

Net Zero Energy Homes and Indoor Air Quality

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ABSTRACT

None of our energy efficiency work matters if we don't also improve indoor air quality and protect occupant health. Net zero energy was the initial goal for the 25 homes and the 15 unit multi-family building for the new TREE Community at Eco Village in Ithaca, New York. Triple-pane windows, double stud insulated walls, a continuous air barrier, and attention to air sealing contribute to the super insulated, air tight shell. The first phase of homes tested less than 0.6 ACH50, is LEED for Homes Platinum certified, Energy Star, Indoor airPLUS, Water Sense labeled, and anticipating PHIUS Certification. The early involvement of third party consulting and verification allowed the conversation to evolve from energy efficiency to occupant health and safety. Ductwork for the Energy Recovery Ventilator was carefully sealed with mastic to ensure each room was supplied within 5 cfm and exhaust within 20% of the design values. And while attention was paid to the fresh air ventilation, the team was also careful with material choices so as to not introduce unnecessary chemicals and VOCs. Shoe removal is encouraged when entering the homes, all the flooring is hard surface (no carpets), low VOC paint and finishes were used. And while the team chose closed cell foam insulation plus blown in cellulose in the wall cavities, the homes were allowed to off gas prior to sheetrock installation. There are no combustion appliances in the all electric homes but CO monitors were still installed on each floor. Solar thermal provides domestic hot water and when the 4.4 kW photo voltaic system was installed the HERS Indexes went from 39 to 15. And while the predicted energy use is only \$546 per year, we all know that occupant use is a big factor so several of the homes are being monitored for actual energy use and humidity.

BIOGRAPHY

Karla Donnelly is a Senior Sustainability Specialist at SWA, working with residential buildings. Her expertise is in sustainable consulting services, program certification support and implementation of high performance and sustainable building technologies. With architects, developers, builders, and homeowners, she develops specific sustainability strategies for both new construction and renovations. Ms. Donnelly is an integral part of the initial strategic planning sessions and workshops with stakeholders based on program criteria; she verifies in the LEED® for Homes, Passive House, Energy Star, and National Green Building Standard programs.