

Columbia, Missouri

PECKHAM HOME



CHALLENGE

Selecting a cooling and heating system for one of the country's greenest homes

SOLUTION

Zoned Comfort Solutions®
(Variable-Capacity Heat Pump)
from Mitsubishi Electric

RESULT

A handful of green certifications
and year-round comfort

For over half a century now, Nick Peckham, FAIA, LEED AP, design scientist, Peckham Architecture, Columbia, Missouri, has been studying buildings and their impact on the world. Concerned by how much energy buildings consume, and inspired by the idea of designing with environmental responsibility in mind, Peckham decided to build something extra-green for his own home in Columbia. His house is now on track to earn the following certifications: LEED® v4 Platinum, PHIUS+, ENERGY STAR®, Indoor airPLUS and the U.S. Department of Energy's Zero Energy Ready Home program. It is no surprise that Zoned Comfort Solutions® from Mitsubishi Electric is a key part of the project.

Peckham's house is 3,850 square feet spread through an H-shaped structure. David Horton, CPHC, LEED AP Homes, operations manager, Green Building Consulting, Cincinnati, served as the project's

energy consultant. He said, "The complicated geometry was a challenge. The home had a similar floor area as other houses we've seen, but the H shape created more surface area that had a heat load and a cooling load. As a result, we had to design a better home to satisfy the [certification programs'] metrics than we would have with a home with a simpler geometry." When it came to HVAC, Peckham said, "My goal was to find the most energy-efficient system out there."

With ground-source heat pumps in mind, Peckham called in Jamie Callahan, director of field operations, Air & Water Solutions, Columbia, who was known for building Columbia's most energy-efficient homes. Callahan said, "I looked at the plans and, right off the bat, Mitsubishi Electric came into play because of the variable capacity and potential for dehumidification." Horton echoed this idea: "In a climate like Missouri's, we worry about moisture in the air."



Managing humidity is difficult but the way the ductless mini-splits run helps with humidity by running at a lower speed with fewer stops and starts – which also helps with the equipment’s long-term durability.”

Horton also knew that zoned systems would help earn multiple green certifications while ensuring a pleasant lifestyle. “We thought the home would be comfortable and all of the needs would be met with the ductless mini-split system. It was also a good decision because of the efficiency. Some forced-air systems can be efficient, but they end up having a lot of unnecessary energy usage regarding fan power – like ground-source heat pumps. But the ductless mini-splits perform really, really well. They meet the needs of the top levels of these high-performance programs,” said Horton.

Peckham added, “Mitsubishi Electric heat pumps also turned out to be both more economical than ground-source heat pumps, and offered no ductwork plus hardly any piping. Ducts take up space, they cost money to box in and they cause problems for the energy side.” Horton said, “With

a ductless system, there’s one very important number that you have, and that’s zero – zero duct leakage. Leaky ducts are one of the biggest problems we face with forced-air, but with ductless mini-splits that number is always zero. That’s extremely important both in modeling and in real performance.”

Going with Mitsubishi Electric over other brands was something the whole team agreed on. As an Elite Diamond Contractor®, Air & Water Solutions has been working with Mitsubishi Electric for more than seven years. Callahan said, “We’ve installed over 700 Mitsubishi Electric units and have had very good customer service and training throughout. We’re just comfortable with Mitsubishi Electric, and with our distributor Mechanical Supply Company Inc. out of St. Louis.”

Peckham trusted Mitsubishi Electric because “they’ve been around a while and their people are both knowledgeable and helpful.” Horton also preferred Mitsubishi Electric, citing prior positive experiences: “Mitsubishi Electric provides tremendous support. We’ve used ductless mini-splits on

other projects and have never had complaints. Plus Mitsubishi Electric has always been supportive when we’ve had questions.”

The team installed seven outdoor units, each connected to one indoor unit. “Only three indoor units are required to heat the whole place but Nick wanted complete zoning capabilities through the whole house. We could have done that on one outdoor unit, but we couldn’t pass up the efficiency of the 1:1 units. They’re all 26 SEER with 12.5 HSPF,”

“ Buildings use almost half the energy on Earth. If all buildings were like my house, so many of our problems would go away. This is so important. I wanted to show that we can build like this. I wanted to inspire people to watch out for the world – the only spaceship we have, and the one we’re living on. ”

— Nick Peckham, homeowner and architect

Project Completed: March 2016 |

said Callahan. That level of efficiency – a boon to the multiple green certifications Peckham wanted to earn – was achieved by installing MSZ-FH12NA and MUZ-FH12NA models.

Since installation, Peckham has enjoyed the comfort of living with a zoned system. “The Mitsubishi Electric system is quiet – virtually silent – and it’s trouble-free. It just runs.” He has also appreciated the financial benefits of living in such an energy-efficient home: “I got my first electric bill a few weeks ago. It was negative \$176. That’s very exciting! I expect to be net-positive – that is, producing energy, rather than consuming it – for the whole year.”

Beyond just comfort and financial benefits, Peckham is proud to live in such a green home. And it really is green. Horton said, “Both in terms of modeling and testing, Nick’s house is in the top one percent of the buildings that we have consulted on all over the country. That’s pretty awesome.”



EQUIPMENT

- ▶ (7) MUZ M-Series Outdoor Units
- ▶ (7) MSZ Wall-mounted Indoor Units

PROJECT TEAM

Architect:

Peckham Architecture, Columbia, Missouri

HVAC Contractor:

Air & Water Solutions, Columbia, Missouri

Energy Consultant:

Green Building Consulting, Cincinnati, Ohio

Distributor:

Mechanical Supply Co. Inc., St. Louis, Missouri