

# Introduction to Passive House

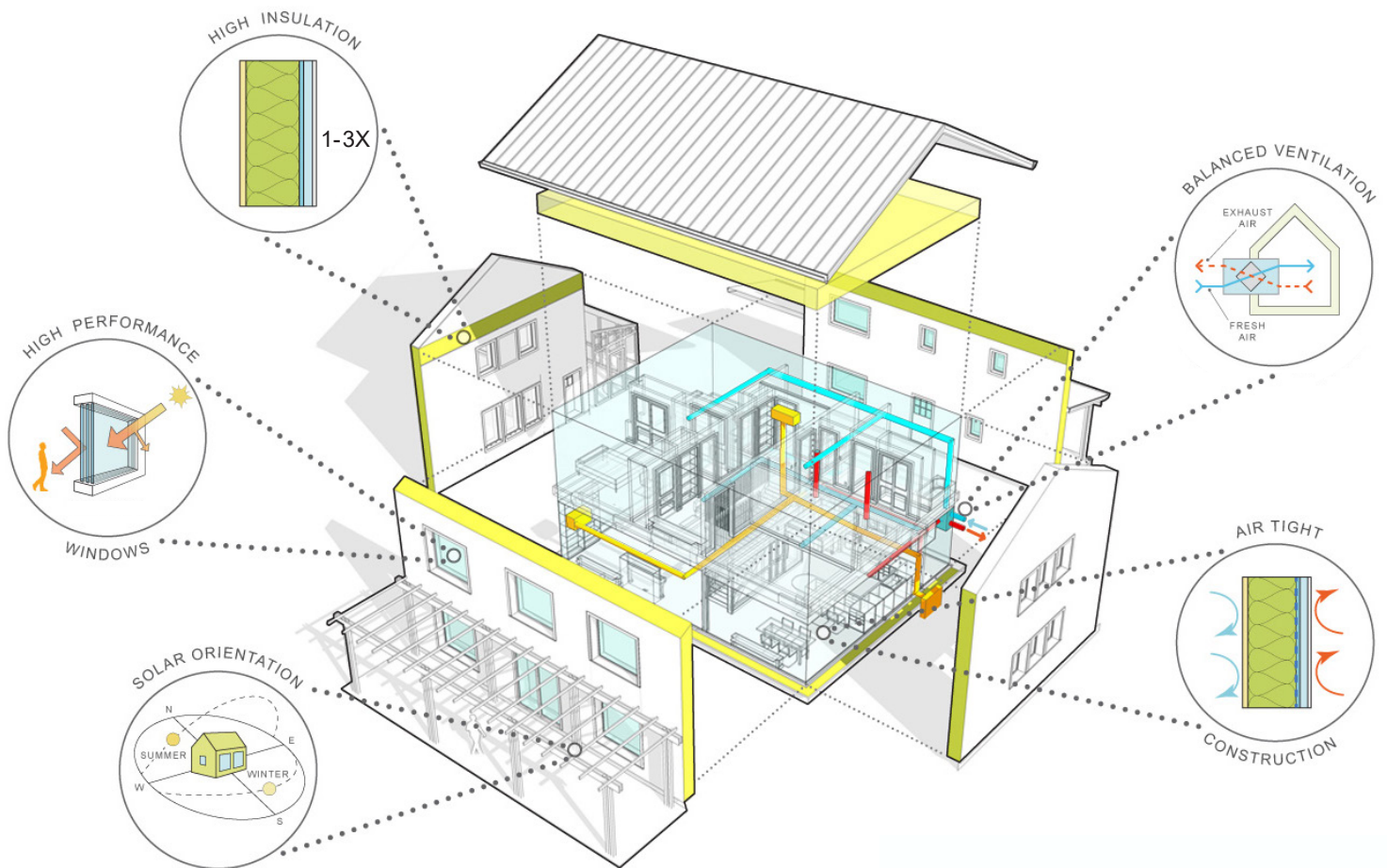
Prepared by Plant Design Partner  
Richard Pedranti, AIA, CPHC, CPHD, LEED AP  
for Plant Prefab RPA LivingHomes



# What Is Passive House?

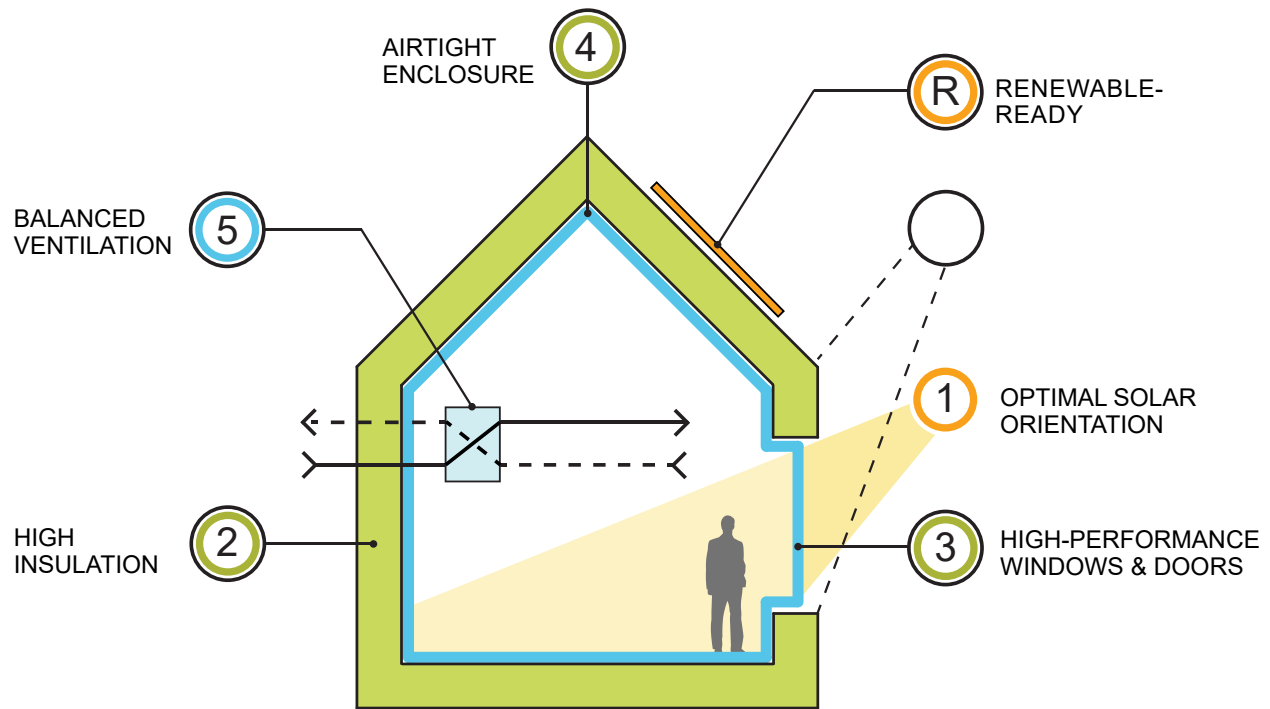
“Passive House” is today’s most energy efficient building standard. Buildings that meet the Passive House standard use 80% less energy for heating and cooling than conventional buildings, yet are markedly more comfortable and healthy. A virtually airtight, super insulated, compact building enclosure accounts for local climatic conditions, sun exposure, and even the heat emanating from inhabitants to achieve an incredibly comfortable living environment. A specialized ventilation system provides a continuous supply of filtered fresh air, offering excellent indoor air quality. The Passive House standard provides homebuyers a true triple bottom line: (1) personal health and comfort, (2) energy efficiency, and (3) cost efficiency.

This document provides an introduction to the Passive House standard and its application in the RPA LivingHomes designed by Plant Design Partner Richard Pedranti, a leading Passive House Institute US (PHIUS) Certified Passive House Consultant (CPHC) and Passive House International (PHI) Certified Passive House Designer (CPHD). Much more information is available at [richardpedranti.com](http://richardpedranti.com).



*Key Passive House features of an RPA LivingHome: High insulation, high-performance windows, optimal solar orientation, balanced ventilation, and airtight construction.*

# Key Principles of an RPA Passive House

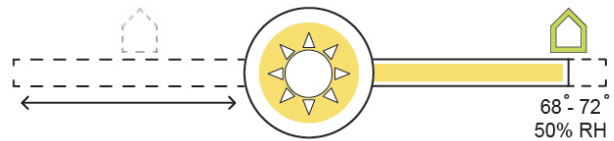


- ① Passive House design employs detailed solar and climate data to model and predict the building's energy performance.
- ② Passive House buildings are super insulated. With insulation up to three times that of standard construction, the inside temperature is stable and predictable.
- ③ Passive House design places significant emphasis on specifying high-performance windows and exterior doors. To meet the performance needs of various climate zones, windows must meet strict standards for insulation, air tightness, and solar heat gain values.
- ④ Passive House takes great care in designing, constructing, and testing the building enclosure for industry-leading leakage control. Blower door testing is a mandatory technique for Passive House certification to assure high building performance through a virtually airtight enclosure.
- ⑤ The “lungs” of a Passive House is an air exchange unit utilizing heat or energy recovery, depending on the local climate. This specialized system provides a constant supply of filtered fresh air and saves money and resources by recycling the energy that already exists in the home's indoor air.
- Ⓜ A climate-optimal building envelope can reduce heating and cooling energy by up to 80%. With a small, roof-mounted photovoltaic system, an RPA LivingHome can easily achieve net zero energy.

# Key Benefits of an RPA Passive House

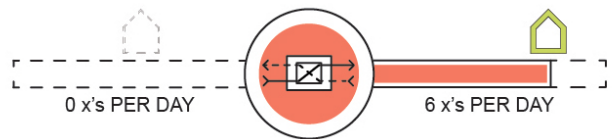
## Comfort

Passive House offers the highest level of interior comfort of any building type available today. You'll enjoy an ideal, stable climate with no drafts, hot spots, cold spots, or upstairs/downstairs temperature differentials.



## Excellent Indoor Air Quality

The average American spends 90% of their time indoors, where the air quality is typically three to four times worse than it is outside. In a Passive House, a specialized ventilation system provides a continuous supply of fresh, filtered air, providing superior indoor air with greatly reduced dust, pollen, and pollutants.



## Reduced Energy Usage & Operating Costs

Passive House buildings consistently reduce energy for heating and cooling by as much as 90% over typical construction. Extraordinary airtightness levels, high-performance glass, and thick insulation also provide superior sound insulation. Passive Houses are very quiet. Careful detailing, advanced design, better building components, and proven building science help to ensure there is no mold and no condensation inside the home or inside the walls of the home.



## Superior Design & Engineering

Passive Houses use well-designed, simple mechanical systems and high-quality building components that make them much simpler to operate and significantly less expensive to maintain than traditionally-built homes.



## Net Zero Ready

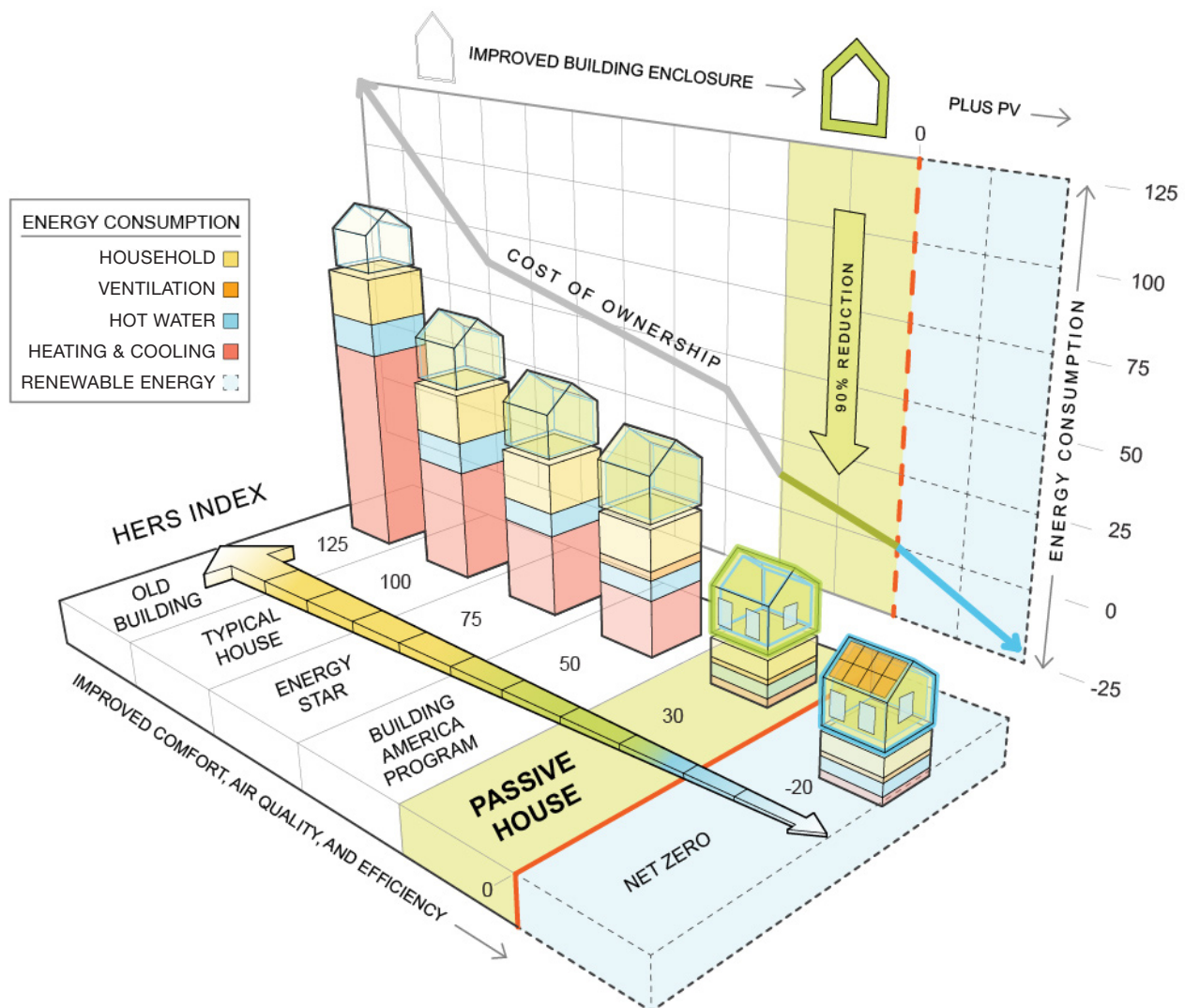
Because Passive Houses have such low energy requirements for heating and cooling, they can easily be made net zero with the addition of a small and affordable renewable energy system. All RPA LivingHomes are solar-ready.



# Passive House Certification

In the United States there are two organizations that administer Passive House certification: Passive House Institute US (PHIUS) and Passive House International (PHI). All RPA LivingHomes are designed to meet Passive House standards, but certification is entirely optional, so PHIUS and PHI certification fees are not included in the LivingHome cost estimates listed on the Plant Prefab website.

If you are interested in pursuing Passive House certification for an RPA LivingHome, please let us know at the onset on your project, as specific procedures are required. Certification provides many valuable and lasting benefits, which we are happy to discuss with you.



*Energy consumption, cost of ownership, and occupant comfort of Passive House versus other common building standards as well as typical new and old homes.*