



Exterior view on INhome constructed of SIPS (photos: April Lutheran-Garrett, INhome Computer Graphics Artist and Elizabeth Howard, INhome BIM Manager)

Team Purdue and the INhome

SOLAR DECATHLON 2011

Team Purdue’s INhome (short for Indiana home) is one vision for future residential housing that is efficient, practical and essential. It has an energy efficient design that integrates high levels of insulation, natural ventilation, day lighting and energy efficient appliances. This was accomplished without sacrificing comfort or amenities, and also meeting the cost expectations of a typical Midwestern consumer in today’s cost competitive residential market. The INhome captures all of these design themes.

Efficient, practical, and essential

The INhome is constructed of structural insulated panels (SIPS). SIPS panels are comprised of closed cell polyurethane (PU) injected between two sheets of oriented strand board. The SIPS are stud-less and therefore have a higher insulation rating, minimal air leakage, and no thermal bridging, which is common in typical stick frame construction. Each panel is precisely cut to accommodate doors, windows and modular splits for transportation. Therefore SIPS create very little on-site waste. Another benefit of using SIPS is that the walls and roof can be assembled in a single day. This creates an expedited assembly process of the INhome’s six main sections as they are assembled and disassembled throughout the INhome’s Solar Decathlon trek to Washington DC, USA and back.

Photovoltaic (PV) array of the INhome

One of the most important components of the INhome is the PV array. The INhome has a 9kW PV array featuring 36 240W monocrystalline panels that enables the home to become a net-zero energy home. All excess electricity is sold back to the power utility company, lowering the power utility company’s base and peak demand production. The PV array provides enough electricity to give the homeowner all the modern day comforts, while remaining net-zero for electricity use over the course of the year.

Modern comfort inside

Some of the modern comforts inside the INhome are high efficiency appliances, a security monitoring system, and a user-friendly home control system. A smart phone can remotely and securely control locks, change temperature set points, lighting controls, and view electricity consumption. The INhome will be heated and



Team Purdue in front of Purdue University, West Lafayette, IN, USA

cooled with a Trane XL20i two stage, air-to-air heat pump capable of achieving Seer ratings up to 19. A Trane energy recovery ventilator (ERV) is tied into the HVAC system to provide adequate ventilation inside the home. A plant wall integrated with the HVAC system will extract carbon dioxide and volatile organic compounds that exist inside homes. The INhome’s heat pump water heater is particularly innovative and uses less than half of the energy of a typical electric water heater. It extracts energy from the ambient air surrounding the water heater and then uses that energy to create hot water. Additionally, passively designed overhangs shade the south facing windows and clerestory windows in the heat of summer and allow the sun’s energy to enter the home during the winter.

Many of the interior finishes are sustainable as well. The INhome’s solid surface countertops contain 40% pre-consumer recycled material and are Greenguard certified for indoor air quality. Furthermore, the paints used in the interior emit zero volatile organic compounds. The hardwood floors are made with over 74% recycled content and installed without any glues or adhesives.

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