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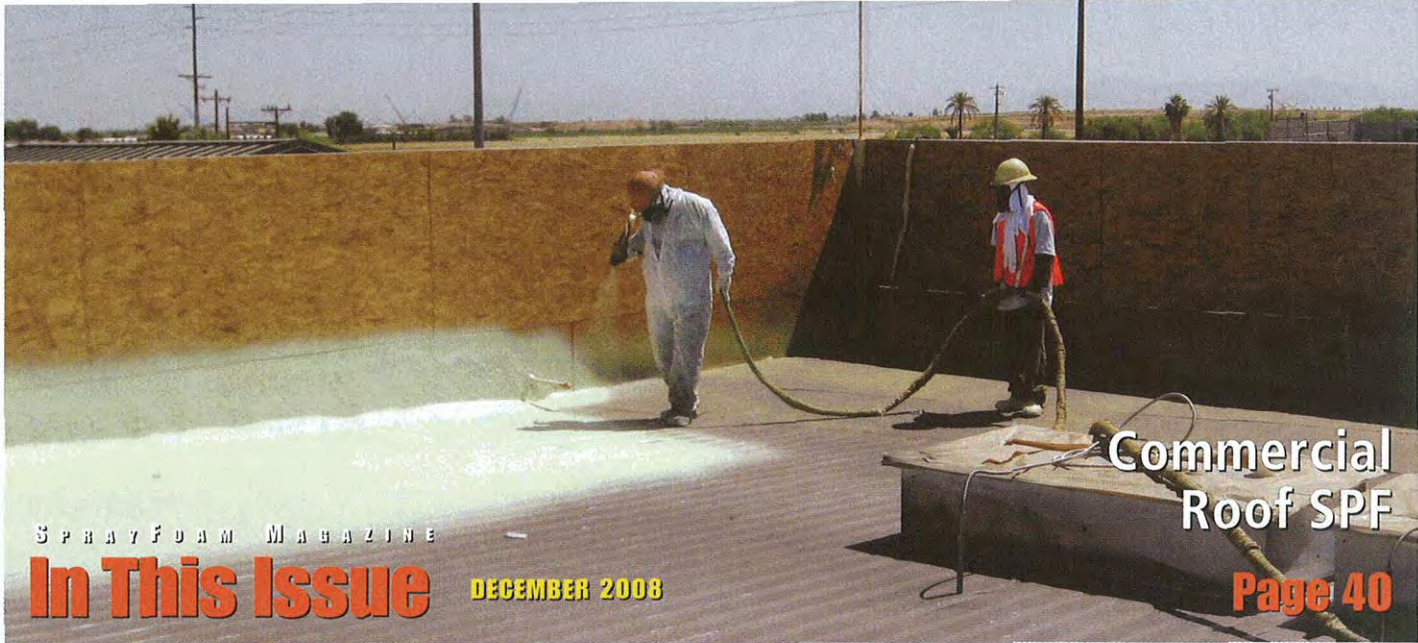


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SPRAYFOAM MAGAZINE

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Roof SPF**

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20-below zero temperatures didn't stop this SPF crew from installing tailor-made foam into 20 million-dollar townhouses.

On the cover: When the Innovative Insulation Solutions' two-man crew was called in to work ahead of schedule, they knew they would have an unusual job ahead of them. They rushed from Elk Grove Village, Ill. to Chicago, bringing along with them spray guns, organic respirator cartridges, stilts, and an open attitude! What was their part in building the Yannell family's Zero Net Energy house, and how did their flexibility help overcome each of the challenges they faced along the way?

— Photo courtesy of Innovative Insulation Solutions, Ltd.

On this page: When the Diversified Roofing Corp. crew arrived at the GarageTown USA job in May 2008, they were welcomed with 110,000 sq. ft. of roofs in the Arizona desert. The five newly-constructed roofs were built, broom-swept, and ready to be sprayed. All that was left was completing a five-step coating process amidst dust devils and monsoon thunderstorms. Was the SPF crew able to wait out the weather and make it happen?

— Photo courtesy of Diversified Roofing Corp.

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SPF PROS AT CROSSROADS WITH ZERO NET ENERGY HOME PROJECT

By Jack Innis

Photos courtesy of Innovative Insulation Solutions, Ltd.

Eight years ago, Richard Spiess found himself standing at one of life's crossroads. The Chicago-based certified public accountant lost his job when the major accounting firm for which he worked went belly up.

An avid do-it-yourselfer, Spiess decided to take some time off and finish a home remodeling project. He wanted to insulate with spray polyurethane foam (SPF), but he wasn't having much luck finding SPF contractors. So he began researching the industry.

Next thing you know, Spiess is backing a brand-new, 16-foot turnkey Corbond SPF trailer into his driveway.

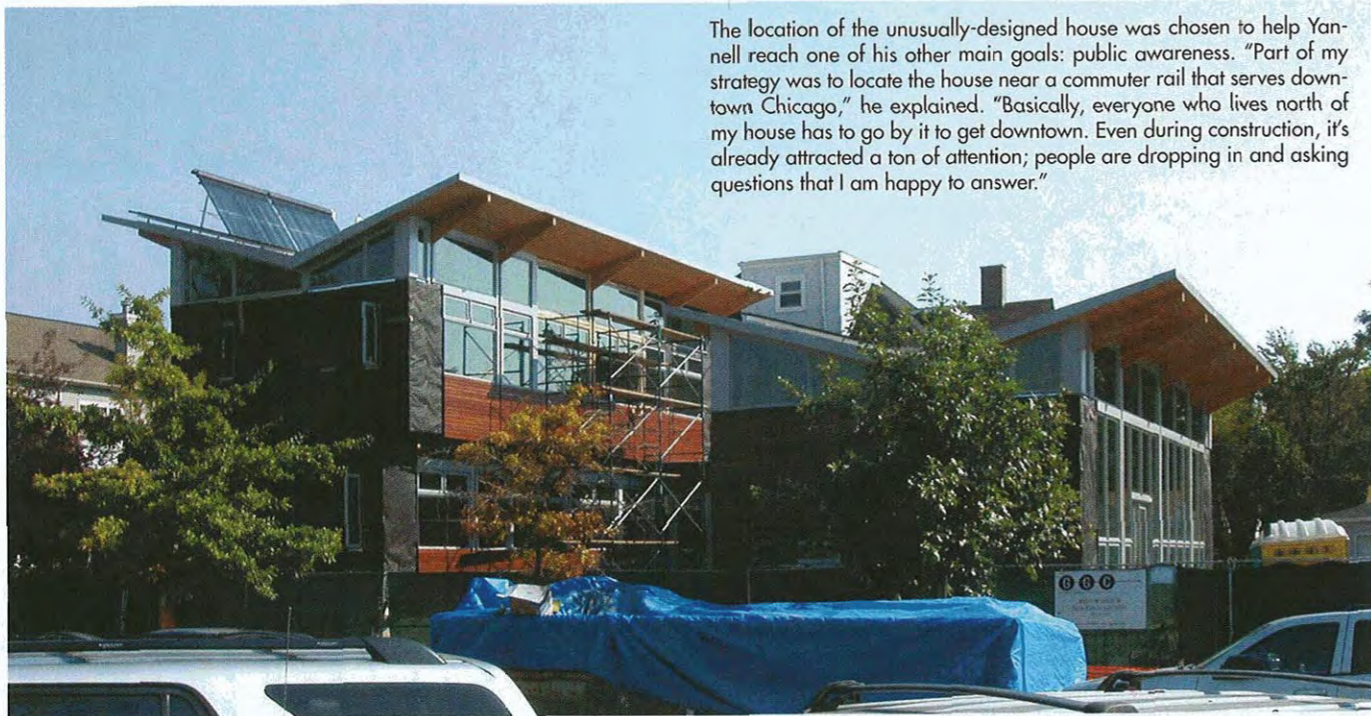
Road to Energy Self-Sufficiency: Well Insulated

Today Spiess runs Innovative Insulation Solutions, Ltd., a Chicago-based SPF application firm specializing in home and commercial installations. Over the years, Spiess established valuable connections by making himself available to architects and general contractors who had questions about spray foam. One such connection paid off recently when Innovative Insulation Solutions landed a contract to install SPF in a completely energy self-sufficient, 2,675-square-foot, new-construction home.

Zero Net Energy (ZNE) homes combine the latest technologies so that at the end of any given year, they've produced more energy than they've drawn from the grid. A difficult task anywhere — but especially in Chicago.

After meeting with homeowner Michael Yannell and architects from Farr Associates, Spiess knew his crew would have to perform flawlessly for the home to perform to expectations.

When the Yannell family decided to build a Zero Net Energy (ZNE) house in Chicago, they needed to find ways to produce more energy than they would use. They chose SPF for its various abilities: air barrier, vapor retarder, thermal insulation, and downsize construction materials. Homeowner Michael Yannell hired the Innovative Insulation Solutions, Ltd. crew to install Corbond Corporation's 2-lb. closed-cell SPF. Although the crew encountered a few scheduling delays and parking challenges, they finished the 2,675-sq.-ft. job in a mere two weeks.



The location of the unusually-designed house was chosen to help Yannell reach one of his other main goals: public awareness. "Part of my strategy was to locate the house near a commuter rail that serves downtown Chicago," he explained. "Basically, everyone who lives north of my house has to go by it to get downtown. Even during construction, it's already attracted a ton of attention; people are dropping in and asking questions that I am happy to answer."

Specifications called for Corbond Corporation's two-pound, closed-cell SPF throughout the interior. The spray polyurethane foam — applied at nearly five inches in walls and seven inches on ceilings between exposed beams — would also act as an air barrier.

But while looking at the blueprints to formulate how he'd prep, Spiess spied a big problem. Masonry walls would form the west side of both sections of the house; the brickwork would function as a thermal mass to collect and store heat from the sun. Since plans called for an air space between the masonry walls and outside sheathing, Spiess realized his crew would have to spray interior foam from the outside...before other trades installed exterior sheathing. Spiess looked at the calendar and made a quick call to the general contractor. The masonry interior walls were already up, and sheathing was about to begin.

"You'd better get your crew down here right now!" he was told.

Although it was a month and a half before they were scheduled to show up, Innovative Insulation Solutions quickly mobilized. Working feverishly, they fabricated tarp containment tents to the sides of the building to prevent overspray. With no time to waste, the two-man crew used Gama Master-series spray guns fed by G140 proportioners to apply Corbond SPF to nearly five inches in two passes.

"There are so many cars in that crowded residential area that it would have been easy to overspray," Spiess says. To prevent sun damage to the cured SPF, Innovative Insulation Solutions left the tarp tents in place after they finished. They almost needn't have; sheathing crews were ready to go the next day!

Once Innovative Insulation Solutions started spraying the building envelope, people started noticing something different about the work being done on the house. One of the SPF crew members sprayed while balancing on stilts! "At first I was worried he might fall, but he walks around like the stilts are extensions of his legs," explained Innovative Insulation Solutions owner Richard Spiess. To ensure the installer's safety, Spiess made it a firm policy to keep all floors free of debris, dry, and level.



JOB at a GLANCE

THERMAL EFFICIENCY IN CHICAGO HOME

PROJECT:

Install interior SPF thermal insulation in ultra-efficient, energy-conserving home

COATINGS CONTRACTOR:

Innovative Insulation Solutions, Ltd.
300 Scott Street
Elk Grove Village, IL 60007
(847) 454-9081
www.gotfoaminsulation.com

SIZE OF CONTRACTOR:

A two-man crew worked this project

PRIME CLIENT:

Michael Yannell
Chicago, Illinois

SUBSTRATE:

Wood and masonry

SUBSTRATE CONDITION:

New

SIZE:

About 2,675 sq. ft.

DURATION:

Approximately two weeks

UNUSUAL FACTORS:

- Owner aiming for LEED Platinum (highest designation) for home
- Interior SPF applied to the outside of masonry walls that were subsequently sheathed from the outside
- Interior exposed beams led to more prep time than anticipated
- One SPF professional prepped and sprayed while wearing drywall stilts

MATERIALS/PROCESS

- Cover all windows, exposed beams, and masonry
- Duct tape all electrical boxes and outlets
- Apply 5" of Corbond SPF in two passes to walls
- Apply 7" of Corbond SPF in three passes to ceilings
- Use Gama Master-series guns with G140 proportioners

SAFETY CONSIDERATIONS:

- Working in tight quarters with other trades required vigilance
- Working on stilts required all floors be kept free of possible trip/fall debris
- 3M full-face respirators with organic vapor cartridges worn while spraying

Henry

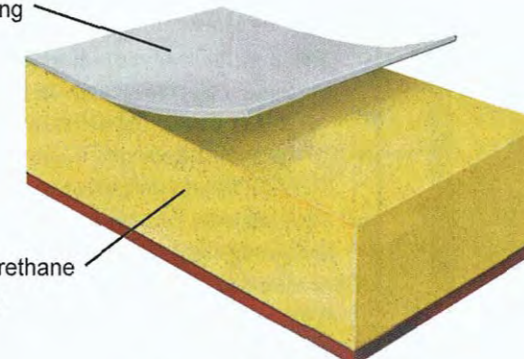
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Reader Inquiry #620



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Reader Inquiry #642

To start the job, the SPF crew covered all windows, exposed beams, and masonry with fabricated tarp containment tents. They then duct taped all electrical boxes and outlets to protect them from overspray. Finally, they were ready to come in to spray the SPF onto the wood and masonry substrates. They applied 5" to the walls in two passes and 7" to the ceilings in three passes using Gama Master-series spray guns with G140 proportioners.

United States at Energy Crossroads

Residential and commercial buildings consume 71 percent of all electrical energy produced in the United States, according to National Renewable Energy Laboratory (NREL). While the percentage is expected to climb to 75 percent by 2025, there are an increasing number of individuals determined to reverse that trend. Homeowner Michael Yannell hopes his ZNE house will raise public awareness that something can be done to lessen this nation's reliance on energy.

"Throughout the upper Midwest, there's a feeling you can't really benefit from some of the solar and other technologies because we're so far north and our winters are so cold," Yannell says. "One of the things I wanted to showcase in this house is renewable energy."

While spraying, the two-man SPF crew was forced to work in tight quarters with other tradesmen. This meant that the crew needed to keep things on schedule and ready for the next crew to come through the house to do their job. The SPF crew also needed to wear 3M full-face respirators with organic vapor cartridges, full-body suits, gloves, and closed-toed shoes. These practices helped them be as efficient as possible on the job, which, in turn, helped to create the Yannell's energy-efficient house.

To achieve a Zero Net Energy rating, Yannell personally footed the bill for a raft of energy-producing and -saving devices, including rooftop solar voltaic (or panels) and water heating, geothermal heating and cooling, and roofs that collect and deliver rainwater to a 550-gallon cistern for irrigation. But SPF played three vital roles: thermal insulation, vapor retarder, and downsizing of construction materials.

"We went with spray foam to achieve an R30 in the walls and R40 in the roof," Yannell says. "But the centerpiece of ZNE is that the building is as airtight as possible."

Farr Associates' project manager April Hughes points out that SPF also helped save construction materials, which in turn lowered energy costs associated with building the home.

"The increased R-value per inch allowed us to downsize our wall framing," Hughes says. "Originally, we were looking at spray-in cellulose, which is half the R-value of SPF. With the SPF, we were allowed to go from the (originally planned) two-by-eight-inch base plate to two-by-six-inch construction. That helped us achieve a reduction of material used in framing."

With Spiess, Yannell, and Hughes exploring the cutting edge of SPF's contributions to energy savings, it's surprising to note that some charged with the task of promoting energy conservation are slow to embrace spray polyurethane foam. On NREL's diagram of a "modest

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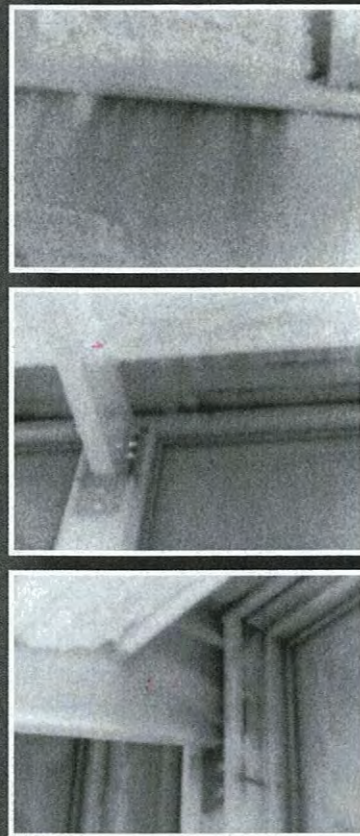
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Reader Inquiry #690

The ZNE house in Chicago is on the road to earning a LEED Platinum status. LEED is the U.S. Green Building Council's Leadership in Energy and Environmental Design rating system. The Platinum rating — the highest designation possible — may be earned by proving that the house uses less energy and produces less waste than a typical home. Hand-held infrared cameras, one of the tools used to test the house, may help prove that little heat is leaking from the building's envelope.



ally impossible to do business. You also need to make sure your contracts stipulate you have a place to park your rig. In this case, there's an area in the backyard that's ideal for parking."

With adequate access assured, Innovative Insulation Solutions' crew began taping windows, electrical boxes, and exposed beams.

"There was a tremendous amount of prep," says Spiess. "Blueprints never tell the whole story. In this case, the ceiling beams looked great on blueprints — but they're usually wrapped in drywall. These were exposed, which meant we spent so much time taping that we actually started spraying while we were prepping on the fly."

Tall Order!

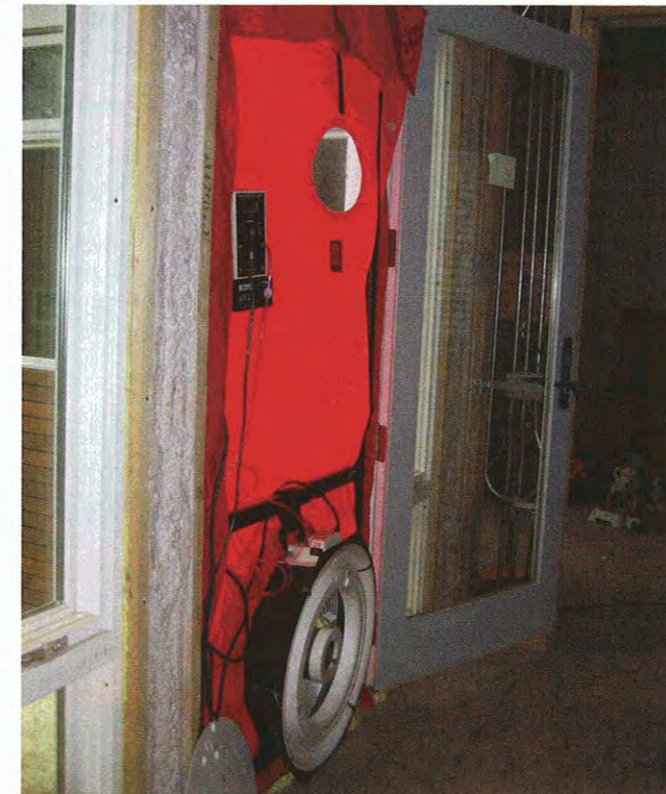
As work progressed, other trades began noticing something different about the way one Innovative SPF pro prepped and sprayed. Martin Judino came to Innovative Insulation Solutions two years ago with a background in SPF, fiberglass, and drywall. Judino also came with a stilt habit he simply could not kick. Stilts!

"It took quite a bit to convince me, but I finally broke down and bought Martin a pair of stilts," says Spiess. "They're very popular with drywallers."

Since safety is paramount on any job site, Spiess makes it a firm policy to keep floors free of debris, dry, and level.

"At first I was worried he might fall, but he walks around like the stilts are extensions of his legs," Spiess says.

Another test of efficiency for the ZNE house was the static pressure test. More commonly known as the blower door test, this test uses a 48" tunnel fan to determine how tight the house was built. By closing all of the inlet doors in the house, the fan created an internal pressure, which was then measured. By determining the difference in static pressure between the inside and the outside of the house, the testers were able to calculate exactly how much air leaked from the house. A tighter house meant the house may consume less fuel.



zero energy home," (www.nrel.gov) plans call for foot-thick, double-stud-construction walls that contain massive amounts of fiberglass insulation. NREL's foot-thick walls hope to achieve R40, while Yannell's six-inch walls provide R30. The difference in building materials required is striking!

"SPF helped us achieve our insulation goals with a reduction of material used in framing, which was important to the owner in this case," Hughes says. "Even with our original idea — a two-by-eight-inch base frame with offset frame two-by-four-inch construction — would have resulted in an extraordinary amount of material used for headers and window sills."

City Streets Hard to Navigate

The streets of Chicago are tremendously difficult to travel. Traffic is thick, streets are crowded, and empty parking spots are snatched up in less time than it takes SPF to rise and harden. City ordinances ban certain types of rigs. Job site access can never be left to chance.

"This is a tough working environment if you don't know what you're doing," says Spiess. "Anything larger than a 16-foot tagalong trailer and it's going to be virtu-

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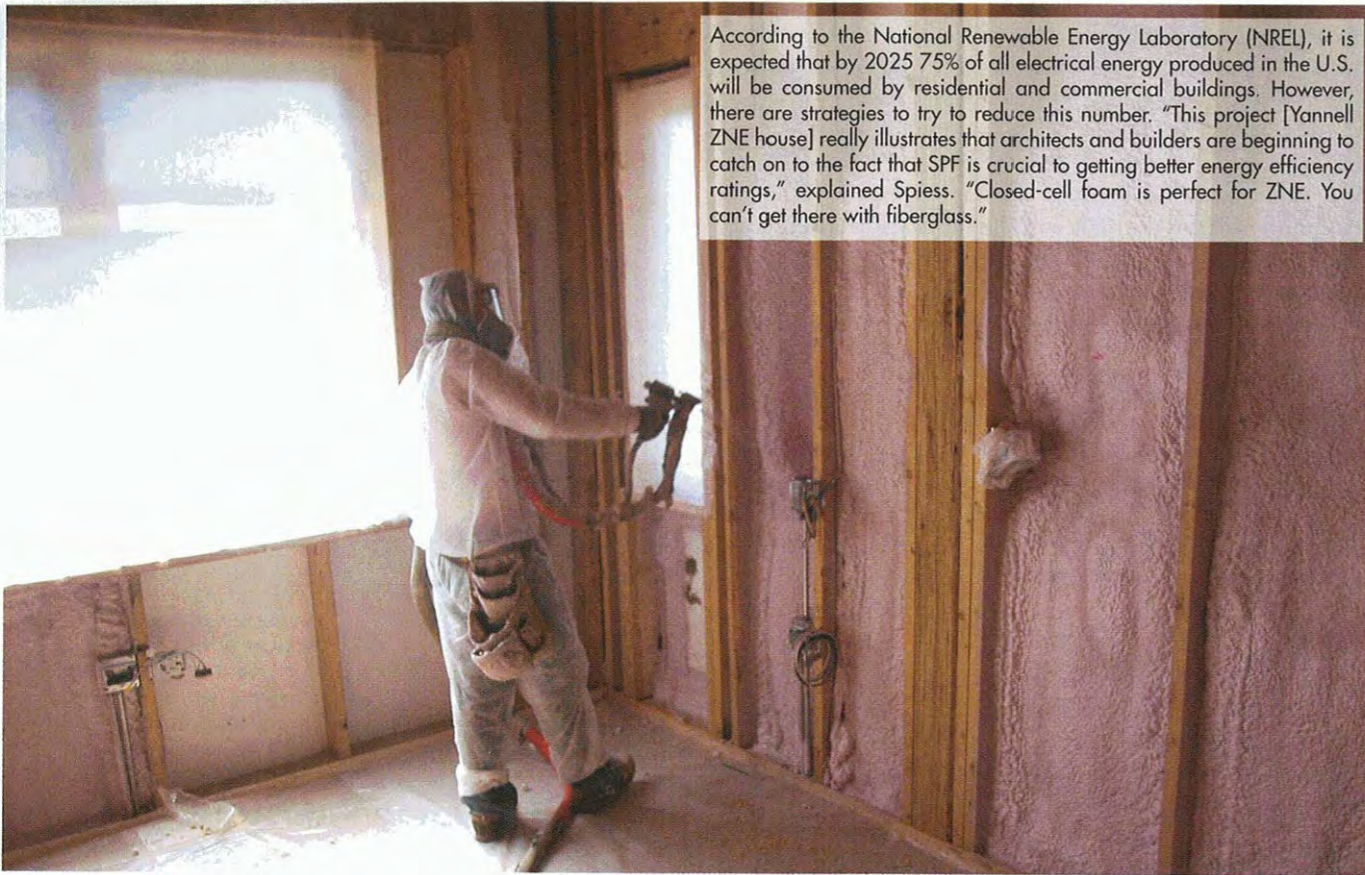
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Reader Inquiry #678

According to the National Renewable Energy Laboratory (NREL), it is expected that by 2025 75% of all electrical energy produced in the U.S. will be consumed by residential and commercial buildings. However, there are strategies to try to reduce this number. "This project [Yannell ZNE house] really illustrates that architects and builders are beginning to catch on to the fact that SPF is crucial to getting better energy efficiency ratings," explained Spiess. "Closed-cell foam is perfect for ZNE. You can't get there with fiberglass."



Crossroads

When construction wraps up in late December 2008, the Yannell ZNE home is expected to begin a long life as a completely self-sustaining building. The unusual design — it looks as though the roofs were unintentionally installed upside down — is sure to keep the building in the public eye. Since public awareness is one of Yannell's goals, it's no accident that his ZNE house sits at a commuter crossroads.

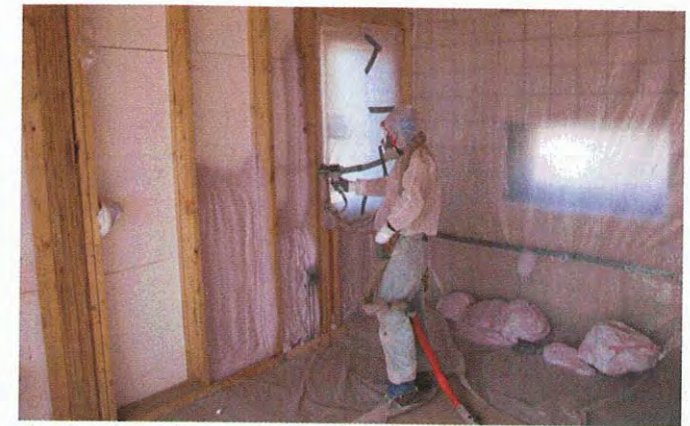
"Part of my strategy was to locate the house near a commuter rail that serves downtown Chicago," Yannell says. "Basically, everyone who lives north of my house has to go by it to get downtown. Even during construction, it has already attracted a ton of attention; people are dropping in and asking questions that I am happy to answer."

Yannell hopes his ZNE house will help change people's behaviors regarding home energy usage.

"There's certainly no way everyone can immediately go with ZNE, but one of the systems or part of one of the systems can be applied to your next house or retrofitted to what you have," Yannell says. "If we can raise awareness, increase demand, and pull these ideas through, prices will start to come down as mass production begins."

Indeed, NREL hopes that the energy conservation-related business will grow to the point that whole-house energy use can be reduced in new homes by 50 percent by 2015 and by 90 percent by 2025. This certainly cannot happen without continued growth and support of the SPF industry.

Spiess and his Innovative Insulation Solutions crew couldn't be happier to be standing on this particular crossroad.



The NREL hopes that — with efforts like that of the Yannells' ZNE house in Chicago — the whole-house energy in new homes will reduce by 2015. "There's certainly no way everyone can immediately go with ZNE, but one of the systems or part of one of the systems can be applied to your next house or retrofitted to what you have," Yannell explained. "If we can raise awareness, increase demand, and pull these ideas through, prices will start to come down as mass production begins."

"This project really illustrates that architects and builders are beginning to catch on to the fact that SPF is crucial to getting better energy efficiency ratings," Spiess says. "Closed-cell foam is perfect for ZNE. You can't get there with fiberglass." **SF**

For more information on the Yannell ZNE house, go to their Web site at www.greenhomechicago.us. Check out Richard Spiess' contractor profile in the upcoming issue of SprayFoam Magazine!

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