

# BEST IN CLASS

In-depth look at Featured Developments

## PASSIVE HOUSE & THE FUTURE OF BUILDING



By Jake Granoff

On Thursday April 13th, NYU's Innovation in Sustainable Development Committee Co-Chair, Jake Granoff, brought in the Vice-Chair of New York Passive House, George Kontaroudis, to speak to a room full of future real estate developers about Passive House design. Mr. Kontaroudis is a LEED Accredited architect, Certified Passive House Designer and Senior Project Manager at Morris Adjmi Architects during his day to day but knew that talking with business-minded students would require an adjustment to his usual sustainability pitch. He came prepared with a full hour-long presentation and interactive conversation focused on the facts, myths and cost implications of developing a Passive House building.

Kontaroudis prefaces the Passive House (PH) initiative by painting a picture of "The Ideal Building." Most of the following is taken directly from his slides:

"The Ideal Building" is one that caters to our needs as we spend 90% of our time indoors. Unfortunately, buildings contribute to 40% of global emissions and have become expensive, unreliable, and unhealthy. "The Ideal Building" should provide warmth during the winter and coolness over the summer while also being draft-free, leak-free, and utilizing little to no fossil fuels, leading to lower energy bills. Additionally, it should be affordable to build and maintain and be free of smoke, soot, mold, pollen, bugs, and harmful chemicals. "The Ideal Building" must be resilient enough to provide shelter during extreme weather events and power outages.

Even on a busy street, this building should offer a peaceful and quiet environment to focus and be with family. To sum it all up, "The Ideal Building" should provide comfort, health, safety, and affordability while being sustainable, resilient, and environmentally friendly, and this building is a Passive House building.

Passive House is a building certification program that is widely regarded as having the most rigorous energy efficiency standard in the world. PH buildings are made to be durable and resilient and can reduce operational energy usage by up to 90%. By using PH design tools and construction methods, energy performance becomes both predictable and cost-effective while providing healthy, comfortable, and quiet interiors full of clean, filtered fresh air. Unlike LEED, which is a prescriptive sustainability certification, Passive House is performance-based and strives for results. There is no limit on how to design or build a project. How a team achieves the specific energy goals is entirely up to the innovation of its members.

Passive House specifies that in order to gain certification the building must have a maximum thermal energy demand of 4.75 kBtu/sf per year, a total energy demand of 38 kBtu/sf per year, and an airtightness of 0.6 air changes per hour (ACH). These standards are measured by a licensed PH professional upon project completion to ensure that the building has achieved its designed energy goals.

Passive House buildings typically accomplish this stricter performance through the installation of continuous insulation, the elimination of thermal bridges, the use of airtight, high-performance windows and doors, and the introduction of fresh air with heat recovery. Currently, there are over 5,300 PH projects globally, encompassing over 38,000 residential units.

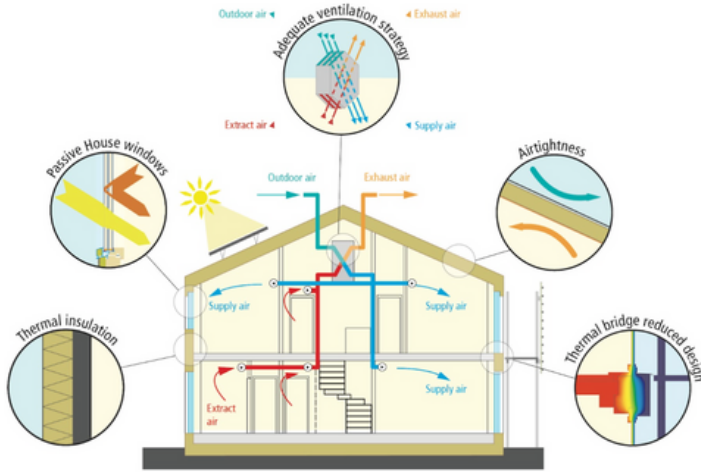
Passive House is a building standard that is often misunderstood and plagued by various myths. One of the most common myths is that it only applies to houses.



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The program originated in Germany in 1988 and the word “Haus” means building in German, which can get a little confusing understandably. However, a prime example of a large-scale PH building is the Winthrop Center in Boston, which is 53 stories tall and 690 feet high.

Another myth is that the windows cannot be opened in a Passive House building. The PH standard actually recommends tilt-turn windows for better sealing and air tightness while still being operable. There is also a misconception that the indoor environmental quality (IEQ) is stuffy due to its airtightness. In fact the opposite is true, PH requires a ventilation rate of 18 CFM per person, which is almost double what’s required in NYC, ensuring a constant flow of fresh air.

People tend to think Passive House is too complicated, but the standard is performance-based, meaning it’s really up to the architect and their ingenuity to meet the performance requirements. People also tend to think PH is sometimes perceived as too restrictive on aesthetics. However, it may be airtight but it’s not so buttoned up on style, as there are no restrictions on the design and it ultimately comes down to the creativity of the designer.

Another common myth is that Passive House is only suitable for mild climates. In reality, PH is built all over the world, including buildings located in Chile, Sweden, India, and New Zealand.

In fact, PH buildings work better in tougher climates when the windows are closed and the heating and cooling systems can function at a more optimal efficiency.

Finally, Passive House is often thought of as being too expensive, but studies have shown that the initial investment can be offset by energy savings within just a few years, making it a cost-effective solution in the long run. Using triple pane glazing, increased insulation and a packaged terminal air conditioner (PTAC) system with an energy recovery ventilator (ERV) can all help lower operational costs over the lifetime of a building.

However, achieving airtightness and thermal bridge mitigation can be costly due to the required knowledge and experience needed to properly detail and achieve the energy goals. Through data released by the Passive House Institute, they note that on average hard costs typically increase 2-5% and that additional costs tend to stem from inexperienced builders who might require PH training. Doing PH the first time can be a bit of a learning curve but once the team has gone through the process, doing it again is much easier and more cost effective.

At the end of the day, when the project is getting value engineered, the choice between luxury finishes and Passive House features may come down to a matter of priorities, but PH offers long term financial benefits. By the end of Mr. Kontaroudis’s seminar, it is laid out how the Passive House program is aligned with US building performance goals of going net zero by 2050. The program’s growth in the US stems partially from policy compliance, like Local Law 97 in the case for NYC.

The ultimate case for Passive House is that by building a high quality product for a slight premium, developers deliver a better living and working environment for inhabitants, save on their long term operational costs and minimize their property’s environmental impact.