



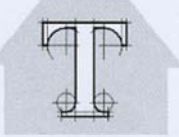
LEFT, PORTLAND COMMUNITY COLLEGE NEWBERG CENTER. BELOW, SARANN KNIGHT APARTMENT COMPLEX IN LAS VEGAS.



## SIP Construction

### *Structural Insulated Panels Help Meet Aggressive Green Building Objectives*

by James Hodgson, general manager, Insulfoam

The Western states are home to some of the country's greenest buildings. The region's design and building professionals regularly receive honors in environmental award programs. Many of the winning buildings rely on structural insulated panels (SIPs) as part of a high-performance building envelope. Projects include commercial and institutional buildings, multi-family residences, schools, and homes. This article showcases recent notable award-winning buildings, and how the project teams used SIPs to help meet green building goals.

**AIA Committee on the Environment (COTE) 2012 Top Ten Green Project:** Opened in autumn 2011, the 13,500 sq.ft. Portland Community College (PCC) Newberg Center, Newberg, Oregon, includes classrooms, a conference room, reception area, and administrative space serving community college students in the Willamette Valley. The AIA COTE award recognizes the project for its role as the first net-zero energy higher education building in Oregon. In addition to high-thermal-efficiency SIP walls and roof, the building uses natural ventilation and passive cooling to reduce energy consumption.

"The SIPs are intended to super insulate and reduce air leaks to stabilize the interior environment," said Doug Reimer, AIA, senior project architect with Hennebery Eddy Architects, Portland, Oregon. "Then, fewer photovoltaic panels are required to generate energy to achieve net-zero."

**Structural Insulated Panel Association (SIPA) 2012 Building Excellence Award:** The 17,000-square foot LEED® Platinum San Luis National Wildlife Refuge Complex, Los Banos, Calif., new headquarters and visitor center relies on SIP walls and roof to help achieve less-than-zero energy status (the building contributes more energy than it consumes). The complex won the Structural Insulated Panel Association (SIPA) 2012 Building Excellence Award. Other energy-efficient features include operable clerestory windows for natural daylight and ventilation, and a 55 kW roof-mounted photovoltaic array. The building helps educate visitors about migratory birds and other wildlife in the northern San Joaquin Valley. Catalyst Architecture, Prescott, Ariz., was the architect.

**Structural Insulated Panel Association (SIPA) 2010 Building Excellence Award:** Built by the non-profit Community Development Programs Center of Nevada (CDPCN), the 82-unit Sarann Knight apartment complex,



PORTLAND COMMUNITY COLLEGE NEWBERG CENTER.

Las Vegas, Nevada, provides affordable housing in Las Vegas's Westside neighborhood. The project used 100,000 sq.ft. of SIP walls. Winston Henderson Architects, Las Vegas, Nevada, was the architect on the project.

"Reducing heating and cooling costs played a major role in our decision to use SIPs," said Sharon Bullock, CDCPCN project manager. "They create a much tighter building envelope than is possible using other construction methods. We estimate an annual energy-cost savings of 20-25% with the Premier Building Systems SIPs compared to stick-framed construction." Bullock also noted several other reasons her organization prefers SIPs. "Compared to stick framing, SIP walls go up much faster since they can be installed in large sections and eliminate the need for separate on-site framing and insulation work. The finished walls are also beautifully straight, which saves time on drywall installation, painting, and other finishing work. SIPs are strong, you can't damage them as easily as conventional framing."

**Living Building Challenge 2.0 Project:** The new science wing addition to the private Bertschi School in the Seattle, Wash., Capitol Hill neighborhood is the first building built to the rigorous Living Building Challenge 2.0 criteria, according to KMD Architects, San Francisco, Calif., and AIA Seattle. The architects designed the wing, "to be a learning tool for the students, impacting the way we interact in the world for generations to come." The project includes a 12 kW photovoltaic system that produces all of the building's electricity and allows students to monitor energy use and power generation. A SIP roof helps provide an efficient high-thermal building envelope. Additional green features include collection and treatment of all water on site, an ethno botanical garden for food, and a green moss-mat roof.

**Structural Insulated Panel Association (SIPA) 2012 Building Excellence Awards Honorable Mention:** The 120,000 sq.ft. Finn Hill Junior High, Kirkland, Wash., in suburban Seattle includes 200,000 sq.ft. of 6" thick SIP wall panels and 10" thick SIP roof panels as



SAN LUIS NATIONAL WILDLIFE REFUGE IN LOS BANOS, CALIF.

part of a net-zero energy design. The building was designed to meet an energy consumption target of 25 kBtu per sq.ft. per year, compared to an EnergyStar™ Target Finder average energy use of 47.3 kBtu per sq.ft. per year, a 47% improvement. By comparison, older schools in the Seattle area consume upwards of 88 kBtu per sq.ft. per year, making the Finn Hill Junior High approximately 70% more energy efficient than older buildings.

The SIPs help the school reduce energy costs, and allow for smaller, more cost-effective mechanical systems. "Utilizing SIP panels not only supported the strategies for energy savings, it allowed for a smooth and rapid assembly process, shaving weeks off a tight construction schedule," said Mitch Kent, AIA, project manager with Mahlum Architects, Seattle.

**EnergyValue Housing Awards 2012 Gold Winner:** Many winning homes over the years in the NAHB Research Center / U.S. Department of Energy (DOE) EnergyValue Housing Awards (EVHA) program have used SIP construction. Of note this year is the 2,000 sq.ft. Far Reach House, Olympia, Wash., which was built to demonstrate how a super-energy-efficient custom home can also be affordable. In addition to triple-pane windows and a ductless heat pump, the home relies on R-40 SIP walls and floors and R-50 SIP roof panels for superior energy efficiency. Estimates made under the RESNET program predict an annual heating cost of

only \$67, despite the cool Northwest climate. Scott Homes was the builder.

## Looking Ahead

Architects frequently design with SIPs, given the panels' adaptability to fit virtually any architectural style while dramatically boosting energy efficiency. The DOE's Oak Ridge National Laboratory found that spaces built with SIPs are 15 times more airtight than stick-framed spaces. The lab also evaluated the whole-wall R-values of SIPs, taking into account energy loss through the structural members, corners, joints, and around windows. Their data show a 3.5" thick core SIP had a whole-wall R-value of 14.09 compared to a 9.58 R-value for walls framed with 2" by 4" studs at 16" on center. The SIP wall also outperformed a wall framed with 2" by 6" studs at 24" on center, which had a whole-wall R-value of 13.69.

Additionally, high-performance SIP building envelopes offer substantial life-cycle benefits. Research commissioned by the EPS Industry Alliance showed the estimated average energy savings over 50 years for a SIP home in the U.S. is 9.9 times greater than the energy needed to produce and deliver the SIPs compared to stick framing.

As energy-efficient construction and net-zero become the norm, whether by market demand or government regulation, SIP construction and related technologies are likely to become more prevalent in the West and throughout the U.S.