

# A Brownstone REVIVAL

New York, New York

“Bringing 2018 technology to this 1918 building that has beautiful architectural aspects has been quite a rewarding project,” says Clemens von Reitzenstein, principal of Brace Enterprises, whose company was hired to do a Passive House retrofit on this 100-year-old brownstone.

Passive House is a no-brainer for townhouse renovations, he explains, because most of the time there are only two exterior walls that require superinsulating. The party walls generally are not insulated, other than for acoustic reasons, because it is assumed that neighbors will maintain a conditioned environment in their spaces. The cellar can be, and was here, the exception to this rule, as there is no guarantee that the neighbors will heat their cellars. All four of the cellar walls are insulated with 2 inches of XPS.

Bringing the cellar into compliance with contemporary codes meant digging down to achieve a minimum overall height of 7 feet 6 inches. First, though, von Reitzenstein requested that a structural engineer be consulted to avoid compromising the existing building foundation. The structural engineer stipulated that the excavation should cease 18 inches from the foundation, so Brace built a reinforced concrete

ledge to protect the foundation. Brace then installed a vapor barrier membrane and 3 inches of XPS insulation below a new steel-reinforced cellar slab.

The existing four floors above were gutted, and the brick party walls were parged with a cement, hydrated lime, and sand mix, and coated to improve their airtightness. An intelligent membrane is being installed in the front and back exterior walls, which are then being insulated with blown-in cellulose. To prevent thermal bridging, a full-height, 3-foot-width layer of XPS is being installed at the junction of the party and exterior walls. The old windows are being replaced with triple-pane units.

As plans for the building include creating two residences, the heating, cooling, and ventilation systems were designed to ensure individualized comfort. Heating and cooling are being supplied by mini-split heat pump systems, with four air-handling units—one on each floor—and two compressors. Two ERVs will provide constant fresh air and help control humidity. A heat pump water heater will provide water heating for the whole building.

## Team

### Builder

[Brace Enterprises, LLC](#)

### Architect

[Downtown Designworks  
Architecture, PLLC](#)

### Consulting Architect

[Duncan Architect, PLLC](#)

### Certified Passive House Consultant

[Baukraft Engineering PLLC](#)



According to von Reitzenstein, whose company normally performs high-end retrofits, the Passive House features are not as complicated or costly as some might fear. A client could easily spend more on finishes. “Given the same budget, instead of more expensive finishes, I would rather put that money into a Passive House, because it further increases the equity value of the property and you live in a healthier and more comfortable environment,” says von Reitzenstein—a choice the owner of this beautifully restored brownstone clearly supports.

Photos by Clemens von Reitzenstein

## Passive House Metrics

Specific space heating demand	5.3 kBtu/ft <sup>2</sup> /yr	16.8 kWh/m <sup>2</sup> /yr
Specific space cooling demand	5.6 kBtu/ft <sup>2</sup> /yr	17.7 kWh/m <sup>2</sup> /yr
Source energy use intensity (EUI)	24.1 kBtu/ft <sup>2</sup> /yr	76.1 kWh/m <sup>2</sup> /yr
Source energy use intensity (EUI) (renewable)	11.7 kBtu/ft <sup>2</sup> /yr	36.8 kWh/m <sup>2</sup> /yr
Air changes per hour	1.0 ACH <sub>50</sub> (design)	

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