

## The Case Against Heat Recovery Ventilation Systems

In my experience, most people who recommend, sell or install energy recovery ventilation systems don't consider whether that money might yield greater energy savings if spent on more productive efficiency measures.

Moreover, HRV/ERV systems typically move far more air than recommended minimum ventilation rates, wiping out much of the savings from heat recovery. When installing a mechanical ventilation system, heat recovery or otherwise, a timer should be used to achieve the desired average flow rate (unless, of course, the homeowner wants to pay for higher vent rates and fully understands the impact!).

Short of running a full-blown hourly simulation, a quick way to put things into perspective is to compare the Btuh savings at the design temperature with the design heat and/or cooling load. Let's say the design delta-t in winter is 45 degrees. A good HRV will recover about 30 degrees (65%) of heat at the winter design temperature. Assuming a large house with a target vent rate of 80 CFM, the savings would be  $1.1 \times 80 \times 30 = 2,640$  Btuh. Divide that by the design heat load (at same ODT). This ratio can then be applied to the estimated annual heating (and/or cooling) costs.

The cooling mode calculation is a bit more complicated if there's a large latent load, as in the Southeast, but most climates with large sensible and latent cooling loads have relatively small heating loads and therefore are not good candidates for recovery ventilation systems.

Note that this type of thumbnail calculation over-estimates potential savings. In particular, heat recovery reduces the beneficial thermal effects of ventilation when outside air is warmer than inside air when there's heating load, and when outside air is cooler and drier than inside air when there's a cooling load. I've been told an HRV/ERV system is available with automatic bypass, but I can't imagine the additional cost would be justified in a home.

In general, residential heat recovery ventilation systems are appropriate in Canada, the upper mid-west, and in areas of the NE that have exceptionally high energy costs. In most other areas of the country, the potential savings from heat recovery are only on the order of a few dollars a month.

Here's a different take on the problem. Plenty of folks in the home performance industry, myself included, believe mechanical ventilation systems are overused. In my opinion, large homes almost never require mechanical ventilation. That's because it's difficult to reduce infiltration anywhere close to recommended ventilation levels, at least, not at a reasonable cost. On the other hand, small tightly built homes often do need mechanical ventilation. But the smaller the home, the smaller the ventilation requirements and the harder to justify the additional cost of an HRV vs. non-recovery vent methods.

My own rule of thumb is to forgo mechanical ventilation if the blower door result indicates an infiltration rate that's more than twice the target vent rate.