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The Wonder of Green Roofs

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Wednesday, February 7, 2007

The term green roof refers to a roof that is partially or completely covered with vegetation, usually with special membranes to protect the rooftop and hold the plants and growing media in place. Green roofs are a proven technology with significant potential to stabilize our climate by cleaning and cooling our air and reducing stormwater runoff.

Green roofs date back at least to 600 BC, to the Hanging Gardens of Babylon, one of the Seven Wonders of the World. These were terraced structures that were built over arched stone beams, waterproofed with layers of reeds and tar, covered with soil and planted with trees and plants. There are houses in the Orkney Isles of Scotland from 3600-2500 BC that appear to have had turf roofs. In Iceland, sod homes with grassy roofs were constructed hundreds of years ago. The idea spread throughout Scandinavia and other parts of Europe. There is a green roof that was planted in 1914 in Switzerland on which an orchid (Orchis morio) thrives today that is otherwise extinct in the region, The Rockefeller Center in New York City has several green roofs that were installed in the 1930s.

Germany has been perfecting modern green roof technology since the early 1970s when the first complete green roof systems were developed and marketed. These intensive systems require thick planting media of 8 inches or more to support a variety of plants and trees and can add upwards of 54 pounds per square foot. In the late 1980s many green roof systems were developed for large flat roofs; these lighter and cheaper versions were designed to be self-irrigating and require minimal maintenance. These systems are generally 3-5 inches in depth, weigh around 20-34 pounds per square foot and utilize various species of sedums, which are hardy succulent plants.

Green roof systems can be incorporated into new construction or retrofitted onto existing buildings.

They are usually found on commercial and public buildings, although they can be installed on smaller residential surfaces. Green roofs, unlike roof gardens, are applied as part of the roofing system and can be installed on a pitched roof. The components include the roof structure, a waterproofing membrane, a root barrier, a drainage system and/or water retention system, filter cloth to maintain the integrity of the green roof layers, a specially engineered lightweight growing medium, and plants. The cost of greening a roof starts at $11 per square foot, not including the structural analysis to determine the roof's load capacity.

Green roofs serve many environmental functions. They absorb carbon dioxide from the atmosphere in exchange for life-giving oxygen, they cool the air and they retain stormwater. That means that once installed, they immediately reduce the urban heat island effect, reduce energy costs and reduce stormwater runoff. According to Prof.

Brad Bass of University of Toronto, when a city installs enough green roofs to achieve a 1ºC drop in temperature, this will result in a 10% reduction in energy use. Green roofs also provide environmental services by creating new space for biodiversity to thrive, reducing allergens and asthma, diminishing air and noise pollution, and increasing roof longevity (which reduces the need for disposal of old roof membranes).

Nearly 10% of Germany's building surfaces have green roofs, covering 50 square miles, and is currently adding 5 square miles of green roofs per year. North America lags far behind, with slightly more than 2 million square feet of green roofed space. Green roof installation is costly in the US, so the economic benefits are not always sufficient to motivate consumers. Our local, state and federal governments need to provide incentives to accelerate the process. In Toronto, the city subsidizes green roof installation by $2 per square foot. Germany offered large incentives during the initial years. Tokyo passed a law in 2001 to require new buildings to green at least a fifth of their rooftops. Chicago, a city with a celebrated green roof on its City Hall, has more than 200 green roofs, and is perhaps the greenest city in the US. It is now requiring developers to green all buildings that undergo city review.

When we cool our coastal cities with sufficient numbers of green roofs, we may even begin to cool our oceans by limiting freshwater runoff, and thereby slowing the rate at which coastal waters are being reduced in salinity due to human activity. Some advocates feel that green roofs have the potential to keep the Atlantic's thermohaline pump performing properly.

Green roofs limit greenhouse gas emissions, and therefore can help to slow global warming. The northeast corridor, from Boston to Washington, DC is contributing an enormous burden of CO2 to the atmosphere. Policymakers have an opportunity to turn our urban corridor into the Eighth Wonder of the World, a carpet of green roofs, and help preserve a livable world.

Earth Our Only Home, Inc. is a company led by three mothers committed to reversing the rate of global warming through green roof technology,
www.earthouronlyhome.com