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INDUSTRY NEWS

Promoting "Better Than Energy Star" Homes

The US Department of Energy (DOE) is planning to launch a new initiative, the National Builders Challenge, to promote the construction of energy-efficient new homes. Although elements of the new initiative remain to be finalized, the DOE has floated a proposal to create a new marketing label — the "Victory Home" — to designate "better than Energy Star" homes.

Details of the draft proposal were provided in the December 2006 issue of *Energy Efficient E-News*, a Web-based newsletter published by Guaranteed Watt Savers, a home-performance contractor in Oklahoma City, Oklahoma. The newsletter includes a DOE document titled "National Builders Challenge" announcing a new initiative designed to create a "'critical mass' of builders and other stakeholders willing to build and promote super-efficient homes to the general public."

Labeling HERS 70 Homes

According to the DOE document, "no single entity has assumed the role of playing the critical role of convening the necessary stakeholders, ensuring development of a consistent, yet regionally specific set of technical and marketing approaches for building super-efficient homes, and working with these stakeholders to ensure that all efficiency investments are productive and mutually reinforcing. Through the National Builders Challenge, DOE will help serve these critical roles." The initiative intends to "establish a national label designed to allow consumers to quickly and intuitively identify homes that progressively approach zero net energy use." To be eligible for the proposed new national label, the "Victory Home designation," a new home would need to have a HERS Index of 70 or below.

The *2006 Annual Report* of the Residential Energy Services Network (RESNET), the national association of home energy raters, notes, "With input from RESNET, DOE is currently developing a National Builders Challenge that would use a national index and thresholds on that index for the labeling Building America and Net Zero Energy Homes."

Further details of the National Builders Challenge were provided by Kelly Parker, the president of Guaranteed Watt Savers, an Oklahoma City firm that provides residential energy ratings. Parker is also the current president of RESNET. "About six months ago, [RESNET Executive Director] Steve Baden and I met with people at DOE and proposed a policy change," Parker recently told ***EDU***. "What we felt at RESNET was that there should be one metric that everyone uses, and this metric should be the HERS Index." Since a house cannot receive a HERS Index unless it has been inspected by a RESNET-certified rater, it is in RESNET's interest to

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promote programs that require the use of the HERS Index. "EPA and RESNET already had an agreement to use the HERS Index as a metric -- that aligned the HERS industry with the EPA," Parker continued. "So Steve and I proposed this to DOE, and they agreed. The National Builders Challenge is the result. There will be a single metric in the industry."

DOE, Meet EPA

The DOE and the US Environmental Protection Agency (EPA) have engaged in turf battles for several years over aspects of the Energy Star program. Since some Energy Star programs — including appliances and windows — are administered by the DOE, while others — including new homes and CFL fixtures — are administered by the EPA, the rivalry between the two agencies for control of the Energy Star program is structural.

Apparently, the DOE has not shared its plans to launch the National Builders Challenge with EPA officials. Among those miffed by the snub is Sam Rashkin, the EPA's national director of the Energy Star Homes program. "Essentially, the information we have is all second-hand, because we haven't been involved in this process," Rashkin told ***EDU***. "There is not really any coordination going on between DOE and EPA. The DOE is developing another label on their own — what they are calling a 'super-efficient home,' which they define as having a HERS Index of 70. They have said that a builder who achieves that will get a 'Victory Home' designation. What doesn't make sense is why that new label will help the marketplace. We're a little bit perplexed. EPA has not been invited to the table for this effort. When you have a new label being promoted, you want to say, 'If that's the solution, what's the problem?'"

Staying Out of Politics?

After taking credit for RESNET's lobbying efforts in Washington, Parker, without apparent irony, told ***EDU***, "We try to stay out of Washington politics. It is unfortunate that the two entities didn't talk to each other, but that doesn't make the [National Builders Challenge] proposal a bad idea."

When ***EDU*** called Marsha Quinn, the DOE's program manager for technology transfer at DOE, to learn more about the National Builders Challenge, Quinn said that she was not authorized to speak to the press on the topic.

According to Parker, the proposed Victory Home designation will fill a void. "The proposal by DOE to create a new label is an effort specifically to address Building America houses," he said. "Previously there was no label for these buildings -- no label for builders who are building houses above Energy Star. A certain percentage of builders want something better than Energy Star. For example, in Phoenix and Houston, Energy Star is almost passé. Energy Star made the first step; if the Victory Home label is the next step, so be it."

The "National Builders Challenge" document is posted online at *www.gwssi.com/extnews/main/html/dec__2006.html.*

California Homeowners Rarely Open Windows

According to Standard 62.2, the residential ventilation standard developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), most new US homes should be equipped with a mechanical ventilation system (see ***EDU***, June 2003). However, the standard includes a major geographical exception: in Zones 3B and 3C of the International Energy Conservation Code (IECC) cli-

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mate map — an area that includes most of California, as well as small slices of Arizona, Nevada, New Mexico, and Texas — mechanical ventilation is not required, as long as "the authority having jurisdiction determines that window operation is a locally permissible method of providing ventilation."

Underventilated Houses

Standard 62.2's geographical exception is based on the assumption that a mechanical ventilation system is superfluous in climates warm enough to permit the frequent opening of windows — an assumption undermined by new research findings. A report by Phillip Price and Max Sherman, two researchers from Lawrence Berkeley National Laboratory (LBNL), presents data showing that California homeowners rarely open their windows for ventilation. The paper notes, "Many houses are under-ventilated: depending on season, only 10%-50% of houses meet the [ASHRAE] standard recommendation of 0.35 air changes per hour. … Survey data suggest that windows provide much less than 0.3 ACH for most homes in winter, and less than 0.35 ACH in about half of homes in fall and spring."

To gather their data, the researchers distributed survey forms to a group of occupants of California homes built in 2003; 1,448 of the survey forms were completed and returned. According to Price and Sherman, the purpose of the survey was "to determine occupant use of windows and mechanical ventilation devices; barriers that inhibit their use; satisfaction with indoor air quality (IAQ); and the relationship between these factors."

Data on window-opening frequency were based on residents' memories of their habitual behavior. The survey respondents reported that the main reasons they rarely opened their windows were "security" and "energy saving."

Most of the survey respondents live in houses lacking a whole-house mechanical ventilation system. Although the houses are equipped with bathroom exhaust fans, these fans are apparently underused: about 30% of respondents said they rarely or never used their bathroom fans.

Revising Title 24

As part of the regular cycle of revisions to the California residential energy code (Title 24), the California Energy Commission is currently considering a proposal to adopt ASHRAE Standard 62.2 by reference. Armed with the data assembled by Price and Sherman, several experts have concluded that the geographical exception in Standard 62.2 is untenable. The Commission is therefore considering a proposal that would disallow the substitution of resident-controlled window opening for the installation of a mechanical ventilation system in any future residential ventilation requirement incorporated into Title 24.

Like the California Energy Commission, the ASHRAE 62.2 committee is considering whether the geographical exception is no longer tenable. "I presented the findings to the 62.2 committee at the last meeting," Sherman told ***EDU***. A proposed addendum to 62.2, Addendum K, would eliminate the geographical exception; the addendum has been released by ASHRAE for public review.

"Ventilation Behavior and Household Characteristics in New California Houses," by Phillip Price and Max Sherman, is posted on the Web at *http://repositories.cdlib.org/lbnl/LBNL-59620/*.

NEWS BRIEFS

Zero Energy House Contest Has Single Entrant

GREENFIELD, MA — As the deadline approaches to announce the winner, if any, of a cash prize for the best-performing zero-energy house in the Northeast, judges are considering whether an eccentric off-grid house qualifies for the award. One year ago, the Northeast Sustainable Energy Association (NESEA) said they would award a $10,000 prize to a house in New England or the mid-Atlantic states that used no more energy than it produced for one year (see "News Briefs," ***EDU***, May 2006). The contest organizers hoped to attract architects and engineers engaged in cutting-edge low-energy house design. However, the contest's only entrant was André Rambaud of Hancock, Massachusetts, a campground owner whose aging off-grid home is powered by a homemade micro-hydro system. According to a Massachusetts newspaper, the *North Adams Transcript*, NESEA's director, David Barclay, commented, "We were hoping for more applicants." Rambaud, owner of Privacy Campground on Route 43, diverts some of the flow from a stream on his property to a mile-long 4-inch PVC pipeline supplying a Kato generator installed in an old bomb shelter. Since Rambaud's 8.5-kW micro-hydro system produces AC power 24 hours per day, it requires no batteries. His 1965

house, framed with 2x4 walls, is not superinsulated, and his appliances include an old chest freezer on its last legs and a conventional refrigerator. The home's space heating is provided by electric resistant baseboard units, and Rambaud's kitchen is equipped with a microwave oven, a toaster-oven, a single-burner hot plate, and an electric crockpot. Domestic hot water is supplied by three solar thermal collectors with electric resistance backup. Rambaud claims he hasn't used any firewood, propane, or grid-supplied power for over three years. "I think I should win the prize," Rambaud told ***EDU***. "If I don't, they'll probably say the house is too unusual -- I think that will be their cop-out. What they are looking for is a house they can put on the Internet."

New Version of REScheck Supports 2006 IECC

RICHLAND, WA — The Pacific Northwest National Laboratory has announced the release of the latest edition of REScheck, version 4.0.1, which supports builders complying with the 2006 International Energy Conservation Code (IECC). Like earlier versions of REScheck, the free software helps residential builders demonstrate that their designs meet energy code requirements; it includes modules with custom calculators for states with differing energy codes. To download the latest version of REScheck, visit *www.energycodes.gov*.

Bush Budget Shortchanges Efficiency Programs

WASHINGTON, DC — President Bush's FY 2008 budget includes cuts to several energy-efficiency programs, including a $98 million cut in funding for the low-income weatherization program and a $237 million cut in funding for the DOE's Office of Energy Efficiency and Renewable Energy. Bill Prindle, the acting executive director of the American Council for an Energy-Efficient Economy, noted, "This request should be dead on arrival in Congress, because it cuts 2007 spending for efficiency and renewables by 16 percent, and the efficiency budget alone could fall by up to a third."

California Bill Would Ban Incandescents by 2012

SACRAMENTO, CA — California Assemblyman Lloyd Levine has introduced a bill in the California legislature that would ban the sale of incandescent light bulbs by 2012. In a rare example of legislative humor, Levine has dubbed his bill the "How Many Legislators Does it Take to Change a Light Bulb Act." According to the Reuters News Service, Levine, a Democrat from Van Nuys, explained, "Incandescent light bulbs were first developed almost 125 years ago, and since that time they have undergone no major modifications. Meanwhile, they remain incredibly inefficient, converting only about 5 percent of the energy they receive into light."

LED Efficiency Claims Found To Be Exaggerated

WASHINGTON, DC — A US Department of Energy (DOE) research project has provided strong evidence that manufacturers of LED lamps have exaggerated the efficiency of their products. As part of the Solid-State Lighting Commercial Product Testing Program, DOE researchers tested two LED downlights, an LED task light, and an LED undercabinet light; the manufacturers' names have been kept confidential. While the manufacturers claimed that their products had efficiencies ranging from 36 to 55 lumens per watt, the actual measured efficiencies of the LED lamps ranged from 11.6 to 19.3 lumens per watt. According to the report, "With regard to luminaire efficacy, both LED downlight products out-perform similar incandescent downlights, whereas CFL downlights outperform the tested LED downlights, attaining luminaire efficacies from 1 ½ to 3 times higher than the LED downlights." For more information, visit *www.netl.doe.gov/ssl/comm_testing.htm*.

Energy Star Labeling Program For LED Lighting Is Launched

WASHINGTON, DC — The US Department of Energy has launched a new Energy Star labeling program for LED lighting. In light of recent evidence that some manufacturers of LED lamps have exaggerated the products' efficiency, however, the criteria for Energy Star LED lamps have not yet been finalized. For more information, visit *www.netl.doe.gov/ssl/energy_star.html*.

EPA Sets Date To End Energy Star Thermostat Program

WASHINGTON, DC — Andrew Fanara, a project manager at the US Environmental Protection Agency, has published a proposed timeline for phasing out the Energy Star label for programmable thermostats (see ***EDU***, December 2006). According to the timetable, manufacturers must stop selling thermostats with the Energy Star label by May 1, 2008. Fanara's announcement noted, "No data was submitted by any [Energy Star] partners to refute the existing five studies which conclude there were no significant savings from programmable thermostat installation." For more information, contact Andrew Fanara, Environmental Protection Agency; Tel: (202) 343-9019; E-mail: fanara.andrew@epa.gov.

Florida Energy Code Made More Stringent

TALLAHASSEE, FL — The energy provisions of the Florida Building Code became more stringent in December 2006, when the 2006 Supplement to the code went into effect. According to the December 2006 issue of *CARB News*, the latest version of the Florida code increases the minimum SEER of air conditioners from 10 to 13, and increases requirements for ceiling insula-

tion for the "base model" to R-30. The code allows builders to apply credits from trade-offs; for example, credits are awarded for airtight ductwork and for locating HVAC equipment within conditioned space. For more information, visit *www.floridabuilding.org*.

Canada Announces New Residential Weatherization Program

OTTAWA, ONTARIO — After enduring stinging criticism for canceling the well-regarded EnerGuide for Houses program last year (see ***EDU***, September 2006), the Conservative government in Ottawa has announced a new plan to invest $220 million (Canadian dollars) over four years in a program to promote energy-efficiency upgrades to existing homes. According to Natural Resources Minister Gary Lunn, the program will provide a rebate of up to $5,000 per household after a homeowner provides proof that certain energy-efficiency improvements have been completed. Calling the proposal a "watered-down version of EnerGuide for Houses," critics note that the new program, unlike EnerGuide, would require homeowners to pay the upfront costs — generally between $200 and $300 — for a pre-retrofit audit.

Vermont Considers Law To Discourage Monster Homes

MONTPELIER, VT — Two Vermont state legislators have introduced bills to establish a tax on the construction of new monster homes. The House version of the bill, introduced by Representative Tony Klein, a Democrat from East Montpelier, would require builders of homes greater than 4,000 square feet to pay a fee of $1,000 per 100 square feet for the area over 4,000 square feet. The collected fees would be earmarked for Vermont renewable energy projects. The Senate version of the bill, introduced by Virginia Lyons, a Democrat from Chittenden, would charge builders of homes larger than 4,000 square feet a fee equal to 1% of the home's cost, unless the house was LEED-certified. Klein noted, "When you build something that requires the potential use of a lot of electricity, even if you don't use the electricity, our utility has to have it in their portfolio, which means they have to add to their contract amounts, which means it costs all of us in our rates."

Monitoring Results For the OASys Evaporative Cooler

SACRAMENTO, CA — Monitoring data from a Sacramento field study of the OASys indirect evaporative cooler manufactured by Speakman CRS (see ***EDU***, May 2005) show that the unit is three times more efficient than a 14 SEER air conditioner. Although it is difficult to compare the performance of an evaporative cooler with a conventional air conditioner, researchers from Steven Winter Associates in Norwalk, Connecticut, determined that the OASys has roughly the same cooling capacity as a 2-ton unit. The study, which was funded by the Partnership for Advancing Technology in Housing (PATH), is discussed in the January 2007 issue of *Wintergreen*, posted online at *http://swinter.com/WinterGREEN/WGJanuary07.pdf*.

Phantom Loads In New Zealand

PORIRUA CITY, NEW ZEALAND — The Building Research Association of New Zealand recently completed a ten-year study that monitored fuel use at 400 New Zealand homes. The Household Energy End-Use Project (HEEP) determined that phantom loads (electricity used by appliances when switched "off") averaged 57 watts per household. The HEEP researchers were surprised to learn that firewood provides 56% of residential space heating in New Zealand. A full report on the project can be downloaded by visiting *www.branz.co.nz*.

New Web Forum For Energy Policy Wonks

WASHINGTON, DC — A new Web forum for energy policy wonks has been launched by Issue Dynamics, a for-profit Washington consulting firm. The forum will post articles and solicit comments on a variety of energy-related topics, including "energy independence, electricity rate reform, and the role of renewables." The forum can be visited at *www.smartenergypolicy.com*.

Outdoor Wood-Fired Boilers Spark Complaints

NEW YORK, NY — Outdoor wood-fired boilers "have spawned a rash of lawsuits and local ordinances across the country," according to an article in the *New York Times*. "A growing body of research about the toxins spewed by the boilers — namely carcinogens and lung-clogging particulate matter — has prompted campaigns around the country to limit their use." At least 50 jurisdictions in New York state have passed laws to regulate outdoor boilers. Philip Johnson, a senior scientist at the Northeast States for Coordinating Air Use Management, a nonprofit association, is familiar with outdoor-boiler woes. "I am getting so many calls from people complaining about their children getting sick and the nuisance of the smell, and it's just brutal to listen to their stories," said Johnson.

EPA Asks Manufacturers of Outdoor Wood-Fired Boilers To Design New Models

ARLINGTON, VA — The US Environmental Protection Agency (EPA) has reached a voluntary agreement with ten manufacturers of outdoor wood-fired boilers calling for the companies to introduce less-polluting versions of the appliances. The manufacturers have promised that, in the spring of 2007, they will begin selling new models equipped with an orange tag denoting compliance with

the EPA's Phase I air emissions standard of 0.60 pounds of fine particles per million BTUs of heat input. According to the agreement, the manufacturers will be permitted to continue to sell older, more polluting models alongside the models with orange tags. EPA spokesperson John Millet explained, "This is an important first step in getting a handle on a relatively new machine that's having an impact on air quality." For more information, visit *www.epa.gov/woodheaters/what_epa_doing.htm*.

Developing A Better Relief Damper

NORWALK, CT — Steven Winter Associates (SWA), a consulting firm in Norwalk, is working with Heyoka Solutions of Falmouth, Massachusetts, to develop a better relief damper for homes equipped with evaporative coolers, according to the January 2007 issue of *CARB News*. Since evaporative coolers pressurize a house with outdoor air, they cannot function well unless the house has effective relief dampers allowing exhaust air to leave the home. Available dampers are designed to pop open when necessary, but often leak air when closed, creating an energy penalty during winter months. The development work is supported by funding from the California Energy Commission and the Building America program. "This winter, SWA and Heyoka will be conducting benchtop testing of various Building Integrated Relief Damper (BIRD) prototype designs," says Marc Zuluaga, an engineer at SWA. "This initial design phase will be followed by the demonstration and evaluation of BIRD prototypes in CARB demonstration houses this summer." For more information, contact Zuluaga at marcz@swinter.com, or visit *www.carb-swa.com/PDF%20files/CNJanuary07.pdf*.

A Hanukkah-Inspired Campaign To Promote CFLs

BALTIMORE, MD — A Jewish environmental coalition is using the story of Hanukkah, the Festival of Lights, to promote the replacement of incandescent bulbs with compact fluorescent lamps. According to an article in the *Baltimore Sun*, more than 500 Jewish congregations have agreed to change the bulbs in their synagogues and members' homes as a result of the project. Hanukkah commemorates an event in early Jewish history when one day's worth of lamp oil miraculously lasted for eight days. "The question is, how long will our oil last?" said Barbara Lerman-Golomb, executive director of the New York-based Coalition on the Environment and Jewish Life, one of the activists who helps launch the bulb-swap campaign.

Britain Introduces Star Rating System For New Homes

LONDON, UK — The British government has introduced a voluntary system to rate new homes for energy efficiency. Builders who agree to follow the standard, called the Code for Sustainable Homes, will have their new homes rated using a star system. To be eligible for the top rating of six stars, a home must meet all of its energy needs from renewable energy produced on site. The rating system is part of a package of measures designed to encourage the development of zero-carbon homes in Britain.

Quote Without Comment

"Even as we pat ourselves on the back for the rapid rate of growth in the number of certified 'green' buildings, we're turning a blind eye to the fact that the energy-efficiency gains of those buildings are often very modest. For example, Energy Star-certified homes in the Northwest only promise a 15 percent improvement over the local energy code." [Alistair Jackson, "Sealing the Envelope," in *Northwest Energy News & Analysis*, November 28, 2006]

RESEARCH AND IDEAS

Using Radon Mitigation Systems To Dry Basements

Most active radon mitigation systems include a continuously operating fan that exhausts air pulled from a layer of crushed stone under a basement slab. Several studies have shown that such subslab depressurization systems can effectively lower indoor radon levels. In addition, accumulating anecdotal evidence suggests that such systems also have a beneficial side effect: at least in northern climates, active radon mitigation systems appear to lower the indoor humidity levels in basements that might otherwise be damp.

Joe Nagan, the technical director for the Wisconsin Energy Star Homes program, first noticed the drying effect of subslab depressurization systems a few years ago. "We were looking at a group of homes owned by a holding company that offered housing to relocated executives," Nagan told ***EDU***. "These houses are bag-tight, with no passive makeup air vents, and no power-vented appliances that might indirectly dilute the background moisture level. Yet the houses had much lower humidity levels than we would expect, and we were wondering why this was happening. Then we

noticed that these were the buildings with radon systems installed."

Gary Nelson, president of the Energy Conservatory in Minneapolis, Minnesota, recently shared a similar anecdote. "Jim Fitzgerald and I were investigating a 50-year-old house with moisture problems," said Nelson. "The work included installing a sub-poly depressurization system in a crawlspace and a sub-slab depressurization system in the basement. In two or three weeks, the homeowner called up and said, 'Gee, things are snapping and popping and creaking, so you better come back and take a look.' On the second floor, we saw a room with painted wood paneling — the paneling had been there for 20 years — and the wood was shrinking. You could see unpainted wood at the tongue-and-groove joints. I said, 'I think this shows that your humidity level was a little high before.'"

Most radon mitigation fans draw between 20 and 85 watts. In continuous mode, such fans cost between $21 and $89 per year to operate (assuming electricity costs 12¢ per kWh). When a radon fan is used to help dry out a basement, its operating cost should be lower than that of a humidifier.

Sensing an economic opportunity, a few companies are already promoting the humidity-lowering effect of sub-slab depressurization systems.

Indoor Air Technologies

Since 1988, Indoor Air Technologies of Ottawa, Ontario, has marketed a system, the Enclosure Conditioned Housing (ECHO) System, that uses an exhaust fan to dry out damp basements. The ECHO System differs in several important respects from a typical residential radon mitigation system, however. Instead of pulling air from the layer of crushed stone under a slab, most ECHO System fans pull air from the cavity between the slab and a carefully installed subfloor, as well as from the cavity between framed perimeter walls and the foundation (see Figure 1).

The first step in the installation of the ECHO System is careful air sealing of basement walls. Next, insulated perimeter stud walls and an insulated raised subfloor are installed. Once these are built, the airspace behind the stud walls and under the subfloor is depressurized by a continuously operating fan exhausting the air to the exterior. ECHO Systems employ an 85-watt fan adjusted to create 2 pascals of depressurization under the subfloor and the finished walls; once commissioned, such a fan draws as little as 20 or 30 watts. The system is designed to pull its makeup air from the interior of the house.

Indoor Air Technologies has installed ECHO Systems in over 300 basements, mostly in Canada. According to the Indoor Air Technologies Web site, the ECHO System provides a "continuous, depressurized envelope cavity [that] prevents soil and building material moisture, gases, and mold spores from entering the living space. … ECHO System ventilation and drainage technology keeps building and insulation materials dry in what might otherwise be a damp and musty basement floor and perimeter wall cavities."

HomeAire's Active Dampness Control

HomeAire, a division of Spruce Environmental Technologies, promotes the beneficial drying effects of its radon mitigation systems. When sold to customers interested in basement drying, the installations are marketed as Active Dampness Control (ADC) systems (see Figure 2). One installer of HomeAire's ADC system is Radon Specialists of Wisconsin; according to the company's Web site, "We cannot divulge what is different with the fan or installation because they are trade secrets."

However, HomeAire's product marketing manager, Phillip Chevalier, confirms that ADC systems do not differ in any way from regular radon mitigation systems. According to Nagan, "When this idea started to get popular, the radon guys just started putting a different label on the same system and calling it 'Active Dampness Control.'"

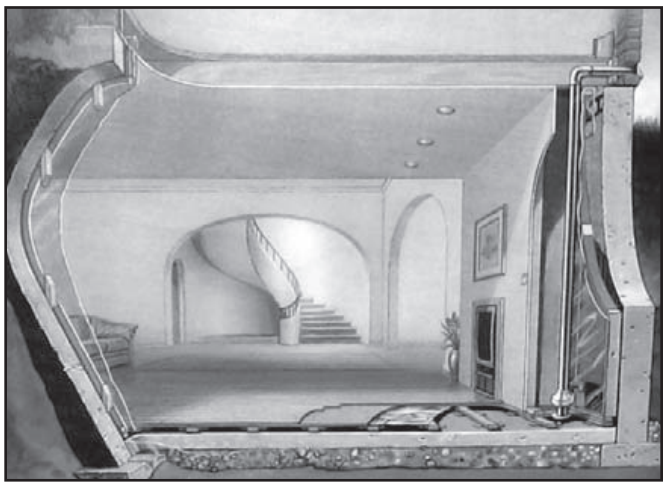

Figure 1. Indoor Air Technologies installs its ECHO Systems to help dry damp basements. Each ECHO System includes a fan that depressurizes the cavity under the subfloor and the cavities behind the framed perimeter walls.

Chevalier promises that his company's subslab depressurization system will dry basements. "The ADC system removes moisture, leaving you a dry basement, without odors or contaminants or the moisture that leads mold to grow," Chevalier told ***EDU***. According to the HomeAire Web site, "While operating at peak performance, HomeAire's Exclusive ADC System will exhaust up to one half-gallon of moisture from under the slab every hour."

A HomeAire employee, Trudy Smith, has written a paper extolling the virtues of subslab depressurization. The paper, "Reducing Moisture by Fixing Radon," is posted on the Web at *www.greeningtheheartland.org/presentations06/smith_poster24.pdf*. In it, Smith asserts, "One side benefit observed from the installation of these active soil depressurization systems [for radon mitigation] across the country is dehumidification, especially of the basement environment."

According to Smith, subslab depressurization systems are inexpensive. "The cost of the materials for the active dampness control system, including piping, fittings and miscellaneous adhesives and caulks, is roughly $200 or less," she writes. "The fan to activate the system is approximately $150."

According to Smith's calculations, a subslab depressurization system is more efficient at moisture removal than a basement dehumidifier. Based on electricity at 10¢ per kWh, Smith calculates that removing one gallon of water from the air costs about $1.82 using a dehumidifier, but only 8¢ to 48¢ using a subslab depressurization system.

Current Research Projects

Although HomeAire promises that its subslab depressurization systems help dry basements, researchers caution that little data have yet been gathered on these systems.

Among the questions researchers are investigating: What is the mechanism by which the moisture removed by the radon fan would otherwise have entered the house? Since new basement slabs are installed over a layer of polyethylene, the radon system is clearly not preventing moisture from diffusing through the slab. Rather, the most likely moisture transport mechanism being thwarted is the infiltration of soil air — that is, moisture-laden air that would otherwise be pulled into the house by the stack effect, entering the basement through cracks at the slab perimeter. In theory, operating a radon fan can reverse the air flow, pulling basement air downward through slab cracks.

Figure 2. HomeAire advertises that its radon mitigation systems help dry out damp basements.

At least two researchers are currently studying the question of whether subslab depressurization systems are effective at keeping basements dry: Brad Turk, the president of Environmental Building Sciences in Santa Fe, New Mexico, and Pat Huelman, associate professor and cold climate housing coordinator at the University of Minnesota in Saint Paul.

Huelman's group is currently monitoring the performance of active radon mitigation systems in six new Minnesota houses. "It's absolutely phenomenal what happens to radon levels when we operate the fans — when we test in active mode," said Huelman. "Once the active system is turned on, the radon turns off, within days. We know that the radon is in the soil, and we know that operating the active system changes the air flow. Theoretically you could argue that if it does that to the radon, it must also do that to the moisture in the soil. But it has been very challenging to see the signal of that happening. We have been watching the moisture level in the air leaving the stack, and over time the moisture level goes down. So the source concentration decreases with time.

But we're still having a hard time sorting the data out. Radon is easier to track than moisture, and the moisture change is not as dramatic as with radon. It doesn't jump out and say 'Wow.' But the information is still bundled up in data sets, and we haven't had a chance to look at all the data yet."

Pennsylvania Research

In a telephone interview with ***EDU***, Brad Turk described his research project. "The EPA has funded an exploratory study to look at three houses near Harrisburg, Pennsylvania," said Turk. "We've been monitoring the houses for 18 months, collecting data on radon and moisture in the basement air and basement materials."

Like Huelman, Turk has not yet finished analyzing his data, so he is reluctant to generalize about the effects of subslab depressurization systems. "Before we began our study, we did a literature search, and found that there have been precious few refereed papers on the topic," said Turk. "Most of the information is anecdotal. People who have worked with these soil depressurization systems have noticed certain effects — odors tend to go away, and if there is paneling in the basement, then the paneling shrinks."

During most of the year, fan operation in the monitored Pennsylvania houses has helped with basement drying. "In the three houses we looked at, we see a really repeatable moisture reduction in the basement air when we run these systems in the fall, winter, and spring," says Turk. "We've just begun to analyze the data from the summer. In the summer, it's not as clear-cut. So we're taking a closer look at the summer data."

Turk cautions that house construction details, soil conditions, and climate can all affect the performance of a subslab depressurization system. "The problem is that these are only three houses in one specific climate zone, so to extrapolate from the data would be perilous," he notes.

Where's the Makeup Air Coming From?

Radon mitigation fans usually have airflows in the range of 100 cfm to 200 cfm. Although most radon mitigation contractors assume that the makeup air supplying the fan comes from the soil under and around a home's foundation, little data exist on the source of makeup air for radon mitigation fans.

"One of the key questions we'd like to investigate is, Where is the makeup air coming from?" says Turk. "Unfortunately it is difficult to track air from the soil, other than by using radon as a tracer gas. Our current hypothesis is that a lot of the makeup air is coming from upstairs, or from outside, entering around the rim joist." If further analysis of the Pennsylvania data confirms that fan operation during the summer has less of a drying effect than fan operation during the winter, as it now appears, one explanation might be that humid outdoor air is entering the basements, replacing the air exhausted by the radon fans.

At least one research project has demonstrated that radon mitigation fans suck in significant quantities of basement air. In a 1993 paper, "Radon Mitigation Energy Cost Penalty Research Project," four Minnesota researchers (David Bohac, Lester Shen, Timothy Dunsworth, and Mark Hancock) reported, "Tracer gas measurements were performed to estimate the amount of indoor air entrainment into the [radon] mitigation system. … The percent basement air entrained in the mitigation exhaust ranged from 11% to 61%."

According to Turk, the percentage of soil air in radon fan makeup air varies with soil type. "It depends on a lot of factors, including how tight the basement foundation is and how tight the soil materials outside the foundation are in comparison to the basement materials," Turk explains. "For example, in New York state or eastern Washington, the soil is often glacial till, which is a highly permeable material. You can move a lot of air through glacial till. In those areas, you may find that a significant part of the fan's makeup air is coming through the soil. But there is a large range in how much of the air entering the basement is soil air. It can be as high as 20 or 30 percent — or in some cases, if there is tight basement construction and impermeable soil, it can be almost unmeasurable."

Basement moisture can come from several sources. "If you ask people with basement dehumidifiers, 'When do you run the dehumidifier?', they usually answer, 'In the summer,'" Turk notes. "That's a clue as to the source of moisture. In a lot of houses, basement moisture originates from the outdoor air."

In theory, a radon fan can depressurize a basement, increasing infiltration. Moreover, basement depressurization can cause combustion appliances to backdraft — a danger that reputable radon mitigation contractors are careful to prevent. In Wisconsin, Nagan verified that the radon fans were not depressurizing the basements he inspected. "Even though the contractors are not necessarily sealing the perimeter of the concrete floor, we were still not able to pick up any negative

pressure in the basement," said Nagan. "And we tested for it. If you take the same digital manometer and slip the tubing into the sump crock, it will show a pretty good depressurization under the slab. But it's not communicating with the basement."

Nagan admits that the source of the fan's makeup air is somewhat mysterious. "If in fact the makeup air is coming from the soil outside the foundation, why aren't we chilling the crap out of these slabs?" asks Nagan. "I've measured the temperature of the slabs, are they're warm."

According to Turk, soil air reaching the crushed stone under a slab usually has a temperature of about 50°F, so in most cases soil air does not significantly chill a basement slab. "Around buildings, there can be a few direct pathways that connect the outside air to the crushed stone under the slab — for example, the shrinkage gap next to the foundation where they backfill," says Turk. "A subslab depressurization system can pull the air down next to the foundation wall, and in some cases you can see the air pulled down by using a smoke stick. But the path that the air follows is almost unknowable — there are so many permutations and pathways, so many materials that are not homogenous. You don't have an engineered channel directing the air. It is possible to have situations where you chill the slab — if air can find a short path to the subslab aggregate — but in most cases the path is so tortuous, you're not going to see any chilling of the slab."

Unanswered Questions

Although researchers agree that radon mitigation systems often help keep basements dry, many questions remain unanswered, including:

- What conditions determine the source of a radon fan's makeup air?
- What are the mechanisms by which the moisture removed by a radon fan would otherwise have reached the basement?
- Do subslab depressurization systems lower basement humidity during the summer, or only during the fall, winter, and spring?
- Are subslab depressurization systems as effective at drying basements in warm humid climates as they are in cold northern climates?
- Do radon mitigation systems installed in basements with block walls perform differently from those installed in basements with poured concrete walls?
- What effect does the installation of perimeter stud walls, insulation, and drywall in a basement have on the drying effect of a subslab depressurization system?
- If a subslab depressurization system effectively lowers indoor humidity, will residents decide to operate the home's mechanical ventilation system for fewer hours? If so, will indoor air quality be affected?

Turk would like to see more research addressing these questions. "We have all these anecdotal reports, and I think they are right on the mark," he said. "But the question is, are these reductions in humidity occurring in all four seasons? And what kinds of houses are the reductions occurring in?" Among the many variables to consider, says Turk, are the different mechanisms by which moisture enters a basement. "Some people assume that when you run a radon mitigation system, you're stopping the highly saturated soil air from entering the basement," he says. "But in some houses, soil air may not be the dominant contributor to basement moisture."

Until researchers gather more data, builders installing radon mitigation systems should avoid overselling the advantages of the systems. "I could imagine situations where, if you have a radon mitigation system running, you could depressurize the basement and draw warm humid air from the outside," Turk said. "In other words, the summer would be the risky season. It could also be risky in warm humid climates -- for example, in Mississippi or Florida."

Until more research is completed, it is best to proceed with caution. "You have to remember the law of unintended consequences," notes Turk. "The airflow patterns that these systems create can be widely varied. If you start changing airflow patterns by operating these systems, you really don't know what's going to happen."

For more information, contact:

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Spruce Environmental Technologies, 187 Neck Road, Ward Hill, MA 01835-8027. Tel: (978) 521-0901 or (800) 355-0901; Fax: (978) 521-3964; *www.homeaire.com*.

Another Rainscreen Tip

The latest tip for creating an airspace between siding and the water-resistive barrier (WRB) is simple and inexpensive: install vertical strips of folded-over asphalt felt every 16 or 24 inches on center (see Figure 3).

Depending on the choice of asphalt felt (#15 or #30) and the number of folds, a variety of thicknesses can be created; in fact, by varying the strip thickness, the strips can be used as shims to correct minor framing irregularities.

According to Troy Sprout of Hendersonville, Tennessee, the method has many advantages. It's "a simple, fast and efficient means to mark the studs over the house wrap," he notes. "The system prevents the siding from bowing over random button-caps [housewrap nails], and maintains an air gap/drainage plane to prevent the paint from being forced off the siding."

Sprout is a fan of asphalt felt. "I prefer felt as a sheathing wrap to any of the newer woven products," he says. "I've witnessed it still doing its job after 50 years behind brick. I even use it under modern housewraps when a building inspector will only accept the modern plastic wraps. It is inexpensive, durable, easy for one person to install and, most importantly, very effective at preventing water damage to the framing."

Figure 3. This photo shows vertical strips of asphalt felt installed to create a rainscreen. (Unfortunately, since the WRB in this photo is also asphalt felt, the strips are difficult to see.)

NEW PRODUCTS

Skinless Wall Panels

Skinless wall panels, like their better-known cousins, structural insulated panels (SIPs), are insulated with rigid foam. But while SIPs depend on layers of OSB for their structural strength, skinless wall panels use wood or steel studs embedded in the panels' foam to carry structural loads. Most brands of skinless panels include two parallel rows of framing, one interior and one exterior, so that the layer of foam separating the two rows forms a thermal break.

Over a decade has passed since ***EDU*** last looked at skinless wall panels (see ***EDU***, July 1995). Four of the five manufacturers profiled in our 1995 article — Nascor, Techbuilt Systems, ThermaSteel (formerly known as ThermaStructure), and Truefoam InsulWall — are still in business. The fifth manufacturer, RayCore, has stopped producing wall panels, at least for the time being. In recent years, at least two new skinless panel manufacturers, Energy Wise Systems and Kama, have entered the field. All of the wall panel manufacturers profiled in this article insulate their panels with expanded polystyrene foam (EPS).

Panel manufacturers provide different specifications for bottom plates and top plates; while a few use steel plates that can create a thermal bridge, most panel manufacturers have energy-efficient plate details. Moreover, some manufacturers can provide custom plate details for customers with specific energy concerns.

Like walls built with SIPs, walls assembled from skinless panels are usually tighter and better insulated than stick-built walls. Skinless wall panels are a natural choice for builders who like the idea of wall panels, but are concerned about the longevity of OSB.

Energy Wise Systems

Energy Wise Systems is a Cleveland, Ohio, manufacturer of EPS wall and roof panels. Energy Wise panels obtain their structural strength from two parallel rows of embedded 18-gauge galvanized steel studs spaced 24 inches on center (see Figure 4).

Wall panels are available in three thicknesses: 5 ¼" (R-22), 7 ¼" (R-30), and 9 ¼" (R-40). Most panels are

4 feet wide, and as high as required by the home's ceiling height (see Figure 5). The manufacturer can produce panels up to 36 feet long. Energy Wise also makes 12" thick (R-50) roof panels strong enough for unsupported spans of 15 feet. The manufacturer recommends the use of 2" x 8" steel top plates, a detail that creates a thermal bridge.

Energy Wise wall panels can be installed below grade; such installations require pressure-treated plywood sheathing protected by a rubberized asphalt membrane.

For areas subject to high wind or seismic loads, Energy Wise engineers can manufacture panels with extra steel bracing. As long as load requirements are specified correctly, Energy Wise panels do not require exterior sheathing. (The only drawback to omitting exterior sheathing is that siding fasteners are spaced 24 inches on center; for some types of siding, such wide fastener spacing may be inadequate.)

"Installing our panels is easy," says Marc Crudele, vice president of operations for Energy Wise Systems. "I tell homeowners, 'If your builder can't figure it out in 15 minutes, you don't want the builder.'"

Energy Wise Systems panels can be shipped to any US location.

Kama Energy-Efficient Building Systems

Kama has been manufacturing wall panels in Las Vegas, Nevada, for four years. Although the company has made a few roof panels for special projects, Kama's main business is wall panels.

Kama wall panels are available in five thicknesses: 3 ½" (R-14), 5 ½" (R-24), 7 ¼" (R-30), 9 ¼" (R-38), and 11 ¼" (R-45). They can be ordered in widths up to 8 feet and heights up to 16 feet. Structural loads are carried by parallel rows of steel studs spaced 16 or 24 inches on center (see Figure 6). The top and bottom plates are steel angles installed without thermal bridging. Adjacent panels meet with a shiplap joint that installers seal with canned foam.

In areas of the country subject to high wind or seismic loads, Kama panels require exterior sheathing for bracing. When asked to compare his company's panels to SIPs, Ken Miller, Kama's CEO, said, "Obviously, our panels weigh less than SIPs. Secondly, OSB is still a wood product, and most of our customers want to get away from wood. In its place, OSB is a useful product, but when you start using it for structural situations, you have to remember that moisture can destroy it. Once those fibers get wet, they can turn into a pile of sawdust."

Kama is able to ship its wall panels anywhere in the country.

Nascor EnerGard Panels

Nascor manufactures its EnerGard wall panels in Calgary, Alberta. The EPS foam panels are available in two thicknesses: 5 ½" (R-20) and 7 ¼" (R-30). Nascor does not manufacture roof panels.

Unlike Energy Wise or Kama panels, the structural loads in Nascor EnerGard panels are carried by wood I-studs with OSB webs (see Figure 7). For most residential panels, stud spacing is 24 inches on center, although panels with 16-inch-on-center stud spacing are available.

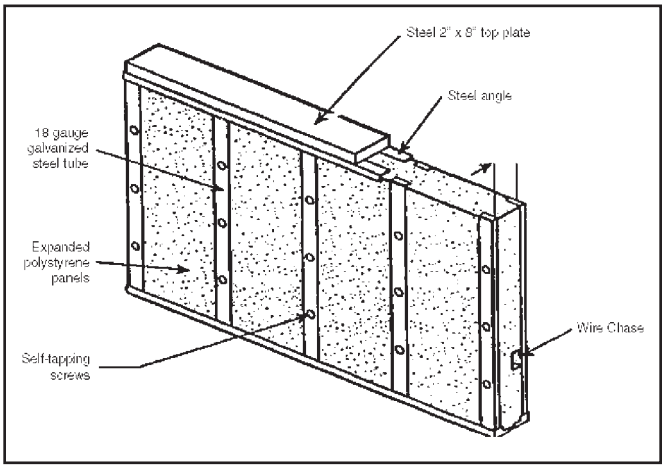

Figure 4. Energy Wise wall panels are rectangles of expanded polystyrene foam fitted with embedded steel studs.

Figure 5. Most Energy Wise wall panels are four feet wide.

Figure 6. Kama panels can be ordered in several thicknesses, including R-45 panels measuring 11 ¼ inches.

Figure 7. Nascor wall panels have embedded wood I-studs with OSB webs.

Typical residential panels are 8 feet high and 12 to 18 feet long; however, due to the I-studs' inherent rigidity, very tall EnerGard walls (up to 26 feet high) are possible. Because the I-studs extend from the interior to the exterior, minor thermal bridging occurs through the studs' OSB webs. The EnerGard system uses standard wood 2x6 or 2x8 plates; vertical panel seams are joined with an EPS spline.

Exterior sheathing is optional, as long as the panels have been engineered for anticipated wind and seismic loads; where required, the panels are strengthened in the factory with diagonal Simpson T-braces. EnerGard panels include factory-routed horizontal wiring runs.

Table 1 — Skinless EPS Wall Panels

Manufacturer	Nailer or stud material	Stud spacing	Roof panels available?	Available thicknesses and R-values
Energy Wise Systems	18-ga. 1"x2" tubular steel	24" o.c.	Yes	5 1/2" (R-22), 7 1/4" (R-30), 9 1/4" (R-40), 12" (R-50)
Kama Energy-Efficient Building Systems	20-ga. galv. steel	16" or 24" o.c.	No	3 1/2" (R-14), 5 1/2" (R-24), 7 1/4" (R-30), 9 1/4" (R-38), 11 1/4" (R-45)
Nascor EnerGard	Wood I-studs	16" or 24" o.c.	No	5 1/2" (R-20), 7 1/4" (R-30)
Techbuilt Systems	18-ga. 1"x2" steel	24" o.c.	Yes	7 1/4" (R-28), 9 1/4" (R-35), 12" (R-46)
ThermaSteel	24-ga. steel C-channel	16" or 24" o.c.	Yes	3 1/2" (R-16), 5 1/2" (R-24), 7 1/2" (R-34)
Truefoam InsulWall	Wood 2x4s and wood 1x3s	16" o.c.	No	5" (R-20)

Table 1. The R-values provided in this table are those reported by panel manufacturers; they may be inconsistent. In general, EPS R-values vary with density; typical EPS densities range from 1 pound per cubic foot (R-3.6 per inch of thickness) to 2 pounds per cubic foot (R-4.2 per inch). Although the Federal R-value Rule requires advertised EPS R-values to be based on testing performed at 75°F, some manufacturers still report R-values derived from tests performed at 40°F. Testing at 40°F results in a higher R-value than testing at 75°F. Finally, some panel manufacturers include drywall and siding values in their R-value calculations.

Figure 8. The ThermaSteel wall panels at this house are joined by a steel top plate.

"Our panels are more user-friendly than SIPs," says James Lind, Nascor's vice president of sales and marketing. "Since they're open panels, you don't have to fish wires behind a layer of OSB. Everything is visible."

Nascor can deliver EnerGard wall panels anywhere in Canada or the northern half of the US.

Ray-Core Is On Hiatus

Ray-Core no longer manufactures the wall panels it produced in Lock Haven, Pennsylvania, for more than 13 years (see ***EDU***, December 1993). According to Ray-Core president Harry Raymond, "We were basically hand-making our panels. We had plenty of orders, but we had trouble filling them, so we shut down the operation. We're looking for an investor to take over."

Techbuilt Systems

Techbuilt Systems, a manufacturer in Cleveland, Ohio, makes Thermotech 21 wall and roof panels. The EPS wall panels are typically 7 ¼" (R-28) or 9 ¼" (R-35) thick; roof panels are 12" (R-46). Panels are ordered to standard ceiling heights (usually 8, 9, or 10 feet high), in any length up to 40 feet. Roof panels are 4 feet wide; the maximum span for a roof panel is 12 feet.

Wall panels include two parallel rows of 18-gauge 1"x2" steel studs, 24 inches on center; the rows are separated by a thermal break. Steel angles (1 ½" x 1 ½") are used for plates. Horizontal wiring runs are routed out of the EPS foam at the factory; vertical wiring runs are carved out of the foam on site. Doors and windows are usually installed in 2x8 bucks adhered to the rough openings with canned spray foam. (If desired, the panels can be ordered with factory-installed 2x8 window and door frames.) Wall panels from Techbuilt do not require exterior sheathing.

Like Energy Wise panels, Thermotech wall panels can be used below grade. Basement wall panels are 11 ¼ inches thick, and include factory-installed ¾-inch pressure-treated plywood sheathing.

According to Bill Molé, president of Techbuilt Systems, "When builders switch from SIPs, they usually say that Techbuilt panels require less labor and are easier to install."

Techbuilt Systems can ship panels to any location in the US.

ThermaSteel

ThermaSteel, formerly known as ThermaStructure, manufactures wall and roof panels in Radford,

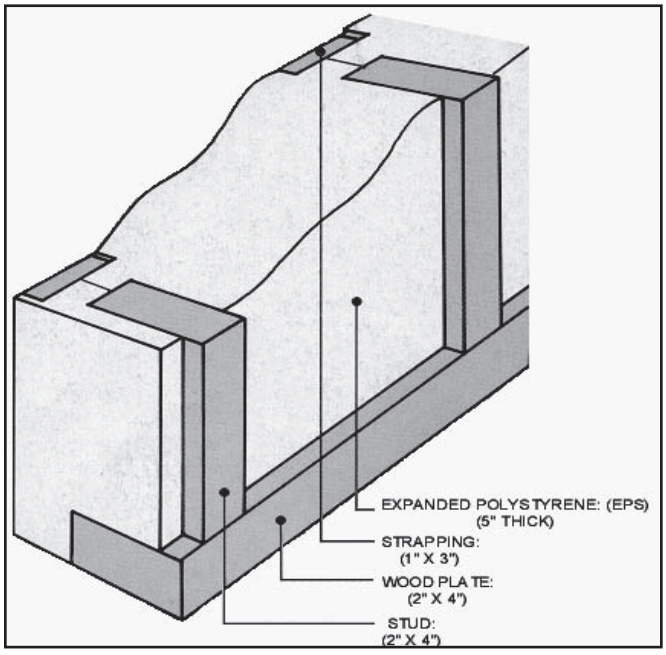

Figure 9. InsulWall panels include 2x4 wood studs and 1x3 vertical strapping.

Figure 10. Load-bearing walls built with InsulWall panels require site-built headers over windows and doors.

Virginia. The panels are available in three thicknesses: 3 ½" (R-16), 5 ½" (R-25), and 7 ½" (R-35). Panels are 4 feet wide, and are available in heights up to 12 feet. Roof panels can span up to 16 feet.

Structural loads are carried by 24-gauge steel studs, installed in two parallel rows, 16 or 24 inches on center (see Figure 8). The top and bottom plates can be either steel or wood.

Whereas most other skinless panel manufacturers start with blocks of EPS, routing out channels in which steel studs are inserted and glued, ThermaSteel uses a different approach: after steel studs are placed in the EPS mold, the foam is formed in place around the studs.

Adjacent panels overlap with a shiplap joint secured by screws. According to John Downes of ThermaStructure, the New England distributor of ThermaSteel panels, "One man can lift a 5 ½-inch thick ThermaStructure panel, which weighs much less than a SIP."

Truefoam InsulWall Panels

The InsulWall panel was developed by Truefoam, an EPS manufacturer in Dartmouth, Nova Scotia. Truefoam does not manufacture roof panels. InsulWall panels use conventional wood framing to carry structural loads: a row of 2x4 studs on the interior parallels a row of vertical 1x3 strapping on the exterior (see Figure 9). The two rows of wood framing are separated by a thermal break.

InsulWall panels are available in two thicknesses: 5" (R-20) and 7" (R-30). Since the edges of the studs stand proud of the interior face of the EPS, the total panel thickness is either 5 ½ or 7 ¼ inches. A standard InsulWall panel is 8 feet high and quite narrow -- only 16 inches wide. The InsulWall system requires the installer to perform on-site assembly of conventional window headers, door headers, jack studs, and rough sills (see Figure 10).

Distribution of InsulWall panels is limited to eastern Canada.

Manufacturers of Skinless Wall Panels

Energy Wise Systems
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Kama Energy-Efficient Building Systems
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E-mail: info@kama-eebs.com
Web site: *http://kama-eebs.com*

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Web site: *www.truefoam.com*

READERS' FORUM

Occupants Are Below-Average Energy Users

Dear Martin,
Thank you for the generous article on the Habitat zero-energy home [***EDU***, February 2006]. I hope you get many letters telling you about other documented ZEH projects!

I feel compelled to say that I am a bit uncomfortable with the emphasis on the actual accomplishment of zero energy performance for the first year. Although it is wonderful that the home met the goal, it would have been no less quality a home if it had not. Because ZEH space conditioning, water heating, lighting, and appliance loads have all been dramatically reduced, the miscellaneous electric loads (MELs) come to dominate the total energy consumption. MELs are both highly variable and highly unpredictable (unless you're building

for a specific set of occupants with known energy use history; even then, people buy new entertainment centers and hot tubs and children eventually leave home).

Our current approach is to design for zero energy performance using Building America Benchmark assumptions which represent average US occupant choices and behavior. We also design for TMY2 weather. This means that it is really a crap shoot whether or not the home meets the zero energy goal on any given year with any given occupants. We can create good odds, but it is no guarantee. It depends on occupant choices and behavior as well as the weather. For example, the NREL/Habitat ZEH spent nearly a month without any PV production due to the unusually high snowfall in Denver this year. Luckily we had enough excess production in the bank to coast through this unpredictable event. Why? Because the owner/occupants happen to be below-average energy users.

I respect your previous article (***EDU,*** July 2004) on the Zero Energy Home program (which is now subsumed into the Building America Program) and your somewhat hard line on what should and should not be called "zero energy." Your article has done the service of helping to clarify the language within the field of ZEH research.

The ZEH moniker has a certain magic about it. The basic concept is easily understood and captures the imagination of most people. I believe we need to harness this magic to move housing research and the housing industry towards better homes with lower environmental impacts. Being clear about what we mean by "zero energy" is essential to this effort. Part of that clarity is the recognition of the paradox that there is really no such thing as a decisively Zero Energy home. No home can be guaranteed to be annual net zero energy every year with any occupant (unless it is actually designed to be a large net producer, which is not economically favorable). However, we can design homes that have the potential to reach zero energy and educate the homeowners about the implications of their choices to reaching the zero energy goal. The home and the homeowner meet or miss the zero energy target together.

Paul Norton
National Renewable Energy Laboratory
Golden, Colorado

A Crucial Component of the Exception

Dear Mr. Holladay,
In "A New Thermal Bypass Checklist" [***EDU***, February 2006], your discussion of the provision allowing builders to omit the solid interior air barrier behind fireplaces missed a crucial component of the exception. They have to seal the exterior sheathing to the studs and to seal all penetrations using a resilient caulk or foam sealant in the cavities to insure a continuous outside air barrier. I negotiated that on behalf of the TX HERO rating organization; it was not a response to angry builders, it was a common-sense solution, raised by someone with over 25,000 Energy Star homes on the ground.

Regarding Mr. Parker's comment about "belligerent builders": they usually become that way when arrogant raters and building science "experts" attempt to enforce their opinions, rather than proven building science based on the laws of physics. I am the provider Mr. Parker was referring to, and as you see I resolved the question by offering a solution, which became the exception in the Thermal Bypass Checklist. Sam Rashkin was very gracious in accommodating this request, after hearing a legitimate argument based on building science principles.

I believe Joe Lstiburek said it well: "Who made up this rule?" Often these decisions are being made based on limited case studies specific to a particular area or situation they have encountered. They then recommend it for all areas of the country, when in fact it should be climate-specific.

Opinions change with time and experience. Many of the suggested best practices seem like a good idea at the time and for the situation, but when you nationalize them, you begin to have problems. As an example: when we were taught to install moisture barriers in warm humid climates as you would in northern climates, it was disastrous.

C. T. Lloyd
Nelrod Company
Fort Worth, Texas

Editor's Reply

As ***EDU*** reported, the new Thermal Bypass Checklist allows warm climate builders to omit a solid interior air barrier behind a fireplace, shower, tub, or other similar areas. As Mr. Lloyd correctly points out, the Checklist requires builders taking advantage of this "exception" to include a "fully sealed exterior air barrier." However, there is little evidence to support Mr. Lloyd's implication that such a "fully sealed exterior air barrier" differs from the exterior air barrier that the Checklist requires of all Energy Star homes. According to the Checklist, all air barriers, both interior and exterior, must meet the same definition: "For the purposes of this Checklist, an air barrier is defined as any solid material that blocks air flow between a conditioned space and an unconditioned space, including necessary sealing to block excessive air flow at edges and seams."