing green roofs, they were essentially "built-in-place" green roofs, installed directly on top of roofs. This process required hauling soil and other materials up to the roof and then the materials in layers evenly so vegetation could be planted, which could be slow and costly and may have actually limited the interest in and installation of green roofs.

But with time, new technologies have helped streamline this process, helping to reduce installation time and costs. For instance, the modular green roof system was developed to simplify the installation process and reduce installation labor costs.

The modular system uses modules made of 100 percent recycled plastic that hold the growth media and vegetation. Because the planting is performed in a factory-like process at a local nursery and not on top of the roof by workers, installation costs tend to be less with the modular system.

Pre-Installation Issues

Hotel property owners should be aware that there is a pre-installation process involved before a green roof can be installed. With a conventional, built-in-place green roof system, some of the installation steps include:

• Installing a waterproofing membrane over the entire existing roof;
• Adding a root barrier system to prevent the plant roots from penetrating and potentially harming the existing roof while searching for nutrients; and
• Installing a drainage layer and filter fabric to facilitate drainage from the roof.

With the modular system many of these steps are eliminated. Modular systems can be placed on most existing roof surfaces as long as

the roof is in good condition. Typically, as much as 3,000 to 4,000 square feet can be installed per day, which also helps reduce costs.

Green Roof Benefits

In the case of the Baltimore Hilton Hotel—as with any green roof—building owners may reap several benefits from having a green roof system. For instance, studies indicate that a green roof can:

• Improve storm-water management because more than 65 percent of rainfall remains on the roof to nourish the plants and is not released into gutters and streets, where it becomes polluted, and into overstressed water-treatment centers or local waterways;
• Help reduce air and noise pollution and keep facilities quieter;
• Reduce heating and cooling costs because the temperature of the existing roof often stays at more moderate temperatures throughout the year;
• Slow the transfer of heat to other buildings, helping them reduce their energy costs; and
• Increase the life of the existing roof because it curbs temperature swings that cause the roof to expand and contract, which will eventually damage the roof.

Everyone knows that conserving natural resources makes good sense. But good-sense solutions are rarely adopted until dollar-and-cents benefits are clearly in sight. With new green roof technologies helping to reduce the costs to install green roofs, their benefits are becoming all the more tangible for hotel operators.

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