



Green Roof

A **green roof** is a roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane.



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Extensive Green Roof:

A lightweight, low-maintenance roof which is covered in low-growing vegetation (typically sedum), and is usually installed to create advantages from the additional surface protection and maximize the ecological benefits.



Intensive Green Roof:

A heavier roof, covered with large plants, shrubs, trees, grasses, and structures for human activity. They are usually intended to take the form of well-kept gardens. Anything is possible, given an adequate load bearing capacity is present.



Green Wall

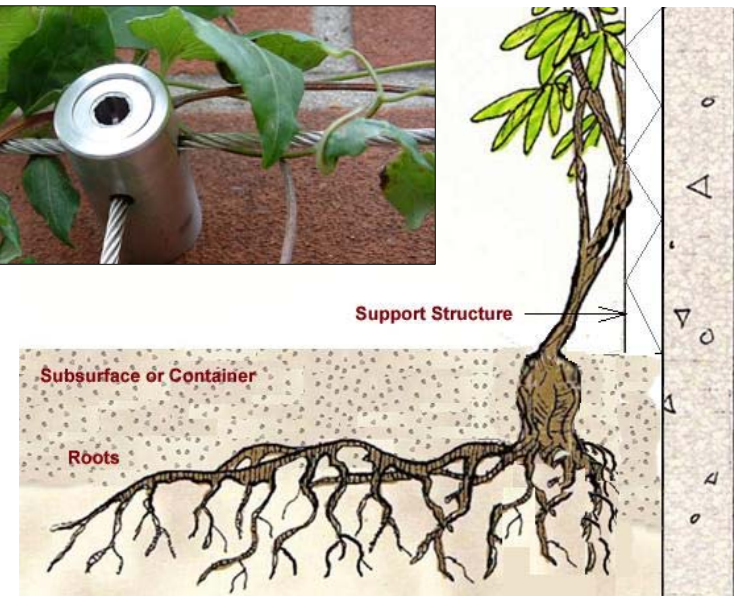
A **green wall** is a wall, either free-standing or part of a building, that is partially or completely covered with vegetation and, in some cases, soil or an inorganic growing medium. They are also referred to as living walls, green façades, bio-walls, or vertical gardens.



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A **‘Green Façade’** or façade greening, features a training structure that supports vines or climbing plants growing upward from the ground, away from the building.





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Source: Green Living Technologies

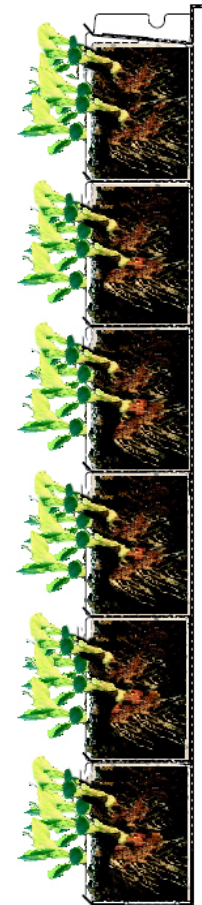


Source: Green Living Technologies

A **‘Living Wall’** is part of a building envelope system, comprising of pre-vegetated or planted-in-place panels; containing plants, growing medium or liquid nutrient, installed in or on a frame, and either secured to a structural wall or free-standing.



Source: Green Living Technologies





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Triple Bottom Line

A phrase coined by John Elkington in 1994, the **triple bottom line** captures an expanded spectrum of values and criteria for measuring organizational (and societal) success: *economic*, *ecological* and *social*. “People, planet and profit” succinctly describes the **triple bottom lines** and the ultimate goal of **sustainability**.

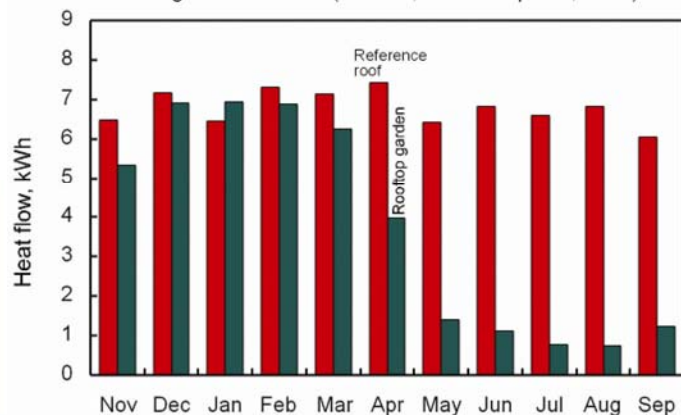
Summary of Benefits

- 1) Significantly reduce year-around heating *and* cooling costs
- 2) Increase a building envelope's life span *and* sound resistance
- 3) Reduce, capture & clean *storm water* runoff throughout the city
- 4) Create additional *amenity space* and *value* for a building project
- 5) Filter pollutants, absorb carbon, reduce *Urban Heat Island Effect*
- 6) Establishment of new *job market* for manufacturers, growers, etc.
- 7) Formation of local, sustainable, urban *food source* for community

1) Significantly reduce year-around heating *and* cooling costs



Average daily energy demand due to heat flow
through roof surfaces (Nov. 22, 2000 - Sept. 31, 2001)



People: Overall decrease in energy consumption, reducing need for expensive hydro infrastructure.

Planet: Significant reduction in greenhouse gas emissions due to energy production & consumption.

Profit: Savings on energy costs during Operation; reducing HVAC & insulation needs during construction of a project.



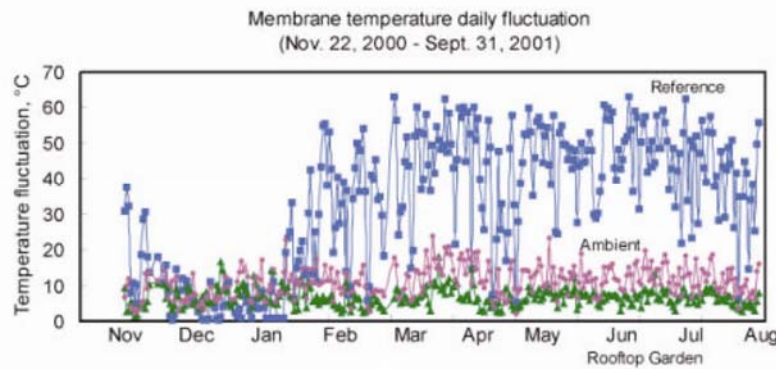
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2) Increase a building envelope's life span *and* sound resistance

People: Significant reduction of sound from surrounding machinery, traffic or airplanes.

Planet: Extending the lifespan of landfill sites by reducing re-roofing material waste.

Profit: Increased lifespan of roof membrane (by as much as three times); decreased maintenance & replacement costs.





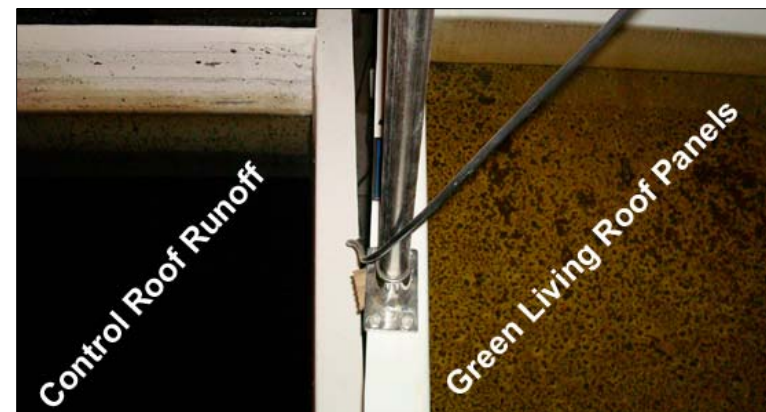
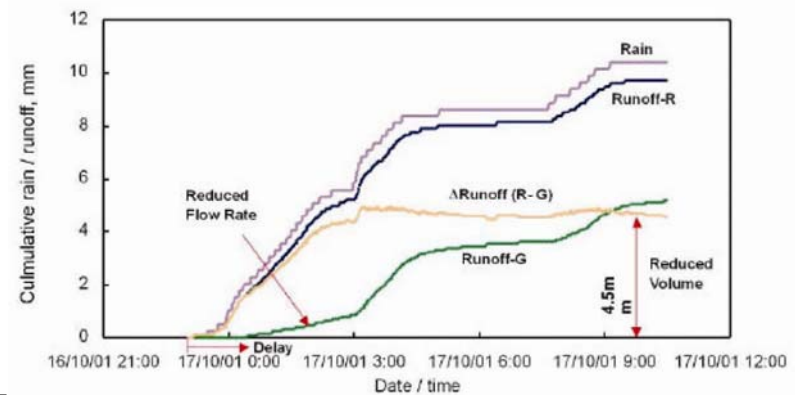
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3) Reduce, delay & clean storm water runoff throughout the city

People: Cost savings from retention & delay, decreasing need to expand water treatment infrastructure.

Planet: Filtration of water runoff, moderating the temperature & quality of water entering the watershed.

Profit: Lessening of storm water management costs (roof drains, retention ponds, municipal fees, etc.)





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4) Create additional *amenity space* and *value* for a building project



People: Increased worker productivity & creativity, creating amenity space & improving the aesthetics of the city.

Planet: Minimize the impact of site development by creating quality habitats for plants, birds, insects, etc.

Profit: Increasing overall value & marketability of building. Potential for grants, fast-tracking, density bonuses, LEED credits, etc. Potential for local, regional, & national market exposure, depending on the project.



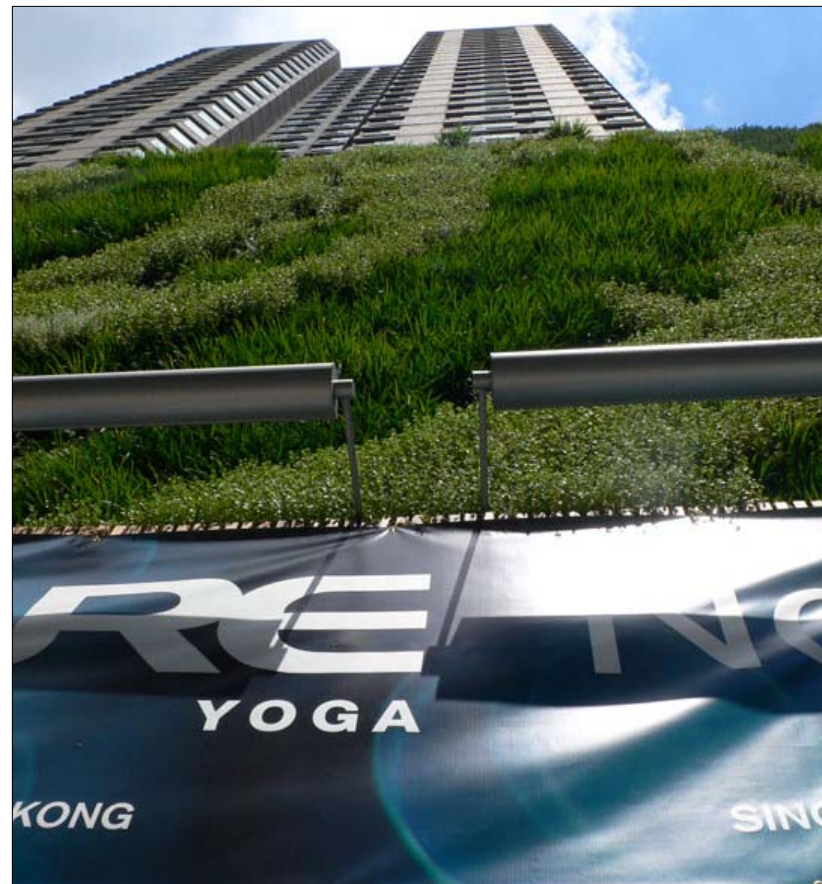
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5) Filter pollutants, absorb carbon, reduce *Urban Heat Island Effect*

People: Increased air quality & temperature; and reduction in related health care services.

Planet: Less air pollution & greenhouse gas emissions.

Profit: Decreased cost of meeting greenhouse gas reductions & adapting to climate change.





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6) Establishment of new *job market* for manufacturers, growers, etc.



People: Creation of jobs for manufacturers, growers, designers, contractors, maintenance technicians.

Planet: Establishment of more environmentally responsible technologies & business practices.

Profit: Allows cities to compete in the “green” economies of the 21st century.





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7) **Formation of local, sustainable, urban *food source* for community**

People: Fresh, local source of food; boosting the local economy & increasing access to food by members of the community.

Planet: Encourages regional & seasonal agriculture & consumption.

Profit: Ability for businesses (ie. restaurants) to grow herbs, flowers, fruits & vegetables, providing an inexpensive food source.

