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PREVIOUS

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## SOLUTIONS: Installing a green roof is worth the investment

Huck Fairman Updated 18 hrs ago

Princeton University has been a local leader in efficient, clean energy production. Its purpose in adopting its several systems has been both to save money and reduce CO2 emissions. In addition to its steam-producing co-gen plant, its large solar array, its chilled water plant, and its groundwater-heat pump systems, it has also recently installed a green roof on the new Wawa store at the Transit Plaza.

This green roof is essentially a rolling meadow, with “artfully constructed” mounds and pathways” atop a 4,200-square-foot flat roof. It stores 79,000 gallons of rainwater which helps insulate the building and is not simply piped off as storm water.

But is this really worth the effort and cost?

The answer is that green roofs provide several benefits, including insulating so that they reduce heating and cooling costs, protecting a roof's membrane thereby extending its life, saving and storing rainwater (which acts as a second insulator,) so that not as much has to be piped elsewhere, and creating a natural habitat producing clean air and supporting plants for birds and insects (and pollinators.)

In addition, this new roof can serve as a living research facility (as did earlier installations at the campus's Butler College, and Sherrerd Hall) and provide a sustainability case study. (These two prior green roofs generated evidence that they can be cost-effective investments, although probably limited to flat or rolling roofs.)

But for most of us, this concept raises a number of questions. Is it worth the investment? Does its extra weight require substantial strengthening? How long can it be expected to last? How much maintenance is required? How does it compare to a white roof? Financially, can it be compared to a roof with solar panels?

The answers provided by the university's Architectural Department and Facilities Department are: The university has long been meticulous in evaluating all these new technologies for both cost savings and environmental benefits. It would not have undertaken this project had there not been demonstrable savings and environmental benefits — from its prior green roofs, and other sources of evidence.

To anticipate the roof's weight requirements and life expectancy, the project's architects, structural engineers, and green roof consultants conferred to ensure that their needs would be met. The original flat roof, plus the rolling green roof, with its extra, shaping insulation, would be heavier than normal, and so extra strength was designed and built in.

While there is no established, finite number of years for the life expectancy of green roofs, in Germany where many were constructed in the 1970s, those roofs are now approaching 50 years of service. The Chicago City Hall green roof is close to 20 and remains "healthy and vibrant."

For Princeton's Wawa roof, different degrees of maintenance have been required. Over the first two years, the green roof contractor needed to provide supplemental irrigation, in addition to rain, to "support initial root development." But that is no longer necessary.

“The landscape architect selected green roof plants for their drought tolerance and ability to provide long-term coverage on the roof.” Still required is “early spring maintenance,” including weeding and cutting back grasses to provide room and light for new growth. In addition, during the summer, perennial flowers are pruned to encourage new blooming. Fall maintenance seems to be guided by aesthetics more than system health.

The variety of plants installed includes not only flowering perennials but a mix of cool and warm season grasses that together produce the look of a local meadow.

In the winter, the plants go dormant but the seeds remain to repopulate in the spring, and provide food for birds.

About 75 percent of the rainwater that falls on the green roof will be absorbed and stored by the plants (and surrounding insulation and bordering crushed granite.) The rest flows into drains.

Studies show that green roofs “perform similarly to white roofs in cooling roof spaces and reducing urban heat islands.” But green roofs maintain this cooling ability as they age, although they do require gardening maintenance. White roofs also need regular attention as they must be regularly cleaned and serviced to sustain their performance.

Finally, there is aesthetic value in a living, rolling (or flat) green roof, in contrast to the usually less-than-beautiful flat roofs that cover many institutional and business buildings.

Because green roofs generate no electrical power, compared to solar paneled roofs, they are an entirely different approach to addressing sustainability. But because the new Wawa roof follows two prior university green roofs, the university’s decision to install another is evidence that this technology is worth the investment for the right building.

*Huck Fairman is a Princeton author who writes about environmental issues in Solutions.*