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Millennium Imports Energy Savings Strategy

Developer Has Aggressive Goals For Passive House Design

By Jay Fitzgerald | Feb 26, 2017

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Amid the debate over the shadow the proposed Winthrop Square tower would cast over Boston Common, another feature of the planned 750-foot tall building has been, well, overshadowed.

If the project indeed moves forward now that the city has proposed compromise legislation on the shadow issue, Millennium Partners, the redeveloper of the old Winthrop Street Garage, plans to proceed with a pioneering design that would dramatically reduce the amount of energy that the office component of the tower would use, based on a building process developed a quarter century ago in Germany.

The so-called Passive House (“Passivhaus” in German) process entails building a su-

per-tight, highly insulated structure – or, in the Winthrop Square case, a large component of a structure – that relies on using cutting-edge energy recovery ventilator (ERV) technology that heats and cools spaces by effectively pumping hot and cold air in or out of a building to reach comfortable interior temperatures.

Today, there are thousands of Passive House structures, both residential and commercial, in Germany, German-speaking nations and Scandinavia. But the design process has only recently caught on in the United States, confined mostly to small and a few large residential projects, such as a new Cornell University multifamily tower on New York City’s Roosevelt Island.

Locally, the best known use of the highly strict building standards is the state’s first-ever Passive House home constructed in Shrewsbury for none other than state Energy and Environmental Affairs Secretary Matthew Beaton.

Now Millennium Partners is working with its chief designer, Handel Architects, and a consulting firm, Steven Winter Assoc. – both of which have worked on the Cornell University project – to win the blessing of the Passive House Institute (Passivhaus Institut) in Germany for its own project. But there’s a twist: It would be the first-ever, mixed-used structure in the U.S. that employs Passive House methods on about 20 of the tower’s planned 60 stories where offices would be located. The other floors of the Winthrop Square tower would be residential and retail, all built to the top-ranked LEED Platinum standard.

“We want to be at the forefront of what’s happening internationally,” said Kathy MacNeil, a principal at Millennium. “We had to say to the Germans, ‘Look, this is a mixed-used building, not an entirely (Passive House) building. What do you think?’” Officials at the German institute are reportedly intrigued with the idea of effectively building a hybrid structure, part Passive House, part LEED Platinum, and consider the Winthrop Square project as a pioneering initiative, officials said. Millennium opted to go with non-Passive House features on non-office floors because of the residential demand for large windows and other features that don’t lend themselves to Passive House standards, Millennium executives say.

Millennium principals are still working out details of the tower’s Passive House designs. But they already know that the exterior walls, to achieve highly strict air-sealing standards, will have to be very thick (probably 10 inches versus the normal 4 to 5 inches) and that they’ll likely have to use triple-pane windows and other sophisticated insulation methodologies.

Heat Exchangers Control Climate

At the core of Passive House office design is the required use of “balanced mechanical ventilation” in order to dramatically reduce – by up to 90 percent – the amount of the energy traditionally used for space heating, said Lois Arena, director of Passive House services at Steven Winter Assoc. The planned ERV system will contain a sophisticated “heat exchanger” that can, very generally, take fresh cold air pulled from outside and allow it to absorb the heat of hot interior air being pumped to the outside. The process can be effectively reversed for air conditioning.

In all, a Passive House designed structure must use from 60 to 70 percent less total energy, including electricity, to meet strict building standards.

A Passive House process can increase construction costs, occasionally as much as 20 percent. Millennium declined to say how much extra it will cost the company to achieve Passive House certification at Winthrop Square, though MacNeil conceded it will “definitely be a bigger hit” than normal construction costs.

But the annual energy savings are so huge, the upfront costs can be offset in a relatively short period of time, she and others say. Steven Winter’s Arena added that, depending on the type of structure and the expertise of designers, the upfront extra costs can actually be knocked down to the 5 percent to 7 percent range – and sometimes down to zero.

Mike Duclos, a principal at DEAP Energy Group, a consultant on high-performance, low-energy homes, said he’s convinced the Passive House design process has a big future in the United States, both on residential and commercial structures.

“It’s really starting to spread,” he said. “It’s a very, very simple idea. It’s about saving energy. It’s passive. It’s why it’s called ‘Passive House.’”

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