



## **Ask an Expert: Jeffrey Bruce, Green Roofs**

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### **First Steps When Considering a Green Roof For An Existing Facility**

**If facility managers are interested in a green roof on an existing facility, what are the first steps to take?**

There are a few simple steps that can help you get started in determining if a green roof is right for your project. The primary step is to determine the structural loading on the building to see if it is capable of supporting the weight of a green roof. This should be conducted by a structural engineer.

Typically if you are removing gravel ballast or pavers from the roof surface, you have some inherent structural capacity in the design of the structure that could be used for the green roof. If you are considering the green roof for a new facility, the design can include the structural capacity to support the green roof for a reasonable increase of cost.

A second important consideration is the remaining life expectancy in your current roofing membrane. Although it can be done, it typically doesn't make a lot of sense placing a new green roof on a roofing membrane which may only have a five-year service life left before replacement. It makes the most sense to consider a green roof when you are replacing the roofing membrane which will

ensure a water tight installation or replacing the membrane when installing a green roof. Seeking out a certified “Green Roof Professional” (GRP) from [Green Roofs for Healthy Cities](#) is a good way to gain a good understanding of the benefits and constraints of installing a green roof system. GRP’s can help you identify occupancy rates, code requirements, costs and evaluate systems making the process much simpler.

## **Green Roof Types For Particular Buildings**

**What are the most common types of green roofs? Are there particular green roofs that work better for certain building types?**

There is a large array of different types of green roof systems in the marketplace each with its own advantages and disadvantages. Much of our technologies for green roof evolve from the Germans, who have a longer history of installing and setting standards for green roofs. There are three primary categories for green roofs, which include extensive, intensive and semi-intensive. Extensive green roofs are less than six inches of growing media and are the most lightweight, making them adaptable for installing on existing buildings with limited structural capacity. Because of the narrow profile they have a very limited palette of plant material that can thrive on these conditions. Plants that normally occur in harsh environments like deserts or rocky alpine meadows are typically used on extensive roofs.

Intensive green roofs have over 6 inches of growing media and can be as much as 48 inches deep. This deeper profile adds loading weight but allows a very wide range of plants to be considered. Due to the structural requirements intensive green roofs are typically associated with new construction; although there are cases where older parking structures or warehouses still have structural capacity to be considered for intensive green roofs. Along with the deeper profile come additional stormwater retention and energy conservation benefits. Since many green roofs are a mix of many conditions there is the

semi-intensive category that is defined that 25 percent of the green roof is 6 inches or more in soil profile (intensive) and the remainder 75 percent is less than 6 inches (extensive). I know it tends to make things complicated.

To make things a little more complicated each of the three categories of green roofs can be either modular or built-up systems. Modular systems are assembled and vegetated off site. They are placed on the roof in trays or modules providing a finished appearance upon installation. Built-up systems are exactly as they sound, they are installed in place by assembling one layer at a time until the entire system is "built-up." Plants in built-up systems are typically installed and grown in on site to achieve coverage.

## **Energy Benefits of Green Roofs**

**Are green roofs beneficial from an energy standpoint in all climates?**

**Why or why not?**

The energy benefits from installing a green roof can be difficult to assess, but there are good tools to quantify the energy benefits. The difficulty arises from the fact that air is a good insulator and when the growing media is dry the insulation value is quite good. However water is not a good insulator and when the soil is wet the insulation value is significantly reduced. Insulation values of green roofs are a relationship between soil moisture content, thickness of growing media, wind exposure and solar orientation. Generally it can be stated that the action of adding a growing media to a roof surface will improve the energy benefit of any building. In some cases the energy savings may be less than you would think, because the roof area of the building can be relatively small in comparison to the entire building envelope. The larger consideration for cost payback of a green roof is extending the life of the roofing membrane, possibly eliminating the need for two or three roofing replacement cycles.

## **Green Roofs Incentives and Rebates**

### **What incentives or rebates might be available for facility managers interested in installing a green roof?**

There are many types of incentives and rebate programs that vary from city to city. Because green roofs provide so many public benefits public entities are actively developing programs to get the public to install more green roofs. The benefits of green roofs are both direct and indirect in nature. Indirect incentives will vary but include such items as density bonus for zoning, development incentives, fast-track permitting, zoning upgrades, reduced stormwater requirements and they can be used to offset green space allocation requirements.

Direct investment or grants may take the form of rebates & installation financing; grant funding, tax credits or reimbursements to property owners who install specific practices. Other incentives can include low interest loans, energy efficiency incentives and stormwater rebates or fee reductions usually related to the use of impervious surfaces. Be sure to check around with your city officials to see what incentives are available in your area.

However remember that many of the benefits and incentives of green roofs are accrued to owner of the building which includes energy efficiency, increased membrane durability and longevity, increased rental rates for a recreation amenity and marketing appeal. Many builders, developers and owners understand that installing a green roof make good economic sense in the marketplace. The economic case for green roofs is well understood in class A office space and multifamily buildings where few new developments can be competitive without considering a green roof as a marketing asset.

*Answers provided by Jeffrey L. Bruce, FASLA, LEED, ASIC, GRP. Bruce is owner of Jeffrey L. Bruce & Company (JBC) a national landscape architectural firm.*

*Founded 1986, JBC provides highly specialized technical support to many of the nation's leading Architectural and Landscape Architectural firms on a wide variety of project profiles including engineered soils, green roof technologies, urban agronomy, green infrastructure, performance sports turf, water harvesting, and irrigation engineering. Bruce is a Fellow of the American Society of Landscape Architects, Past President of the American Society of Irrigation Consultants (ASIC), and Chairman of Green Roofs for Healthy Cities (GRHC).*

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