

Guarini Center

Frank J. Guarini Center on Environmental,
Energy, and Land Use Law
at NYU School of Law

Expanding Green Roofs in New York City: Insights from the City of Copenhagen

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May 2017

In New York City, rooftops are a vastly underutilized resource. Occupying thirty times the land area of Central Park, many rooftops in NYC sit empty and unused. On April 20th, 2017, the Guarini Center on Environmental, Energy and Land Use Law convened a panel discussion in collaboration with Danish Cleantech Hub to discuss how New York City can reap economic, environmental, and social benefits by turning more of its rooftops green.

The discussion featured Danish landscape architects and engineers with expertise in developing green roofs, a representative of the government of the City of Copenhagen, the New York City Parks Department and the Javits Center, which houses the second largest green roof in the United States. The program was moderated by Rebecca Bratspies, Director of the Center for Urban Environmental Reform at CUNY School of Law.

During the event, speakers from the City of Copenhagen shared insights from their experience as the first Scandinavian city to mandate that certain new construction projects incorporate green roofs. Copenhagen provides an illustrative case study for New York City policymakers to examine regarding both the benefits green roofs provide in urban centers, as well as the challenges that must be overcome for them to be adopted widely.

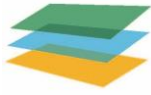
The panelists from Copenhagen all agreed that green roofs have provided myriad benefits to their city. Green roofs have reduced stormwater runoff, which has

helped dramatically improve water quality in the surrounding bays. Today, not only can the residents of Copenhagen swim in the central harbor, but they can also harvest and eat shellfish from the waters. Moreover, adding green roofs has increased the outdoor recreation area available for citizens, and provided corridors for birds, insects, and other biodiversity in the city. Nature is no longer something outside of the city; instead, native species are within the urban center. The vegetated roofs have also improved building insulation, decreasing heating demand during the long Danish winters.

A final noteworthy advantage of green roofs is that they provide synergistic benefits when combined with solar panels. Due to the evapotranspiration of plants, green rooftop temperatures are cooler, which allows solar panels to generate energy more efficiently. Though, intuitively, one might presume that warmer temperatures are better for solar energy generation, in reality, performance begins declining when ambient temperatures exceed 74 degrees Fahrenheit. Green roofs can assist in the generation of renewable energy, while simultaneously reducing building energy demands from heating and cooling.

And yet, despite all these benefits, Copenhagen has encountered some challenges in spurring green roof development that New York City should bear in mind as it contemplates the path forward.

Danish experts argued that the single most arduous obstacle to overcome was



developers' traditional thinking about construction. Many developers instinctually were against adopting new roof practices, and saw green roofs as potential troublemakers, particularly given their impressive ability to retain stormwater. The fear of leaky roofs was ever-present on developers' minds after the leaking roof scandals in 1960s Copenhagen when flat roofs became more prevalent in new construction.

However, contrary to these beliefs, building owners with green roofs have found that the vegetation actually reduces, rather than increases, the risk of leaks. NYC's Javits Center bears this out: the Javits Center suffered from regular leaks before installing its 6.75-acre green roof; post-installation, they have not experienced a single leak.

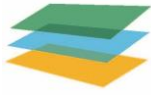
Implementation of the Copenhagen mandate has also been hindered by limitations in the legislation itself. While the City has successfully drafted highly specific regulations that govern other elements of construction, including regulating the types of bricks that can be used, drafting detailed, binding regulations for something as complex and varied as green roofs proved more of a challenge. Despite careful drafting, there are still some loopholes in the legislation that developers have been able to exploit to avoid the mandate.

A final obstacle to widespread green roof installations in Copenhagen is the long-term nature of the investment. While green roofs provide savings by both reducing energy costs and increasing the life of the roof, the majority of the costs must be made upfront, at the time of installation. Many developers construct buildings and then immediately sell them, thus, their primary objective is keeping construction costs down.

For those who are holding on to their buildings, green roofs can confer significant cost savings. Indeed, Alan Steel, CEO of the Javits Center's operating company, explained that one of their primary motivations for installing a green roof was that it made economic sense. Last year, the Javits Center saved \$3 million, which is about 25% of their total electricity bill, thanks to the insulating effect of their green roof. They found that the green roof kept the building cooler in the summer and warmer in the winter. Not only do green roofs reduce energy costs, but they can also create a source of income for building owners. As one green roof installer noted, in Williamsburg, Brooklyn, six by ten foot plots of rooftop gardens rent for \$100 per month. As more people understand all of the benefits of green roofs, there will be increased market demand for buildings with green roofs.

Looking back at the Danish experience, a key task for policymakers in New York City is to help correct some of the common misconceptions regarding green roofs. The best way to do so is through education and one tool that officials can employ towards that end is to develop pilot projects in public spaces that allow people to see green roofs in action. The panelists emphasized that when people can see and interact with green roofs, they are no longer an abstract and farfetched concept, but rather a practical reality with tangible benefits. The City's educational initiatives should also include the dissemination of economic models that demonstrate the financial benefits of green roofs. Several panelists noted that there is an opportunity for the private sector to take the lead on these initiatives if the government can muster sufficient political will.

While New York City has a variety of programs promoting green infrastructure,



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and bold goals for sustainability in the OneNYC Plan, there is not a clear and unified effort to increase green roofs citywide. Today, developers who wish to install green roofs encounter a complicated, disjointed array of incentive programs and must navigate a difficult and confusing permitting processes. Streamlining these processes and incentive structures could go a long way towards facilitating installation of green roofs on a citywide scale. Given the billions of dollars being invested in improving NYC resiliency post-Sandy, this seems like a natural cause for local policymakers to champion.

Speakers included:

Opening presentations:

- Herbert Dreiseitl, Director, Livable Cities Lab, Ramboll
- Mette Skjold, Partner and CEO, SLA

Panelists from New York City and Copenhagen:

- Jacob Larsen, Director, Climate Change, Water Management, Urban Drainage, Infrastructure, Orbicon
- Lykke Leonardsen, Head of Resilient and Sustainable City Solutions, City of Copenhagen
- Max Lerner, Sustainability Project Development Coordinator, NYC Department of Parks and Recreation
- Alan Steel, CEO of New York Convention Center Operating Corporation, operator of the Javits Center