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Anne & Bradshaw
General Contractors Inc.
Wrightsville Beach, N.C.

Mini-Splitting the Energy Bill

by John Vastyan



In mini-split ductless heating and cooling systems, mix-and-match evaporators allow installers to dictate climate conditions room by room.

How one homebuilder's mission to incorporate **ductless HVAC technologies** resulted in energy savings and green commendations.

Proud of its dedication to “green” innovations, one North Carolina homebuilder has taken its commitment to high-efficiency HVAC to a new level. Anne & Bradshaw General Contractors Inc., based in Wrightsville Beach, N.C., a suburb of Wilmington in an area known as Cape Fear, chose “green build” as its strategic path several years ago. “We’ve never regretted the move,” says Pamela Fasse, general contractor and partner in the firm. “I’ve considered myself an environmental builder for many years, with a focus on energy efficiency and sustainability, but went all-out ‘green’ about four years ago. It appears that we were green before green was in style.”

A Brighter Shade of Green

It's a sign of the times that many of the home industry's environmentally conscious techniques — low-imprint landscaping, high-efficiency HVAC, low-flow water fixtures, and non-CFC insulation — have turned an even brighter shade of green during the past couple of years. At building sites, the green movement leaves industry insiders asking:

- What approach will the builder take?
- Do they truly embrace green-build techniques and technology?

■ Will their commitment to green exceed homeowner expectations?

“We feel it's important to stay current with conservational techniques to minimize cost without sacrificing comfort,” Fasse says. “There's a level of global responsibility at work, but we force ourselves to think locally. After all, as homebuilders, we're apprised of new techniques and technology before consumers are, and it's right here at home where we can have the greatest impact. Going a bit more broad-

ly, green construction aids in the preservation of our state's fragile coastal ecosystems," Fasse explains, her partner and husband Brad Karl by her side.

For the homeowner, green products and techniques translate into significantly lower energy costs, the partners explain. They also benefit from higher property values, cleaner, allergen-free living or working spaces and low-impact technologies that provide beauty and efficiency with little maintenance.

The Quest for Mini-Split Knowledge

One of the key contributors to Anne & Bradshaw's green-build approach has been the recent addition of ductless mini-split air conditioning and heat pump systems. "My husband and I were traveling in Asia last year and we were amazed at the simplicity and efficiency of the systems, and how they were used everywhere," Fasse explains. "Even at higher elevations in Japan, where it gets quite cold, mini-splits were meeting the comfort needs of what seemed to be every home and business."

Fasse returned from her trip and looked into the availability of ductless systems here. "What we found initially was that, in this area, there was very little experience with or knowledge about mini-split systems except on a one-room scale," Fasse says.

When Craig Chadwick, owner of the independent rep firm, Chadwick & Associates, Greensboro, N.C., learned through Wilmington's Four Seasons Heating and Air Conditioning that Fasse had interest in knowing more about the systems, he quickly reached out to her. Within a few months, North Carolina's first whole-house ductless mini-split application was under way.

"Chadwick was the critical link for us," she adds. "They had expertise on tap and the advantage of their many years in the market. They gave us a balanced view of how best to apply the technology; they did Manual J load calculations ... the works. My husband I settled on equipment manufactured by Fujitsu ... We were especially impressed with the manufacturer's variable-speed Haleyon line."

They've now installed several of the mini-split systems in homes they've built with the help of Walt Raeger and Jamie Fowler of Four Seasons HVAC, and Don Lewis, owner of All Pro Services, an HVAC



Ductless technology can be applied for zoned cooling and heating where the builder or homeowner wants it.



firm also based in Wilmington.

"The [mini-split] systems are ideal for heating and cooling, and they're a great match to Anne & Bradshaw's green-build emphasis," Lewis says. "Mix-and-match evaporators allow [installers] to create the perfect climate control for any sized space."

System features often include wireless remote control, plasma filter, sleep timer, 24-hour timer, dry mode, auto louver, auto mode, quiet mode, auto restart/reset, auto changeover and efficient operation with low or high ambient temperatures. Some models feature coil

dry mode to help inhibit mold and bacteria growth by reversing the cycle of refrigerant to dry out condensation in the indoor coil without changing room temperature. During dry coil mode, the plasma filter operates to help disinfect the coil. This is helpful in businesses where a



A computerized logic module in the outdoor unit communicates with the system sensors and indoor unit, continually monitoring temperatures.

system is typically shut off for the weekend or for a vacation home that may be closed up for an entire season.

Getting Into the Zone

Ductless technology is typically applied for zoned cooling and heating, conditioning interior spaces right where you want it — and only where you want it.

The technology's techniques save energy by containing the heat or air conditioning. Other, less used areas of the home aren't overcooled or heated unnecessarily — common with central systems. At night, conditioning only the rooms that are used and allowing the temperature to rise (or fall) in the rest of the home saves energy dollars.

Sleek, new mini-splits with variable speed inverter technology have been in use for more than a decade in European countries and now they're catching on in the U.S. as energy costs continue their relatively quick climb. The notion that every room in a home must be conditioned to

the same temperature, all the time, is losing its appeal among Americans.

Inverter technology continuously modulates its energy production to match heat loss and gain, like feathering the gas pedal of an automobile to meet the speed needed. Furthermore, new "automatic modulation" provides ultra-high efficiency operation, like having a chauffeur to play with automobile's pedals.

With inverter technology, all the homeowner needs to do is to set the desired temperature and leave the rest up to the equipment. The "brain" behind it all is a computerized logic module in the outdoor unit that communicates with system sensors and the indoor unit. Together, the indoor and outdoor units are continually monitoring indoor and outdoor temperatures. Sensors feed this information to the logic module.

If anything goes wrong, a fault code indicates what's wrong with the equipment. "That way, homeowners can often take care of minor issues without the need to call for service," Lewis explains. "Or, if a technician is needed, they can respond to more detailed fault codes with diagnostic equipment."

"Rising energy prices and concerns over global warming have pushed consumer attention beyond a focus exclusively on initial cost," Fowler says, adding that "ROIs [returns on investment] have increased significantly as energy costs continue to rise." He says that the fuel savings with the new technology is probably 15 percent to 25 percent higher than that gained with older systems.

According to Lewis, newer systems run at higher pressure. Line sets, therefore, can be smaller. That's no small bonus, considering the savings on copper. Furthermore, new refrigerant compounds also permit higher operational efficiency, transferring a lot more heat into or out of the interior living space.

Fasse adds that it can cost up to 10 percent more to build a green home than it does a conventional one. But, ultimately, it costs less to live in them because of their greater energy efficiency and easier maintenance.

The average monthly cost of electricity in her Parade home, Fasse says, has been about \$50 versus \$200 in a conventional home. "Our homeowners are

Split Decision

The first home in North Carolina to be built with whole-house, mini-split heating and cooling is believed to be the one shown in these photos, constructed by Anne & Bradshaw General Contractors Inc. on Jefferson Street in Wilmington, N.C.

Four Seasons HVAC installed two 36,000-BTU Fujitsu multi-zone systems in the 2,200 square-foot cottage-style green home.

At the end of July, Pamela Fasse, partner in the general contracting firm, received an excited call from the homebuyer. "He said there was no sound, and he was unaware of the air movement. Best of all, his July utility bill was less than \$55. That included all electricity use, not just the home's A/C," she says.

The Jefferson Street home was completed in February 2007 and was recognized with the U.S. EPA's Energy Star rating. The rating was clinched by the efficiency of the mini-split system, plus the use of spray-in foam insulation and sustainable and recycled materials, which earned high points. Even recycled 4-inch x 8-inch Douglas Fir timbers, salvaged from turn-of-the-century warehouses, were artfully used as structural components in the home's design.

Energy Star is the least stringent of the programs, requiring home energy systems to be at least 15 percent more efficient than current energy provisions under the state building code. N.C. HealthyBuilt Homes, on the other hand, uses a point-based program that permits a builder to choose the criteria to be certified as green. Homes with multiple designations often see efficiency increases beyond 50 percent, qualifying the homeowner and builder for tax credits.

delighted with the technology and so are we. We've now added a key new ingredient to our green home recipe." **THB**

John Vastyan is a Manheim, Pa.-based trade journalist, whose work focuses on the geothermal, plumbing and radiant heat industries.