
Advancing Green Infrastructure in the District: Opportunities to Enhance the Green Economy

Efficient and effective implementation of green infrastructure (GI) as an element of sustainability offers many opportunities to enhance the green economy. While GI has historically been an important element of stormwater management programs, recent efforts in urban areas have shifted its use to create employment and career pathways. Despite this change, many barriers and challenges must be collectively considered and collaboratively addressed to establish a green economy that is equitable, profitable, and environmentally sound.

BY DWANE JONES

Stormwater runoff is a major cause of water pollution in urban areas. When rain falls in undeveloped areas, the water is absorbed and filtered by soil and plants. When rain falls on our roofs, streets, and parking lots, however, the water cannot soak into the ground. In most urban areas, stormwater is drained through engineered collection systems and discharged into nearby water bodies. The stormwater carries trash, bacteria, heavy metals, and other pollutants from the urban landscape, degrading the quality of the receiving waters. Higher flows can also cause erosion and flooding in urban streams, damaging habitat, property, and infrastructure (EPA 2014).

Green infrastructure (GI) uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water. The most common GI practices include: rain gardens, bioretention, rainwater harvesting, green alleys/streets, permeable paving, bioswales, green roofs, and urban tree canopies.

Although these structural practices have been applied as stormwater management practices in both urban and rural areas for decades, only recently have cities, such as Philadelphia, begun to consider GI for its “triple bottom line” (urban sustainability) purposes:

On environmental benefits side alone, the potential payoff is massive. Focht [Mark Focht, FASLA, first deputy commissioner, Philadelphia Parks & Recreation and ASLA President] said the greening plan could absorb or help the city

avoid some 1.5 billion pounds of carbon dioxide annually, which is equal to removing 3,400 cars off the road. “This number will compound each year.” With improved air quality due to all the new trees, green roofs, and parks, communities will benefit on the social or health side, as well. Focht estimated 20 deaths due to asthma will be avoided, and 250 fewer work or school days will be missed. Deaths due to excessive urban heat could also be cut by 250 over 20 years. Lastly, the economic benefits are outstanding: the new greenery will increase property values by \$390 million over 45 years, also boosting the property taxes the city takes in. *In the short term, all those green roofs and parks need to be constructed, creating 250 local green jobs* (emphasis added). Focht said *in contrast to grey infrastructure, green infrastructure creates a wider range of jobs, with more opportunities for convicts reentering society.* “Grey infrastructure really just employs engineers” (emphasis added). He added that green infrastructure benefits are immediate across all levels, while grey infrastructure has a “different curve” to kick-in and starting paying back immediately across all levels (Green 2013).

GREEN INFRASTRUCTURE AND URBAN SUSTAINABILITY IN THE DISTRICT OF COLUMBIA

Although implementation of GI is not new to the District, our sustainability agenda, of which GI is an element, is. Transitioning Mayor of the District of Columbia, Vincent Gray, in one of his first major initiatives launched Sustainable DC, an ambitious plan to help make DC the “greenest, healthiest, most livable city in the nation by the year 2032” (Sustainable DC Plan 2013). The plan sets targets that will create jobs, improve equity, and enhance environmental quality in the District. The University of the District of Columbia’s College of Agriculture, Urban Sustainability, and Environmental Sciences (UDC-

CAUSES), and more specifically, the Center for Sustainable Development, is a partner in carrying out initiatives set forth in the Sustainable DC plan. DC Water is also a partner in the plan.

DC Water is the primary water service provider in the DC metro area with an approximately 725 square miles of territory. DC Water provides retail water and wastewater service to the District of Columbia and provides wholesale wastewater treatment service to Montgomery and Prince George's counties in Maryland and Fairfax and Loudoun counties in Virginia.

DC Water is proposing a pilot program to demonstrate the effectiveness of GI on a massive scale. While DC Water is not the only entity in the District implementing GI, it is certainly one of the catalysts stimulating the industry. DC Water's proposed program would cover 50 acres of the Potomac and Rock Creek sewersheds at a cost of \$10-30 million. Our pilot program will provide green entry-level jobs for District residents, greener and more attractive neighborhoods throughout the District, increased property values, an enhanced ecosystem, and more ways to mitigate climate change. DC Water anticipates that it could also keep water and sewer bills from rising past \$120 a month by the end of this decade (DC Water 2014).

DC Water is under a 2005 court-ordered consent decree to build a massive tunnel system to control combined-sewer overflows to all three District water bodies. The program, called the Clean Rivers Project, is in the implementation phase of a tunnel system under the Anacostia River. When complete, it will reduce overflows in the Anacostia by 98%—or more than 2 billion gallons of diluted sewage a year (DC Water 2014). The consent decree requires similar tunnels for the Potomac River and Rock Creek. DC Water is proposing a GI pilot program to explore whether a large-scale green solution can reduce overflows enough to make the next tunnels smaller or eliminate them altogether. Doing so could save taxpayers hundreds of millions of dollars.

Regulators and courts have approved plans for other cities around the country, notably Cleveland, Kansas City, and St. Louis, to experiment with GI as a way to reduce runoff (DC Water 2014). This next generation of consent decrees and programs is the result of a new understanding—that it is possible to balance environmental protection, job growth, and financial impact to the community footing the bill.

UDC-CAUSES MISSION

UDC is the only urban land-grant institution in the nation.

The history of land grant colleges of agriculture is intertwined with the history of higher education for U.S. citizens of aver-

age means. The land grant system began in 1862 with a piece of legislation known as the Morrill Act. This law gave states public lands provided the lands be sold or used for profit and the proceeds used to establish at least one college—hence, land grant colleges—that would teach agriculture and the mechanical arts. Land grants for the establishment of colleges of agriculture and mechanical arts were also later given to U.S. territories and the District of Columbia. The legislative mandate for these land grant colleges helped extend higher education to broad segments of the U.S. population (National Research Council 1995).

So, what does this mean and how does it apply to GI, the green economy, and urban sustainability? As a land-grant institution, UDC extends academic, informal education that typically originates on campus into our communities (all eight Wards of the District of Columbia) through outreach, short courses, workshops, and other opportunities.

Our mission is as follows: *The College of Agriculture, Urban Sustainability and Environmental Sciences of the University of the District of Columbia offers research-based academic and community outreach programs that improve the quality of life and economic opportunity of people and communities in the District of Columbia, the nation and the world.*

The District's GI initiatives perfectly align with our mission. We viewed GI as an ideal opportunity to advance our mission to improve quality of life for all people in the District.

LESSONS LEARNED

As founder of the North Carolina Low Impact Development (LID) Program at North Carolina State University, (LID is a type of GI technique), I arrived in the District about two years ago to assume the role of Director of the Center for Sustainable Development at UDC. Upon my arrival, I learned there were many initiatives underway in the District aimed at implementing a GI. Despite this, the initiatives were unorganized, non-standardized, and occasionally duplicative in nature and scope.

Shortly thereafter, the Center for Sustainable Development (as part of UDC-CAUSES) launched a collaborative comprised of District governments, agencies, universities, and nongovernmental organizations (NGOs), to discuss and organize programmatic efforts to advance GI in the District. Group representatives include, but are not limited to, District Department of Environment (DDOE), District Department of Transportation (DDOT), DC Water, UDC, George Washington University, Washington Parks and People, American Rivers, and the American Planning Association. The group meets bimonthly on campus at UDC to develop a long term, comprehensive strategy to not only pro-

mote green jobs in the District via GI, but to develop career and education pathways that support the green economy.

As of December 2014, the GI Collaborative has met a total of four times. Each meeting has progressively divulged opportunities and challenges to efficiently and effectively implementing GI District-wide. The following (Table 1) addresses the top five challenges and opportunities identified by the collaborative.

| Challenges | Opportunities |
|--|---|
| High unemployment rate in the District; most employment opportunities require a bachelor's degree or higher. | Engage GI as a mechanism to increase the number of and access to jobs in the District. |
| Uncoordinated implementation of GI in the District. | UDC-CAUSES launches collaborative aimed at organizing opportunities for collaboration, community education, and workforce training to support the green economy. |
| Most employment opportunities in the District require Bachelor's degree or higher. | Utilize GI as an approach to increasing transitional opportunities to move potential workforce from jobs to careers; little education to pathway through Master's degree. |
| Need a plan of action to organize programs and initiatives to ensure long-term program sustainability. | The collaborative is developing a five-year strategic plan aimed at organizing programmatic activities and targeted employment programs. |
| Need for a diversified workforce to support the green economy. | Complement GI training opportunities with other careers (e.g. HVAC Technician, etc.) |

Table 1: Challenges and Opportunities for Use of Green Infrastructure in the District of Columbia.

CHALLENGES AND OPPORTUNITIES

Because of the number of entities in the District with some degree of expertise in implementing GI, the District is ripe with challenges and opportunities as we endeavor to strategically operationalize GI to enhance the green economy and improve quality of life for all residents of the District.

The District has one of the highest unemployment rates in the country. The greater portion of this high rate can be attributed to an undereducated workforce in an educated economy. To combat this issue, the collaborative is developing training opportunities in construction and maintenance of GI practices. These opportunities support the industry and its workforce by ensuring environmental objectives are met, the undereducated and underemployed have access, and the economy benefits.

Training opportunities will be strategic and targeted as outlined in the GI Comprehensive Plan. Each program and potential opportunity will be vetted by the collaborative. UDC, in collaboration with other institutions, will offer opportunities for career pathways. Pathways under consideration include: certificate programs, two- and four-year degree options, and master's level options. Should an individual opt to progress from a job in GI to a career in GI, UDC will offer training opportunities in entrepreneurship, management, communications, and technical expertise.

The Water Resources Research Institute will support water quality monitoring and evaluation efforts to ensure GI practices are effective, both short and long term. Furthermore, training opportunities will be developed to complement GI expertise with careers that require similar skill-sets. For example, employment as an HVAC technician can vary seasonally. Similarly, employment in the GI can seasonally vary. Training opportunities in these careers could complement one another by increasing opportunities for a consistent workflow.

CONCLUSION

The GI industry offers many possibilities for enhancing the green economy. These possibilities can only be realized through an organized partnership between government, land grant universities, NGOs, and targeted opportunities to provide equitable access to potential opportunities. The collaborative is becoming a catalyst for advancing GI in the District. As we continue to discuss initiatives and plan accordingly, quality of life and economic opportunities will improve for District residents, the nation, and the world. ■

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