

PASSIVE HOUSE DESIGN AND AFFORDABLE HOUSING

KEY TAKEAWAYS

Passive House Design Benefits

Passive House buildings cost little to heat or cool and achieve a maximum level of air comfort.

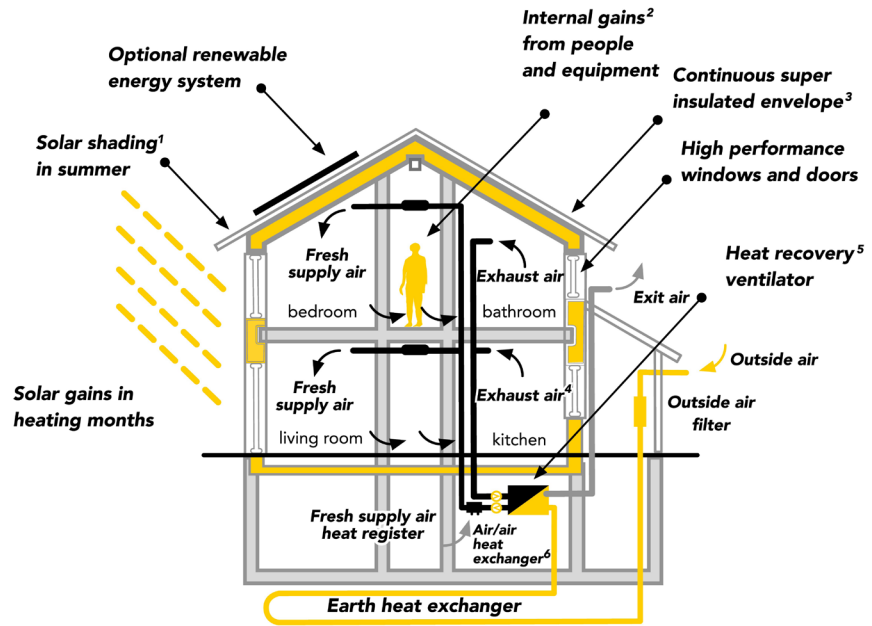
Affordable Housing Options

In addition to reasonable rent, working families need affordable options for standard utilities.

Replicable Solutions

Retrofitting existing multifamily residential buildings to meet Passive House standards can save money for owners and residents and decrease the building's carbon footprint.

Energy efficient affordable, multifamily housing developments can save working families money on energy bills and cut back on the building's environmental footprint.



Passive House Design Diagram

SERVICE BRIEF



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Sustainable design is as impactful for multi-family housing projects as it is for commercial buildings or educational facilities. Passive House design - a more rigorous set of sustainable design principles - meets the highest level of

energy efficiency. Passive House buildings cost little to heat or cool while achieving maximum air comfort. They are truly energy efficient, comfortable, affordable, and environmentally conscious at the same time.



RetrofitNY is leading the effort to create design solutions to renovate and modernize their test pilot projects, as shown above.

Modernizing existing buildings to meet these standards has long-lasting benefits for owners, residents, and the environment. Understanding the importance of modernizing these buildings, RetrofitNY is leading the creation of standardized and affordable solutions that will dramatically improve the energy performance of multifamily residential buildings. Through test pilot projects, they are working aggressively to bring affordable housing units to or near net-zero energy use by 2025, improving the quality of life for affordable housing residents. The goals of the projects include:

- Develop a cutting-edge design that improves living space comfort, indoor air quality, and the exterior aesthetics
- Substantial savings on utility and maintenance expenses
- Serve as an energy efficiency model for the industry beyond New York

One project, a 24-unit, two-story building, was built in 1986 and is a wood-framed affordable senior housing project. The exterior walls are wood stud framed with face brick, vinyl siding, and asphalt shingle covered mansard exterior cladding. The ground floor is concrete slab on grade. The building and apartments are heated via electric resistance baseboard and there is no cooling available for the residents.

The project focused on creating an affordable and scalable design solution that could be easily replicated for future deep energy retrofits on similar apartment projects around New York. The solution proposed is a panelized exterior cladding concept - essentially, a pre-fabricated, super insulated wall panel that can "wrap" the building.

Designed by Cocoon Construct, the state-of-the-art, pre-insulated panelized exterior cladding includes integrated triple glazed Passive House rated windows installed in the factory and transported to the field for installation. Exterior finishes would be pre-installed and the panels will be hoisted into place and fastened to the existing building exterior. This factory production process can minimize construction schedules and tenant displacement and allow systems and finishes to be installed in a controlled environment. In addition to the cost and time efficiency, the panels will give the exterior of the building a fresh, updated look.

Energy saving design solutions created by the team include:

- Protected Roof Membrane Assembly (PRMA) - Low Slope Roof with R-40 Extruded Polystyrene Insulation
- Individual low profile, high efficiency, ducted refrigerant heat pumps with associated outdoor units
- Rooftop dedicated outdoor air unit to supply ventilation air and facility exhaust with total enthalpy recovery wheel for energy recovery from exhaust/relief air (ERV)
- On site ground mounted PV solar array
- Utilize energy produced by the solar array to offset the building "house" energy usage

Affordable housing options continue to be a critical need for working families. In addition to reasonable rent, residents need affordable options for utilities and living expenses. Although this project is not yet constructed, the Passive House renovation design solution can serve as a model for future renovation projects, providing residents affordable heating and cooling options, while creating comfortable and aesthetically pleasing homes.