Saving Money with Energy-Efficient HVAC Systems

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Cost is a factor that is never very far from the minds of contractors and homeowners alike. Everybody wants to keep costs down. But there is also a need to get the maximum bang for your buck. For example, is there much difference between a $100,000 mortgage and a $110,000 mortgage if that extra ten grand buys a top-of-the-line HVAC system that saves energy and provides a more comfortable, healthier living environment? Not to mention rebates from the government and a higher resale value?

Builders and homeowners need to work together to design and construct homes with the best possible features that improve energy efficiency and indoor air quality. Just as homeowners seek out consultants to discuss interior trim, cabinets, tile, and lighting, they also need to be involved in critical decisions regarding materials used in the home – especially the HVAC components – that can make a huge difference in the comfort level and long-term energy costs.

Furnaces

The largest user of energy in the home is the furnace. "In our part of the world," says Lee Eft, district sales manager for Lennox Industries in Des Moines, "where we have more heating hours than cooling hours, upgrading the furnace is a good place to start saving energy in the home."

This of course means installing a variable-speed furnace that is 90% energy-efficient or higher, which reduces fuel costs over the standard 80% furnace. "Contractors, however, still install a fair number of 80% furnaces because they cost less," says Eft. "But lowest cost is not always the best cost."

Two-stage, variable-speed furnaces are higher-end products with different blower motor speeds that use less energy overall than 80%-efficient furnaces. "The gas valve can adjust gas pressure so you basically have a low fire and a hot fire," Eft explains. "If the comfort level in the home is a big consideration, a two-stage furnace is a must." Variable-speed furnaces, or modulating furnaces that respond immediately to climate changes through a sophisticated control system, are excellent choices for larger homes and zoned homes.

A humidifier added to a heating system can also save the customer money. As the outdoor air that enters a home is heated, the relative humidity indoors drops. In order to feel comfortable, the homeowner must set the thermostat higher. According to Eft, "the humidifier is basically a comfort feature that improves overall indoor air quality. Because it is easier to heat moist air, the thermostat can be set at a lower temperature, which reduces the heating bill."

Zone Controls

Up until about six to eight years years ago a warm-air system could not be zoned. Zoning has become more popular because the technology has been improved. Today a homeowner can program a zoned heating system that controls the temperature in different parts of the home. The combination of zoned damper controls and set-back thermostats can maintain a dozen or more zones.

Speaking of thermostats, nearly one-half of all thermostats sold today are not energy-efficient (i.e., "set-back" thermostats). "For every two degrees the thermostat is set back, about 3% of the energy bill is saved," says Eft. "If no one is home during the day, for example, there is no need for the house to be 72 degrees."

Air-to-Air Exchangers

To create a healthy indoor atmosphere, fresh outdoor air needs to be drawn into a home; the stale indoor air that carries micro-organisms and toxins, such as carcinogenic gases that are given off by compounds in glues and certain upholsteries, needs to be expelled. A constant flow of air also controls excessive indoor humidity and mildew, a common problem in newer airtight homes or those that contain Jacuzzis and whirlpool baths.

Air-to-air exchangers are becoming more important as new housing becomes tighter and tighter. "Houses need to breath," comments Eft. "The exchanger uses outdoor air for combustion because it is cleaner than the indoor air."

During the winter, outdoor air is drawn into the home, which needs to be heated to room temperature. By passing through the air-to-air exchanger, about 80% the heat from the exiting indoor air is transferred to the incoming air. Savings on the energy bill can be about $100-$300 per year, depending on the size of the home. In the summer, the air-conditioned indoor air is used to cool the warmer outdoor air as it passes through the exchanger. An exchanger is far more efficient than opening windows to let in fresh air, which then needs to be heated or cooled.

There is yet another way to save money using your HVAC system – by purifying the indoor air, health problems and related medical bills are reduced. Indoor air pollution in the home is a serious health problem – threats include poisonous gases that accumulate from formaldehyde in furniture and carpet, adhesives, cleaning chemicals, airborne microorganisms and viruses, particulates that cause allergies and asthma (including pet dander), and deadly radon.

Eft recommends an air purifier that is attached to the furnace and uses UV light. "UV radiation kills microorganisms, dust mites, odors, and viruses that are recirculated in indoor air," says Eft. A UV air purifier costs about $500-$800 installed and the bulb lasts at least two years. When combined with an air-to-air exchanger, the indoor air can be purified up to 40-50 times a day as it passes through the UV circuit.

Proper ventilation in the winter controls indoor humidity and prevents sweating windows, another common complaint in airtight homes. Air-purifying dehumidifiers with air-flow controllers that permit a metered amount of fresh air to enter the system help avoid underventilating or overventilating the home. By maintaining proper humidity mold, mildew, bacteria, and even some outgassing products can be reduced or eliminated.

Air Conditioning

For very little added cost a home can be equipped with a 12-SEER air conditioning system that will "save about 20% in operating cost over the standard 10-SEER AC unit," says Eft. "For every point of SEER added, operating cost is reduced by several percentage points." Many AC units today now contain the refrigerant Puron, which is gradually replacing R-22 freon.

"Upgrading the energy efficiency of a home can save the consumer anywhere from about $30 to $55 a month or more," concludes Dave McCammant, product manager for MidAmerican Energy's EnergyAdvantage residential energy-saving program. "Although it may cost a few thousand dollars more up-front, a high-efficiency HVAC system will increase the comfort value of the home, as well as its resale value." ▶