ECONOMIC INCENTIVES FOR Green Infrastructure

Green infrastructure (GI) is an approach to water management that protects, restores, or mimics the natural water cycle. GI practices are capable of improving water quality and manage water quantity to help communities meet stormwater regulations, but many communities are hesitant to implement GI due to the initial associated costs.

What is the real value of GI implementation?

Tree Plantings

Planting trees in parking lots and in landscaping areas have up front costs, but many are unaware of their long term benefits.

Reduced Stormwater Runoff: Trees intercept rainfall, increase soil infiltration and storage, and minimize runoff through processes like evapotranspiration. Trees also return better quality water to groundwater. This helps property owners meet stormwater regulations. For residential homes, savings are approximately **$10.80/gal** of stormwater prevented from entering the sewer system. For commercial properties, these savings increase to **$23.36/gal**!

Reduced Energy Use: Trees provide shade in summer and release water back into the atmosphere, cooling air temperatures by **5-10ºF**. This allows buildings to use less air conditioning on warm days. Trees intercept cold winds during winter, reducing heating needs as well. Overall, trees reduce energy consumption by **8-12%**, saving households about **$10** on energy uses. One large tree can save businesses up to **$45** annually in energy costs!

Improved Air Quality: Trees absorb **120-240 lbs** of air pollutants like nitrogen dioxide, sulfur dioxide, and ozone and intercept particulate matter. Considering clean-up costs of these pollutants range from **$2.06-$3.34/lb**, planting a tree will save your community money in the long run.

Retail Centers and Business Benefits: Trees help create visual identity for businesses through careful plant selection. Studies show that customers prefer areas with orderly, well-maintained planting schemes with tree canopies and accessory vegetation enough to spend **8-12%** more at businesses with this landscape. Consumers also specified that they would be willing to pay more for parking in areas shaded by trees, helping to offset any parking spaces devoted to tree planting.

Water Harvesting

Water harvesting involves redirecting and capturing rainwater for later use, including downspout disconnection and the use rain barrels or cisterns. These are some of the simplest retrofits.

Increased Available Water Supply: Outdoor irrigation accounts for **1/3** of all residential water use. Capturing rainwater to use for outdoor irrigation substantially reduces the need for tap water. Rainwater is more beneficial for plants because it contains nitrogen and phosphorus and does not contain any salts, unlike tap water, which can harm soils.

Reduced Energy Use: Tap water requires energy to produce, treat, and transport. By cutting down on tap water used, rain water harvesting reduces energy use, improve air quality, and reduces atmospheric CO_2 levels.

A single rain barrel, cistern, or downspout disconnection can divert 3,730 gallons of stormwater from the sewer system with maintenance costs of only $7 per year!

IMAGE CREDIT: http://qikbux.com/ & http://web.uri.edu/

Tinker's Creek Watershed Partners
Rediscover • Respect • Revitalize

ECONOMIC INCENTIVES FOR Green Infrastructure

Permeable Pavement

Permeable pavements allow the movement of stormwater through the surface. Existing paved surfaces are great retrofitting opportunities for this, especially if the area requires repaving.

Reduced Stormwater Runoff: Porous pavement allows up to 80-100% of stormwater to infiltrate into soils, reducing flooding and erosion. It also usually captures and treats runoff, reducing water treatment costs as well.

Reduced Salt Use: Permeable pavement delays frost formation in colder climates. This reduces the need for salt application, saving money and reducing pollution.

Improved Air Quality: Permeable pavement reduces emissions associated with water treatment plants. It also reduces urban heat island effect by absorbing less heat than traditional pavement, reducing ground-level ozone formation and carbon dioxide emissions.

Low maintenance costs: Although it can be expensive to implement, permeable pavement has lower maintenance costs than traditional pavement. The annual maintenance costs are estimated to be **$0.06**/ft^2. After 57 years, communities may experience up to **$2.5 million** in savings.

Green Roofs

Green roofs consist of a layer of waterproof materials, soil media, and plants on flat or slightly sloped roofs.

Reduced Energy Use: By providing an additional layer of insulation for buildings, green roofs reduce energy usage. These gardens reduce the amount of sunlight reaching the surface of the roof and lower rooftop surface temperatures, improving the efficiency of rooftop air conditioning units.

Improved Air Quality: By reducing energy use, green roofs reduce the amounts of associated emissions. The plants on the roof also sequester carbon, further reducing the amount of CO_2 in the air.

Lifespan Benefits: Green roofs have a lifespan of at least 40 years–twice as long as traditional roofs. Over 40 years, this can save retail centers **$600,000** and office buildings **$270,000** in replacement costs. Plants protect the roof's waterproof membrane from UV light, extreme temperature changes, and damage from use or maintenance. Rental premiums from green roofs can be as high as **16%**!

Bioretention and Infiltration Practices

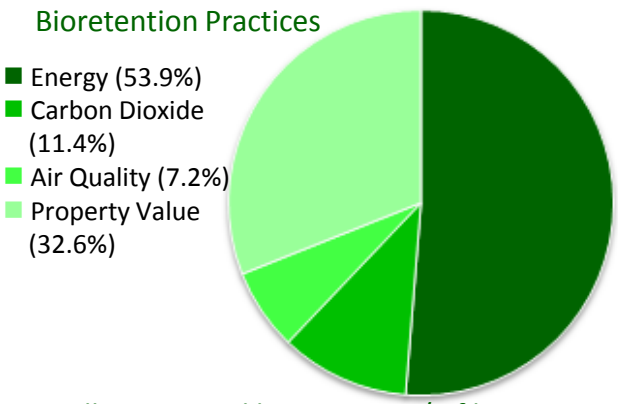
Bioretention and infiltration practices include vegetated, depressed landscape areas that collect and retain or infiltrate stormwater, like extended tree pits, foundation planters, curb-cut bump-outs, rain gardens, and bioswales.

Reduced Stormwater Runoff: These practices store and infiltrate runoff, reducing flood impacts. Additionally, less tap water is needed for irrigation.

Improved Air Quality: By capturing stormwater before it enters the sewers, these practices reduce the amount of water requiring treatment and reduce the amount of emissions from water treatment plants. The plants used in bioretention/infiltration practices also store carbon, lowering CO_2 levels.

Avoidance Costs: Implementation of these practices reduce the amount of costly below-ground infrastructure and the amount of land disturbance involved in construction, resulting in site preparation savings. Savings include **$0.0002/gal** of stormwater from combined sewer system annual maintenance costs. These practices also create aesthetic landscaping, increasing rental rates by **7%** and property values by **2-8%**.

Proportion of Monetary Value from Bioretention Practices



Fully vegetated bioretention/infiltration practices provide benefits of **$14,457** total!