MITSUBISHI ELECTRIC
COOLING & HEATING

Ductless Systems Help Northeast Ohio Get its First Passive House

The PNC SmartHome is a collaborative project between the Cleveland Museum of Natural History and more than 100 partners to demonstrate how simple it can be to build the home of the future using today's technologies. With only a two-month window for construction, the house began as an inspirational and informative exhibit and ultimately housed a family.

Challenge

To build a Passive House-certified home that would be a model of efficiency and sustainable design.

Marty and Jocelyn Schaffer visited their son's family in Cleveland in fall 2011. Residents of Potomac, Maryland, the Schaffers had busy lives and full-time jobs and were not actively searching for a home in the area. However, the PNC SmartHome had just been moved from its exhibit location at the Cleveland Museum of Natural History to its permanent location in the Wade Park neighborhood where it was currently for sale.

"We've always been interested in green building and like learning about smart home technologies," said Jocelyn Schaffer. "We were driving through the neighborhood and were intrigued. We gave the real estate agent a call and took a tour. Three hours later, we made an offer on the house! Within 30 days, we were the happy owners and this second home provided us with a comfortable place to stay when regularly visiting our son's family. We eventually plan to retire to the SmartHome."

It's easy to see why the Schaffers fell in love with the SmartHome, the first Passive House in Northeast Ohio.

The PNC SmartHome meets the most rigorous residential energy performance standard in the world – the Passive House standard. It consumes 90 percent less cooling and heating energy than a conventional house (and about 70 percent less primary energy overall).

The SmartHome has a net living space of approximately 2,500 square feet, including three bedrooms and 2 1/2 bathrooms, plus a full basement. The home features extra-thick insulated panels applied to the outside of the 2-by-6 interior walls and a continuously sealed air barrier that forms an extremely tight seal.

The SmartHome provides fresh air via an energy recovery ventilator - transferring energy at 84 percent efficiency. Also, the SmartHome is the first home in Cleveland to be built without a furnace. Mitsubishi Electric US Cooling & Heating Division (Mitsubishi Electric), Suwanee, Georgia, provided two Hyper-Heating INVERTER™ (H2i®) MSZ-FE systems — one in the great room and one in the second floor hallway. The systems cool and heat the space while still meeting the rigorous energy reduction measures required to meet Passive House standards.

"The Mitsubishi Electric system was the ideal choice for this project," said Edwin Shank, Certified Passive House™ consultant, LEED® AP and engineering manager, Comfort Systems USA - Ohio, Oakwood Village, Ohio. "We've specified Mitsubishi Electric systems for a number of years. The products are exceptional. The modulating capacity of the equipment is the perfect fit because it only needs to run at minimum speed to match the needs of the house. The equipment installs very quickly and we never have any problems with these systems. Since the SmartHome, I have personally worked on five different Passive House projects and I have specified Mitsubishi [Electric] systems on all of them."

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PNC SmartHome Cleveland

Project Location:
Cleveland, Ohio

Completion Date:
Spring 2011

Project Team

Owner:
Marty and Jocelyn Schaffer

HVAC Contractor:
Comfort Systems USA - Ohio,
Oakwood Village, Ohio

Mitsubishi Electric Equipment Installed

(2) MSZ-FE12NA Wall-mounted Indoor Units
(2) MUZ-FE12NA H2i Outdoor Units

Solution

A home that is 90 percent more efficient than traditional houses, using a variety of energy conservation standards including a Mitsubishi Electric H2i MSZ-FE Model system.

In addition to the highly efficient H2i MSZ-FE Model system, the home boasts a myriad of other features that make it stand out. The features include a simple rectangular home design; triple-pane, high-performance windows; super insulation; and a well-sealed building envelope. The house is situated on a south-facing lot with large windows on the south side to allow sunlight to enter and warm the house during the colder months of the year. The windows are shaded so that during the summer, when the sun is higher in the sky, sunlight is blocked. Energy-efficient appliances and lighting are featured throughout the home.

"We've been very happy with the home. We've visited in every season and are always pleased with how comfortable the home is," said Jocelyn Schaffer. ■