

The Economics Heat Recovery Ventilation – My Experience

Any house needs to exhaust stale air and replace it with fresh air. Conventionally-built houses are equipped with individual exhaust fans in kitchen, laundry, and bathrooms, while the replacement air simply leaks in around windows, doors, and other ill-sealed openings. Energy-efficient houses, however, are sealed to a much tighter degree which provides opportunities to save significantly on the power that would otherwise be required to heat incoming fresh air to room temperature.

To achieve that, my house is equipped with a Zehnder Model 350 Heat Recovery Ventilator (HRV)ⁱ. This very quiet centralized unit exhausts stale air to the roof and replaces it with fresh outside air that is supplied to the great room and the bedrooms. Aside from providing air exchange, it acts to pre-heat (or cool) the incoming fresh air by approximately 85% of the temperature difference between outside and inside air thus greatly reduces the load on the heat pump.

The HRV runs continuously at a speed adequate to supply the fresh air needs of the house. In addition, boost switches are provided in bathrooms and kitchen that increase the air flow rate for between 10 and 60 minutes, when desired.

The measured CO₂ concentration in the house (the standard measure of the adequacy of a ventilation system) normally measures approximately 550 ppm, and has never exceeded 1000 ppm even with a dozen people present for a dinner party. Thus it meets all recommended standards for residential air quality.

Based on measured usage over the last year the HRV draws 32 kWh/month, equivalent to a continuous power draw of only 44 watts (about 2/3 as much as a typical incandescent light bulb). If I were paying for this power at Clallam County PUD ratesⁱⁱ (\$0.07/kWh), my average monthly cost would be \$2.23. This is not an incremental cost, however, as alternate conventional means of achieving the required ventilation rates would likely require a comparable amount of energy.

The pre-conditioning of the incoming fresh air reduces my heating load by approximately 16,000 kBTU/year, saving 1391 kWh of energy/year or 116 kWh/month that would otherwise be required and which would have cost \$8.11/month.

- ⁱ HRVs are available from several manufacturers with different capacities and efficiencies.
- ⁱⁱ My house generates 100% of its power on an annual basis using a solar-electric system.