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The wrong way to save money on HVAC

By Bill Dove, CM,
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Application Note

How to advise your clients against potentially harmful decisions

When most homeowners think about reducing their heating costs without additional expenditures, they tend to think in terms of temperature. They want more heat for the same money, they look for "free" heat, they seal sources of cold drafts, and other, sometimes very ingenious, solutions. They forget to think about oxygen, carbon dioxide, carbon monoxide, indoor air contaminants, what they are breathing and where it came from (or didn't come from), and the overall cause and effect of their actions.

"Let's close the registers in unoccupied rooms"
This reduces air volume through the furnace, elevates heat exchanger temperatures, reduces heat transfer into the home, elevates vent temperatures and increases heat losses up the chimney, causes furnace short cycling and shortens component life. There is no savings here, only additional losses and costs. Better to add a zoning system, or use the lowest fan speed for continuous fan operation to keep the temperature more evenly distributed. This may allow for one or two degree reduction in the thermostat setting. For older furnaces, a relay may be needed to operate low speed on a "G" demand, but bring on high speed for a "Y" demand.

"Let's shut off some radiators"
Now we're looking at some possible broken pipes, boiler short cycling, more frequent hot surface igniter failures, and possible increased maintenance schedules. Again we can add some zoning for more effective temperature control. An old trick with cast iron radiation and large water content boilers was to use two stage heat thermostats. Stage one started the circulator, stage two started the burner. This was particularly effective with zoned systems.

"Let's buy a kerosene space heater and take it from room to room with us."
OK, but don't forget to open the windows. Un-vented space heaters use oxygen and replace room air with CO_2, CO and water vapor. CO_2 is heavier than air and will settle at the heater where there should be oxygen, CO is lighter than air and will rise to the ceiling. Excess humidity will damage the structure. If the CO_2 don't get you from below, the CO will get you from above.

"Let's use the oven to heat the kitchen"
Gas oven? Its effects are the same as a kerosene heater, but faster and worse. Bad, bad, bad. Electric oven? How much does electricity cost at a COP (coefficient of performance, or the ratio of the change in heat to the supplied work) of one? How much does an appliance serviceman charge to replace an oven heating element?

"Why should we let all that hot air from the clothes drier vent outdoors instead of indoors?"
Lint. Extremely flammable lint! Lint you shouldn't breath. Lint that will clog the furnace filter (until it bypasses the filter and coats the coils). Chemicals. Anti-static chemicals that will coat the furnace flame sensor with electrically insulating compounds that will eventually cause a no-heat call. How much does it cost to clean a flame sensor? Is it a gas drier? Then we're back to the same objections as a space heater or gas oven.

"I stopped up those pipes to the outdoors in my furnace room"
Serious health hazard. Furnaces, boilers, water heaters, gas driers need a constant supply of fresh air. Vent systems need a constant supply of ventilation air. There are codes to comply with, and there are also the laws of physics to work with. What if we connected that combustion air supply to the return and added a small supply register in the supply trunk in the equipment room and latched on the lowest fan speed for continuous fan operation? We just provided a continuous means of whole house ventilation air at a house positive pressure with a continuous (preheated during the heat cycle) air supply to the furnace room. And don't forget the balancing damper (locked in place) in the outdoor air supply duct. This would satisfy NFGC ANSI Z223.1–5.3.4 "Specially Engineered Systems". (Allow a liberal 50 cfm for combustion air supply and venting in the equipment room for every 100,000 BTUs input.)

"I cut a hole in the return here next to my basement wood stove"
Warning: you could die. Think about this. Let's create a negative pressure in the equipment area, ruin our venting, and suck lots of CO from the wood stove into the rest of the house. Yes, it has happened!

"I use my fireplace to heat the family room"
And that old fireplace just sucks the heat out of the house right up that big ole masonry chimney so the furnace runs longer. Then when it's bedtime and there are still glowing embers in the fireplace and we lose draft, the house can suddenly breath again and suck make-up air down the chimney, right across that bed of glowing embers. That bed of embers that produces phenomenal amounts of CO. Serious health hazard. Fireplace inserts and free-standing stoves that are sealed from the living space and get all of their combustion air from outdoors are OK. Sell them one.

"Can I capture the heat from my furnace vent?"
No. Lowered vent temperatures increase wet time and increase the likelihood of vent damage. There have been devices on the market that sink the heat from vent connectors by conduction/radiation or conduction/convection. Application of these devices with older furnaces with high vent temperatures may not have been as detrimental as applying these devices to a modern furnace with reduced vent temperatures. In either case, these devices are no longer recommended.

Be prepared for some off-the-wall energy saving questions, and consider the total cascading effect before answering. Be careful out there.

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