

Passive House Standards Gaining Ground in Multifamily

With energy-efficient real estate on the rise, and renters and buyers becoming increasingly conscious of the environmental impact of building and operating an apartment, we're taking a closer look at Passive House standards with professionals familiar with the method.

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By Anca Gagiuc

Passive House is slowly gaining popularity in the U.S., serving as an uncompromising construction method that helps developers meet current rigorous codes and significantly lower greenhouse gas emissions. Its standards lead to creating buildings that are better for both the environment and the inhabitants.

A <u>recent study</u> from the New York City Department of Housing Preservation and Development, the Community Preservation Corp., BrightPower and Steven Winter Associates, assessed the costs of construction and operating Passive House multifamily housing developments, compared to conventionally built properties.

The research team set two control groups: one consisting of New York City multifamily buildings built before 2003 and the other one comprising conventional new construction properties built after 2003. They measured them up against early adopters of the Passive House standard.



30 Mac in Princeton, N.Y., a mixed-income, adaptive-reuse multifamily project, completed in 2020. *Photo by Michael Slack, courtesy of JZA+D*

In the energy savings category, the Passive House buildings performed 32 percent to 58 percent better than the post-2003 buildings. Furthermore, Passive House buildings with electric heating and cooling systems perform better than their gas-heated peers.

Looking at the data related to carbon emissions, a hot topic since the announcement of New York's Local Law 97, the report strengthens the superiority of Passive House-certified buildings—including those that use gas for heating and hot water—as data showed that all would comply with both the 2024 emissions limit and the more restrictive 2030 cap.

Meanwhile, the buildings in the two control groups would need to invest in significant energy efficiency capital improvements to comply with the 2030 emissions limits or face civil penalties. Analyzing utility cost savings, all Passive House properties posted significant reductions in energy costs, ranging from 28 to 68 percent on annual utility expenses compared to their baselines. And because Passive House benefits go beyond energy use, the research team looked into occupant comfort, indoor air quality and resiliency. They've found that inhabitants in such buildings enjoy more consistent interior temperatures and humidity levels, as well as higher acoustic comfort than those living in traditional buildings.

New construction techniques come with an understandable fear factor, which transgresses into costs associated with building at Passive House levels. Yet, even though upfront costs are higher—up to 5 percent for experienced project teams—the report's authors point to the fact that these are likely to decrease as components become more widely available and cost-efficient, increasing demand for high-performance developments.



WHAT'S GETTING IN THE WAY OF WIDER ADOPTION?

Nate Thomas, Project Manager, The Architectural

Team. Image courtesy of The Architectural Team

One obstacle to wider adoption has been experience and a lack of familiarity with the process of designing and building larger-scale Passive House developments, believes Nate Thomas, project manager at The Architectural Team.

"In the U.S., many of the designers and contractors who are most familiar with Passive House projects work in the high-end, single-family market. The multifamily sector is catching up, developers gradually recognizing the benefits of Passive House, and those in the skilled trades are gaining experience working on these projects—momentum is building, and as more Passive House multifamily projects come online across the country, the barriers to adoption will continue to fall," Thomas said.



Spacesmith. Image courtesy of Spacesmith

Elisabeth Post-Marner, Principal,

Another factor is the construction industry's lack of interest, Elisabeth Post-Marner, principal with Spacesmith, noted. Additionally, building to Passive House standards requires a lot of constructability knowledge on airtightness, insulation, thermal breaks and others.

"It is not something any contractor can do and requires training," Post-Marner said. Consequently, very few contractors advertise Passive House construction today as an option.



Nelya Sachakova, Certified Passive House

Designer, RKTB Architects. Image courtesy of RKTB Architects

Nelya Sachakova, certified Passive House designer at RKTB Architects, also emphasized the lack of education related to this building method.

"Design professionals, builders, developers and homeowners alike are unfamiliar with these standards. As people begin to realize it's neither novel nor an expensive ideal but an improvement on existing building practices, the concept becomes less daunting," she said.



Victor Body-Lawson, Founder & Principal, Body

Lawson Associates Architects & Planners. *Image courtesy of Body Lawson Associates Architects* & *Planners*

In addition, "the lack of national legislative pressures to create standard new building energy conservation regulations and robust financial incentives are also significant deterrents to client demand and building sector acceptance," noted Victor Body-Lawson, founder & principal of Body Lawson Associates Architects & Planners.

However, Body-Lawson agreed that in an increasing number of countries, including the U.S., these standards are gaining traction as developers and homeowners begin to take advantage of government tax breaks, credits, grants and low-interest rates for installing energy-saving materials and equipment in their buildings.

Joshua Zinder, managing partner with Joshua Zinder Architecture + Design & 2021 president of AIA New Jersey, believes the real battle is between initial costs versus savings down the road.



Joshua Zinder, Managing Partner, Joshua Zinder

Architecture + Design. Image courtesy of Joshua Zinder Architecture + Design

"Developers of rental units are often unfamiliar with strategies for passing on the costs to residents and, as a result, they are often hesitant to spend additional money up-front. Done correctly, a Passive House project can all but eliminate utility costs for residents, making it possible to lease at higher rental rates," Zinder said.

Despite all these obstacles, demand for energy-efficient real estate is rising as the highquality construction that results from Passive House standards can translate into higher sale prices, lower vacancy rates and satisfied renters. "Developers who understand Passive House, understand that the buildings can transcend fluctuating markets," Sachakova said.

POPULARITY DRIVERS

In New York, Local Law 97 makes Passive House a much more enticing option for developers. Recently, other jurisdictions have also introduced aggressive energy reduction goals and "stretch codes" that offer incentives, making these construction standards more "palatable to investors", as Body-Lawson put it, leading to a rising number of such projects across the country.

On the **affordable housing side**, one strong factor increasing the popularity of Passive House is a growing number of incentives for green building projects, according to Thomas. But overall, awareness of the need to address climate change in the built industry is one of the main advocates of Passive House. However, project specifics such as climate zone, location and population density, ultimately determine whether or not it makes sense to pursue the standard.



Home Street Residences. Photo by Erik Rank, courtesy of Body Lawson Associates

Passive design techniques—such as high-performance insulation and energy-rated glazing—are presently used to reduce operating costs, something that Body Lawson Associates Architects & Planners has done for Home Street Residences in the Bronx, N.Y. Although the project does not qualify as Passive House, its design was inspired, in part, by the thinking behind the standard.

CHALLENGES FOR THE MULTIFAMILY SECTOR

Development teams must make every decision through the lens of the building as a system, and this represents the most challenging part, Thomas said. In his opinion, this supersedes other important decisions such as including a photovoltaic array or channeling more resources on the building's envelope.

"At one of our current Passive House multifamily projects, a 55-unit affordable senior housing expansion of The Anne M. Lynch Homes at Old Colony in south Boston, the Passive design goals informed our approach at every step of the process—from the form and massing of the building to the specification of mechanical systems, and the incorporation of elements like metal shading fins into the structure's architectural expression," said Thomas.

While Post-Marner believes that the most challenging part is related to the optimization and orientation of the project to harvest the greatest amount of solar energy, one thing is for sure: There is no one-size-fits-all Passive House method. This is why the developer and architect must collaborate closely to produce the right design for the selected location.

Post-Marner recommends that developers and architects follow a few basic principles when working on Passive House projects: simple, compact shapes with heavy insulation on floors, windows, walls, doors and roofs, electricity as an energy source and orientation to gain maximum benefits from the sun.



The Anne M. Lynch Homes at Old Colony, Phase 3C. Image courtesy of Nate Thomas

ADAPT THE OLD OR BUILD FROM THE GROUND-UP?

From a cost standpoint, new construction versus retrofitting varies, depending on the market. An increasing number of municipalities are beginning to offer incentives and funding for renovations and retrofits that incorporate core Passive House principles in the pursuit of energy efficiency, Thomas explained.

"These incentives boost interest in Passive House, which leads to more contractors, developers and architects gaining experience in Passive House construction methods, and ultimately makes this approach more feasible for both new construction and retrofits," he added.

An investigation of both options for a project is required, according to Post-Marner. "Although an <u>adaptive reuse project</u> may have some relaxed requirements, you will still have to make significant changes to heating and cooling sources, fenestration and wall, ceiling and floor insulation. New construction allows you to orient your building to maximally leverage solar energy."

One must remember that reuse is a highly sustainable building practice and can be very cost-effective, depending on the requirements in building and life-safety codes for the new use, Body-Lawson noted.

HOW MUCH MORE EXPENSIVE IS IT?

The upfront cost premium for Passive House multifamily projects is higher by 3 to 10 percent, according to our interviewees. Several factors are behind these higher costs: location, size, complexity, market rates, requirements for highly efficient ventilation systems. Sometimes, costs are driven up by the increased labor it takes to ensure an airtight building.

The good side of it is that these costs will pay for themselves in three to seven years from the savings gained in operating costs. Moreover, as Passive House principles become the norm over time, these initial premiums will disappear.

Most recently, COVID-19 has reactivated Passive House design. The value of indoor air quality and a safe, comfortable and controlled interior environment was brought into the spotlight. The tight building envelope, paired with energy recovery ventilation systems that are fitted with filters, helps reduce contaminants and regulate humidity, improving residents' overall health and comfort.