

# MEET AGGRESSIVE GOALS WITH A PASSIVE APPROACH

Despite the name, passive houses aren't always houses. Passive house methodologies and design principles lead to energy-efficient buildings which maintain comfort during mild and extreme climate conditions. The passive approach to construction is applicable to [multifamily buildings](#), schools, office buildings, high-rises and other commercial building types. Per a three-year study conducted by [Building Science Corporation](#) and the [Passive House Institute US \(PHIUS\) Technical Committee](#), [PHIUS+ 2015 Passive Building Standards](#) provide cost-effective paths for developers and building owners to achieve aggressive reductions in carbon emissions and energy consumption. This increased sustainability may come with [increased profitability](#).

Buildings qualifying for passive house certification have low heating and cooling loads achieved through continuous insulation and airtight thermal envelopes. They also have double or triple-paned windows positioned to exploit solar heat gain during the winter without overheating during the summer. These buildings require mechanical ventilation and energy efficient, intelligent electric-powered heat pump systems capable of managing low loads. Modern, high-performance heat pump systems offer more sophisticated controls with abilities like occupancy monitoring, self-diagnostics and remote management. Facility managers appreciate the convenience of these features, plus heat pumps consolidate the heating and cooling into one system, so less to manage and maintain.



## MATCH THE LOAD

The [Hollis Montessori School](#) (Hollis Montessori) in Hollis, New Hampshire, was the first independent school in the country certified by the [Passive House Institute](#). Jordan Goldman, principal, [ZeroEnergy Design](#), led the passive house consultation and recommended heat pumps from [Mitsubishi Electric Trane HVAC US](#) for the facility. ***“A conventional system like a boiler would have been dramatically oversized for the facility's low heating demand, which would lead to inefficient operation and increased system cost,”*** said Goldman. Heat-pump systems from Mitsubishi Electric are sized for peak climate conditions but are equipped with variable-capacity compressors. This allows the system to continually adjust heating or cooling capacity to match the actual load of the facility.

[Mitsubishi Electric products](#) run on electricity with the precision needed to ensure comfort and performance in passive buildings. [Visit \[mitsubishi.com\]\(http://mitsubishi.com\)](#) to learn more.

## BE RESILIENT

With Hyper-Heating INVERTER® (H2i®) technology, variable-capacity heat pumps also help passive houses achieve comfort and performance during extreme conditions. ***“The availability of hyper-heating was really important given the rough northeast winters. We also like the track record of performance and reliability with Mitsubishi Electric and their extensive service network relative to other manufacturers,”*** said Goldman. Frank Grossman, president, [board of directors](#), [Hollis Montessori](#), noted how for their project, “Mitsubishi Electric wouldn't need backup heat.” H2i technology enables [residential and light-commercial systems](#) to provide heating at outdoor temperatures as low as -13° F while [CITY MULTI® VRF zoning systems](#) for larger facilities can provide heating at outdoor temperatures as low as -31° F with rated performance down to -22° F.

## RELIABLE HEATING FOR COLD CLIMATES

Increase resilience and ensure comfort during severe cold with [CITY MULTI® N-GENERATION R2-Series H2i models](#) from METUS. Equipped with Hyper-Heating INVERTER® (H2i®) technology, these high-performance outdoor units provide reliable, energy-efficient comfort and continuous heating during defrost. As part of the N-Generation lineup, these units offer up to 295 feet of vertical separation between outdoor and indoor units as well as a compact footprint.

### BENEFITS

- 100% heating capacity at -4° F, up to 85% heating capacity at -13° F and up to 70% heating capacity at -22° F
- Continuous operation down to -31° F
- 6, 8 and 10-ton single modules, along with 12, 16 and 20-ton twinned modules
- Supports up to 48 indoor units per outdoor unit
- New 4-sided heat exchanger, compressor and fan blade design to improve nominal and seasonal efficiency levels



## METUS ON-DEMAND WEBINAR



### OPTIMIZED VENTILATION FOR HIGH-PERFORMANCE BUILDINGS

This presentation discusses how energy recovery ventilators and dedicated outdoor air systems work with VRF systems to satisfy ventilation codes and standards, including ASHRAE 62.1.