National Wildlife Federation®
CAMPUS ecology®

Virginia Commonwealth University
Richmond, Virginia
Gardening and Green Rooftops

SCHOOL

Virginia Commonwealth University, founded in 1968, is home to more than 31,000 students in Richmond, Virginia. The public, 4-year University consists of two campuses, Monroe Park Campus and the Medical College of Virginia Campus.

ABSTRACT

Virginia Commonwealth University and the sustainability department installed a green roof top, and community garden to support its Climate Action Plan to be fully carbon neutral by 2050. The green roof top was installed on top of the Pollak Visual Arts building in September of 2011 and consists of 4,020 square feet. The infrastructure allows for a reduced heat island effect, reduced storm water volumes, reduced storm water flow rates, reduced energy use, new wildlife habitat, and new passive recreational use. Steel planters were salvaged from a local steel facility as well as the locally-sourced Pennsylvania Bluestone pavers and Black Locust wood bench.

GOALS AND OUTCOMES

Goals

With the construction of the green rooftop which also houses a wind turbine, the sustainability department predicted there to be less storm water, cleaner runoff, greenhouse gas emissions reductions, increase in wildlife, and higher energy efficiency for the building due to more insulation. The wind turbine, mounted on the southeast stair tower and visible from the green roof, helps produce power to run the lights, and HVAC system. VCU plans on increasing its sustainable efforts by producing more efficient ways to derive energy and reducing greenhouse gases.

The recently installed community garden assists in allowing students and faculty to grow food and vegetables locally, and at their own cost. Hopefully, the community will learn the benefits of growing their own produce and plants, rather than having to drive to the grocery store.

The sustainability office, in coordination with energy management is working on more ways to reduce energy consumption. VCU plans to work with ARAMARK, the on-campus dining provider, on ways to reduce food waste by composting and re-invent the menu to derive food from local areas, and possibly the community garden itself. The sustainability office is always working to find new approaches to achieve better energy efficiency. Interns are in the midst of updating and providing more information on the sustainability website to keep students and the community informed. VCU plans to be fully carbon neutral by 2050, and has pledged to gradually achieve this goal by reducing emissions by 3% annually.

Accomplishments and Outcomes

The green rooftop's design allows for cleaner stormwater runoff with the planting of 46 varieties of plants. Many of the plants are native to Virginia and would therefore flourish in the mild climate. The vegetation cleans and purifies the rainwater which in turn keeps the James River, in close proximity to campus, cleaner. A pest management plan avoids chemical pesticides, and uses environmentally friendly alternatives. Organic fertilizers and natural soil takes the place of harmful chemical fertilizers. The green roof is conceived and designed as a demonstration of three distinct green roof planting strategies. A conventional green roof occupies the center portion of the roof. The area of conventional green roof features a variety of low-growing sedum species, planted in 3 to 4 inches of growth media. (Sedum species, like cacti, are succulent plants which can store water within their plant structures.) Sedums in this area are non-native species, selected for their hardiness and ornamental characteristics.

A second type of roof, a green roof meadow, occupies the outer, long edge of the roof. This section features somewhat taller plants, bedded in approximately 6 inches of growth media. Plants in this area are a mix of native and non-native species.

The largest portion of the roofscape, closest to the building, features only plants native to Virginia—the first such green roof in the Commonwealth. Growth media in this section of the roof is approximately 12" deep, and can therefore retain more moisture than the other two sections of the roof. To achieve the goal of a 100% native roof area, the design team worked closely with a green roof horticulturalist to identify a range of species with proven ability to thrive in the harshest climates. Many of the species selected can be found on mountaintop balds in the Blue Ridge Mountains—sun-baked, windswept places with poor, thin soils.

The wind turbine, located at the Pollak Building, supports 1kW of power, or 1000 watts. This was the first wind turbine installed on campus, and production of electricity and performance was uncertain. Due to a lack of sustained wind on site, the turbine does not put out as much power as predicted. VCU does not have specific results outlining the energy efficiency results, but can definitely say that the wind turbine is offsetting some power.

The community garden is divided into multiple plots, the majority of which are all filled. Despite the price associated to rent the plots, students, faculty, and community members show motivation to grow vegetation in the garden plots.

Wildlife and the natural environment benefited from this project in a variety of ways. The rooftop garden and community garden attracted many different species of birds and provided a feeding ground for worms and insects. The flowers provided insects with food and more areas to spawn. The natural

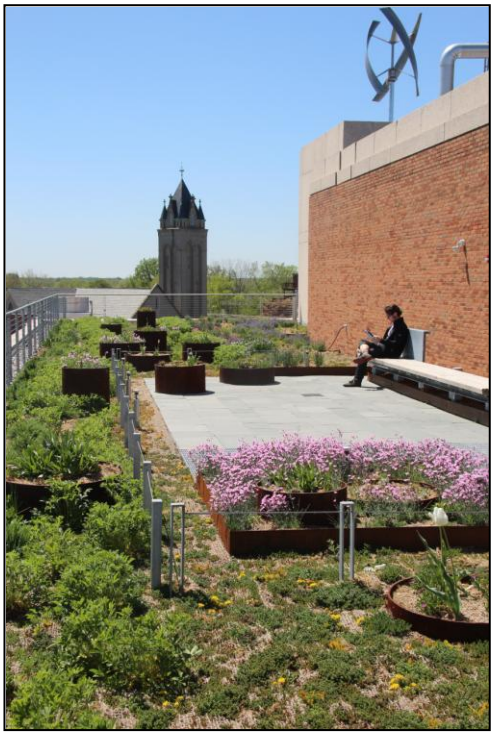
environment benefits simply from less greenhouse gas emissions, and cleaner storm water runoff. A no-smoking policy was adopted for the green rooftop building. Other policies included 24 hour access to the top of the building. There have not been any official studies conducted that have reviewed the impact on wildlife and the natural environment.

Challenges and Responses

Funding for the projects was the biggest issue for the rooftop and garden project. Student Government was generous to provide ten percent of the funding costs. Several design issues halted the construction process but were able to be accomplished. The issues with this project will help anticipate similar issues for future projects.

Campus Climate Action: Your School's Carbon Footprint

Virginia Commonwealth University directly approached global climate change and addressed the issue. The previous president signed the Climate Action Plan with an intent to reduce all carbon emissions by 2050. The green rooftop helps to clean the air with the addition of plants and vegetation, which take in carbon dioxide and exert oxygen. This natural cleansing tool helps to purify the air, therefore reducing carbon dioxide emissions. The wind turbine helps to offset a small amount of the energy used to power the building.



Commentary and Reflection

In planning and implementing any project, communication is vital between the directors, and the people that carry out the physical construction work. A good idea for any project that takes place is to alert the surrounding community. Have an option to have the certain project site open to the community as a way to keep them involved during the entire process.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

Richard Toscan, former Dean of the School of the Arts was an early advocate of the project. Mr. Ed Bennett, Director of Physical Plant was critical in making the project happen, shepherding it through funding, design and construction. Jacek Ghosh, Sustainability Director, was also key as an advocate of the project. Robert O'Connor and Eric Helmick were VCU's able and capable project manager and construction administrator for the project. Capitol Green Roof's of Richmond was capable in its oversight and installation of the green roofing materials. Steve Davis of VMDO Architects was the project manager and David Oakland of VMDO was the partner in charge of the project. Jordan Starbuck in the Sustainability Office was most effective in getting the word out to the larger community and in coordinating this project with other sustainability projects on campus. Seventeen students in the department of interior design in the school of the arts participated in planting the roof with plants.

Funding and Resources

The green rooftop and community garden were internally funded.

Education and Community Outreach

The community garden engaged students and the local community and inspired them to utilize the convenient soil plots to grow produce and flowers that may have been driven to and purchased at the store. Having the community garden positioned in the middle of the city, gave the community the opportunity to grow vegetation at a low cost per semester or yearly. Updates on future and present project operations are kept up to date on VCU's website and flickr accounts. The garden rooftop of the Pollak building serves as a calming inspirational place for the community to ponder.

National Wildlife Federation's Campus Ecology Program
The online case study database served as a template and example for how to prepare VCU's case study.

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MORE ABOUT YOUR SCHOOL
Campus Sustainability History
Virginia Commonwealth and its sustainability department involve itself in as much as it can as far as extending its sustainable efforts. From reducing, reusing, and recycling, VCU has executed many events and programs to address conservation. The university has implemented many energy saving devices such as solar panels and solar powered water heaters. The campus has 1,490 solar panels producing 342.7 kW, contributing to a potential 384,000 kWh savings. Solar energy heats about half of all the hot water used at one of the Dining halls on campus. A 12,000 cistern installed at the Cary Street Gym collects rain runoff, and the stormwater is utilized for irrigation. A 2,500 square foot bioretention area was installed on the south side of the School of Business lawn to control the quality and quantity of storm water runoff. Xeriscaping landscaping, landscaping that consists of vegetation requiring very little or no water to maintain, was established at the Trani Center for Life Sciences building.

As of 2007, seven newly constructed buildings have been certified LEED accredited. The Walter Rice Center, located on the James River, serves as classroom and laboratory space. The building is Platinum LEED certified, and was the first building in Virginia to attain this ranking.

As far as providing alternative transportation, the university has developed a bike rental program, RamBikes, to promote sustainable transportation. Also, the Zipcar sharing program was introduced as another way to reduce emissions. The program allows students and the local community to rent a car by the hour. Zip-car is a great initiative for students to leave their cars at home, or to even hold off on buying a car. By sharing cars, less material is being produced in the production and manufacturing of more cars. The VCU Office of Sustainability's website provides current information on all projects here, http://www.vcugoesgreen.vcu.edu/.

Image Credit: Klaas Versluys