

The ecological promise of living roofs and walls

As cities work to slash emissions and fight climate change, nature-based solutions provide myriad benefits

BY JESSICA WOLFROM

Every time it rains, Vanessa Keitges sees a missed opportunity.

Instead of being captured, that water bounces off buildings, rushes over impermeable surfaces, washes into storm drains and, ultimately, out to the ocean. That's a precious resource lost in a drought-stricken state like California.

On the flip side, as storms intensify in a warming world, cities with century-old sewage systems like San Francisco stand to be overwhelmed by flooding.

Keitges, CEO of Columbia Green Technologies, may have a solution to both problems.

She wants to transform The City's rain-slicked rooftops into green space. Her Portland-based company manufactures living roofs – or a vegetative layer grown on top of rooftops – filling otherwise underutilized urban spaces with water-thirsty plants called sedum that can absorb stormwater while also providing an outdoor oasis for people.

“We've obviously been building our products around helping cities and building owners manage stormwater and build buildings for the environment,” she said. “But post-COVID architecture is now all about the people.”



A lush living roof thrives at MIRA SF condominiums in the South of Market. (Craig Lee/The Examiner)

As cities work to slash emissions and fight climate change, nature-based solutions like living rooftops and walls, which can increase biodiversity, reduce energy usage, mitigate the “heat island effect” and cut greenhouse gas emissions by insulating buildings and lowering air conditioning demand, are surging in popularity.

“Everyone in a hotel, condo office or apartment – they want to know, how do I get access to air, light and nature?” said Keitges. “And, in fact, if you're not doing this, you're not going to be competitive as a building owner in the 21st century.”



A new living roof designed by Columbia Green Technologies opened on top of the Old Post Office in Chicago. The 3.5-acre rooftop features recreation areas, an amphitheater and running and walking trails. (Tom Rossiter Photography)

Columbia Green Technologies has installed more than 2,500 green roofs across the country to date, including on New York’s Chrysler Building, Chicago’s Tribune Tower and Amazon’s Seattle headquarters.

Keitges argues it’s cheaper and easier to plant a garden on a rooftop than it is to replace a maze of aging infrastructure and pipelines under city streets. But, she said, San Francisco, whose buildings contribute over 40% of The City’s total emissions, is behind the curve.

“It’s interesting because California talks about green and green building and green infrastructure,” she said. “But we find the other cities have just taken this and led with it.”

That said, living roofs are not a new concept here. In 2017, San Francisco became the first city in the nation to mandate solar and living roofs on most new construction, requiring between 15% and 30% of

roof space to incorporate solar, living roofs or some combination of both.

There are many stand-out examples of living architecture around The City, including the California Academy of Sciences, which reopened to the public with a 2.5-acre living rooftop in 2008.

Cal Academy’s roof features seven undulating hills packed with porous, biodegradable vegetation trays made from tree sap and coconut husks that reduce the building’s energy use by acting as natural insulation and capturing stormwater, preventing polluted runoff from seeping into the surrounding Golden Gate Park.

At the U.S. General Services Administration’s building near Civic Center, wild strawberries grow among native grasses while grapevines creep across the federal building’s HVAC units, keeping the system free of dust and reducing temperature fluctuations. The 14,000

square-foot planted rooftop, one of Columbia Green's projects, also lowers the ambient temperature allowing the building's solar panels to work more efficiently, noted Andra Higgs, a spokesperson for the agency.

"Even these little bits of nature in The City are important," said Carol Bach, who directs environmental health and safety programs for the Port of San Francisco. The Port oversees the living roof atop the EcoCenter at Heron's Head Park in the Bayview neighborhood. "It's not, you know, the 100,000 acres of wetlands that we want to restore in the South Bay," she said. "But birds use it, insects use it. It's doing its job."

Still, in comparison to other cities, San Francisco has a long way to go if it wants to catch up to its counterparts on the East Coast and in Europe, said Andrew Dunbar and Zoe Astrachan of the architectural design firm Interstice. The company recently installed a living roof on the newly constructed Mira SF condo building in SoMa.

Mira's roof collects greywater from the sinks and showers of residents for irrigation.

"We always try to think sort of regionally about connectivity," said Astrachan, who added that in tandem with the surrounding open spaces including Salesforce Park, the Mira roof acts "as a piece in a bigger puzzle, ecologically speaking, that could support life."

But living architecture can benefit people, too. David Brenner, whose company Habitat Horticulture is known for its massive living wall installations, like the one at SFMOMA, one of the largest in the Bay Area, has long focused on the healing power of plants.

"There are all these psychological benefits just being around plants," said Brenner, noting that biophilic environments can help calm nerves and increase productivity. "There's also something called the restorative effect, where you actually can go back to whatever you're doing and be better at it," he said.



The General Services Administration building at 50 United Nations Plaza features a 14,000-square-foot green roof that reduces the building's stormwater runoff by 75 percent, according to the agency. (Photo by Blake Marvin)



A lush living roof thrives at MIRA SF condominiums in the South of Market. (Craig Lee/The Examiner)

But for city dwellers, access to green space is not always easy to find, which is why designers and city planners are pushing to create it wherever they can. "There's no room in San Francisco or New York or Chicago to build bigger parks. We can't," said Keitges. "So, how do you get people back to work?"

"This," she said, pointing to a photograph of one of her expansive, plant-laden rooftops, "is how we bring people back."