

## What Does It Take for Multifamily to Go Passive?

Here are several considerations that development teams should keep in mind, says Nate Thomas of The Architectural Team Inc.

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As leaders in the multifamily sector seek to cut carbon emissions and meet ever-more-stringent energy codes, the highly efficient standard known as Passive House has gained new ground.

With diverse benefits ranging from lower ongoing operating costs to greatly enhanced occupant comfort, the pursuit of the Passive House standard is indeed a tantalizing prospect. And yet, when it comes time to plan the next big project, many development teams find themselves facing more questions than answers.

For those considering a Passive House multifamily project, how does this innovative approach, better known for its use in high-end, single-family homes, really impact the planning, design, and construction process for large-scale properties serving dozens or even hundreds of residents?

Here are several considerations that any development team should keep in mind when contemplating this path.

## **WHAT DOES PASSIVE HOUSE MEAN FOR MULTIFAMILY?**

A Passive House building's high performance depends on its exacting tolerances—a tight envelope with continuous insulation and high-performing openings, efficient appliances and fixtures, and often, some level of on-site power generation such as a photovoltaic array.

With relatively compact layouts and a high occupant density, apartment and condominium buildings are well suited to the Passive House approach—especially the midrise wood-frame structures that predominate nationwide and have an inherent ability to mitigate thermal bridging issues.

In fact, many project teams find that the individual building elements they are used to designing—such as a façade system—only need marginal upgrades to meet the minimum Passive House standard.

## **EARLY-STAGE DECISIONS PAY OFF DOWNSTREAM**

The key difference is that with a Passive House multifamily project, every decision must be made through the lens of the building as a holistic, integrated system—so it's critical to fully commit to this approach from the earliest stages of the planning process.

For instance, electing not to specify a PV array will necessitate a higher investment in the building envelope to achieve the same performance numbers. Choosing between all-electric or mixed-field mechanical systems will raise similar considerations.

The importance of these decisions also extends to selecting a consultant team, where general contractors and other skilled trades will need to be aware of the requirements of Passive House construction, and the need for extremely close collaboration and field testing at every stage.

It's worth keeping in mind that there can be a 3 percent to 5 percent upfront cost premium for Passive House multifamily projects (in practice, the cost difference often ends up being less). In large part, any premium is the product of limited experience and a lack of familiarity along the project chain—from consultants to suppliers—when it

comes to the process of designing and constructing larger-scale Passive House developments.

The good news, though, is that the efficiency of a Passive House building, and its lower ongoing operating and maintenance costs, mean that development teams reach a break-even point much faster. Even better, this cost premium issue will disappear as more Passive House multifamily projects come online—familiarity breeds efficiency.

For development teams working in the affordable housing sector, there are also a growing number of incentives available at the federal, state and local level that make Passive House projects highly attractive.

### **BALANCING DESIGN GOALS WITH PASSIVE HOUSE NEEDS**

As with any development, successfully realizing a Passive House multifamily project is a balance between what is possible and what is practical—but there is always room for creativity.

From a design standpoint, for example, an expressive architectural statement can often be an important differentiating factor in a competitive rental or condominium market.

While the building performance standard of Passive House will achieve greater optimization from smaller, punched window openings rather than fully glazed curtainwall systems (although even this is foreseeable to change over time as glazing technology improves), this potential limitation also opens up opportunities for innovative or exciting approaches to materiality and composition—not to mention lending itself to the contextual brick or wood façade treatments that are desirable in many markets.

Similarly, Passive House multifamily projects prioritize simple and compact massing because the most efficient shape is essentially a cube, which needs the least amount of exterior envelope for the greatest interior volume. But it is still possible to create an eye-catching design with a lot of curb appeal.

Strategies include using comfort- and performance-enhancing features as engaging elements of the exterior design: Thermally broken metal fins can act as solar shades around window openings, for example, reducing solar heat gain while also adding dynamic visual interest to a façade.

## THINK ABOUT FUTURE-PROOFING

Development teams should also recognize that while certain solutions might not be feasible today, they might become compulsory in the not-so-distant future. For example, depending on the market, the current high operating cost of specifying an electric domestic hot water system in a large apartment complex might not be feasible.

In that case, a best practice is to design the hot water system so that it can be easily electrified as more municipalities shift their power grids over from natural gas.

What does this look like in practice? In more urban environments where the land space is at a premium, design teams should place mechanicals on the roof, and locate mechanical rooms on the top floor, reducing the distance between outdoor units and indoor units—this approach is a growing trend that will likely become mandated, especially in areas that are exposed to sea-level rise or storm surges.

Making that decision now dramatically simplifies any retrofits down the road: Instead of having to build a new mechanical room, the building owner simply switches out the gas-fed boilers for electric ones, reusing most of the piping.

The question of retrofitting existing properties is already becoming an urgent one, and more municipalities now offer incentives for renovations and retrofit initiatives that incorporate core Passive House principles in the pursuit of energy efficiency—a clear sign that developers planning new projects today need to begin adopting this approach in order to stay ahead of the curve. And as this positive momentum builds, we will all benefit.

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