OREGON HOUSING & COMMUNITY SERVICES

Multifamily Energy Program

EMERGING TECHNOLOGIES, HEAT RECOVERY VENTILATION

Presenter: Dan Wildenhaus

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WHAT IS HRV AND ERV?

- **Heat Recovery Ventilation (HRV)** is a **balanced mechanical ventilation system** that simultaneously **supplies and exhausts equal quantities of air** to and from a house while transferring heat between the two air streams.

- **Energy Recovery Ventilation (ERV)** works in a **similar** way **but transfers some of the moisture** from the outgoing airstream into the incoming air, so it keeps the humidity in your home at a constant level.

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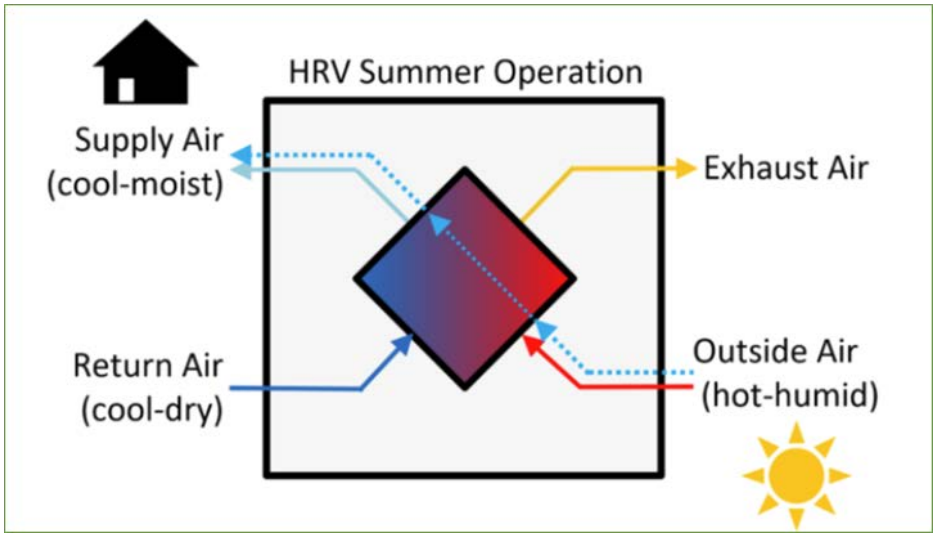
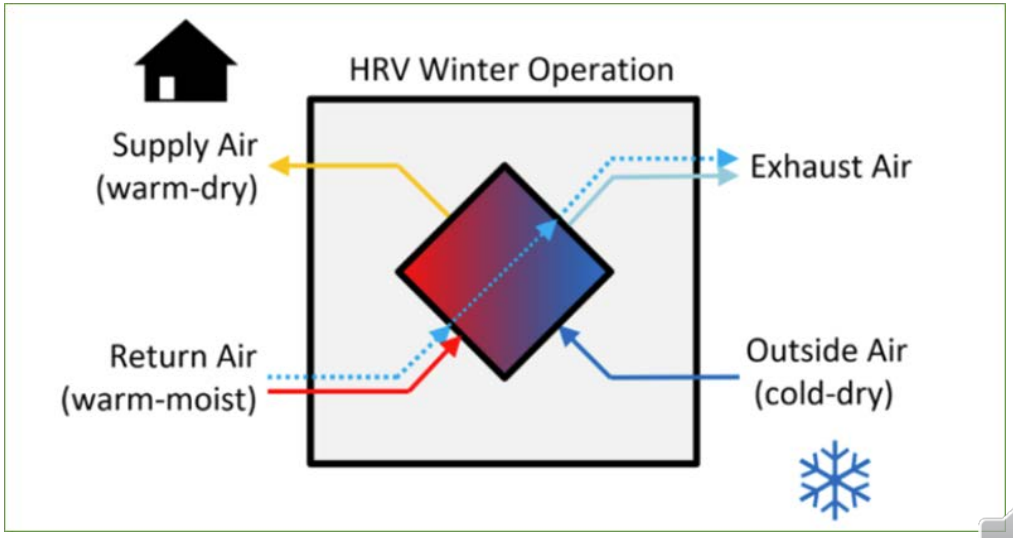
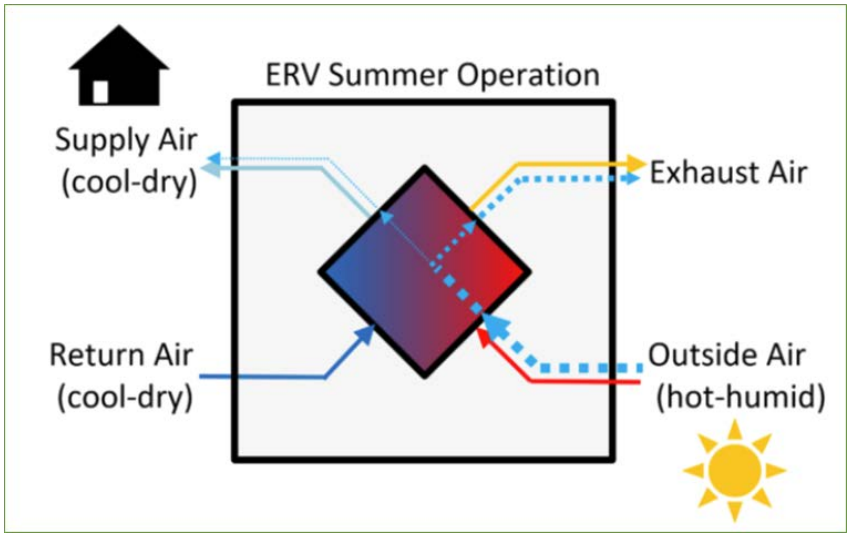
HEAT RECOVERY VENTILATION

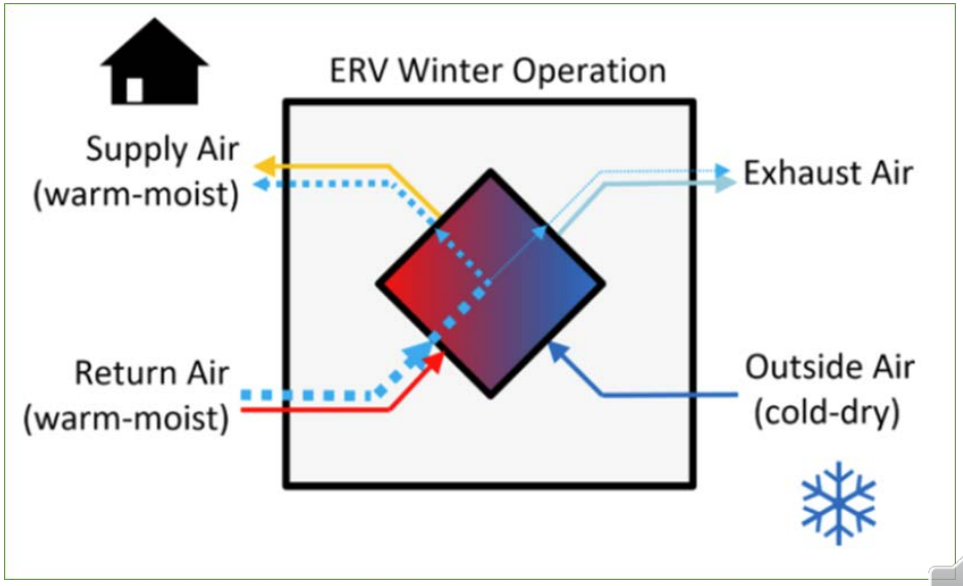




Images courtesy of Steven Winter Associates, Inc
Multifamily Passive House Ventilation Design

ENERGY RECOVERY VENTILATION





Images courtesy of Steven Winter Associates, Inc
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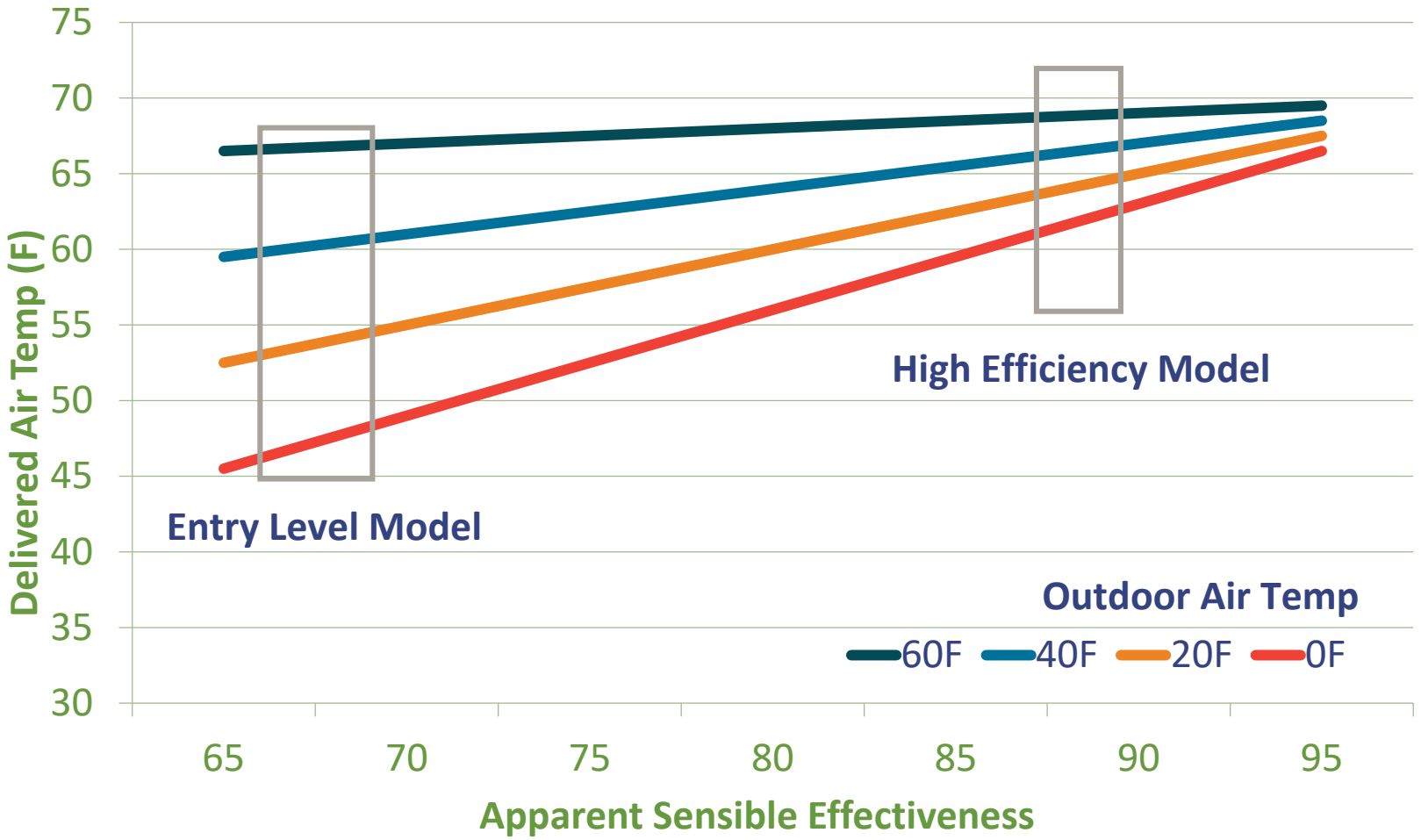
HRV: ENERGY PERFORMANCE TERMS

Efficiency Term	Definition
Sensible Recovery Efficiency (SRE)	SRE quantifies the amount of heat recovered by the incoming fresh air from the exhaust air. It is reported as a percentage of the total sensible heat that is available for recovery.
Apparent Sensible Effectiveness (ASE)	Unlike the SRE, the ASE includes the energy lost from fans with poor efficacy (high energy use for fan operation), heat leaking in or out of the HRV case, and any leaks between the airstreams as they cross through the HRV core.
Total Recovery Efficiency (TRE)	TRE gives the energy recovered by the ERV including both sensible (temperature) heat and latent (moisture) heat. It is similar to the SRE, and expressed as a percentage of the total available energy for recovery.

WHY HIGH EFFICIENCY MATTERS



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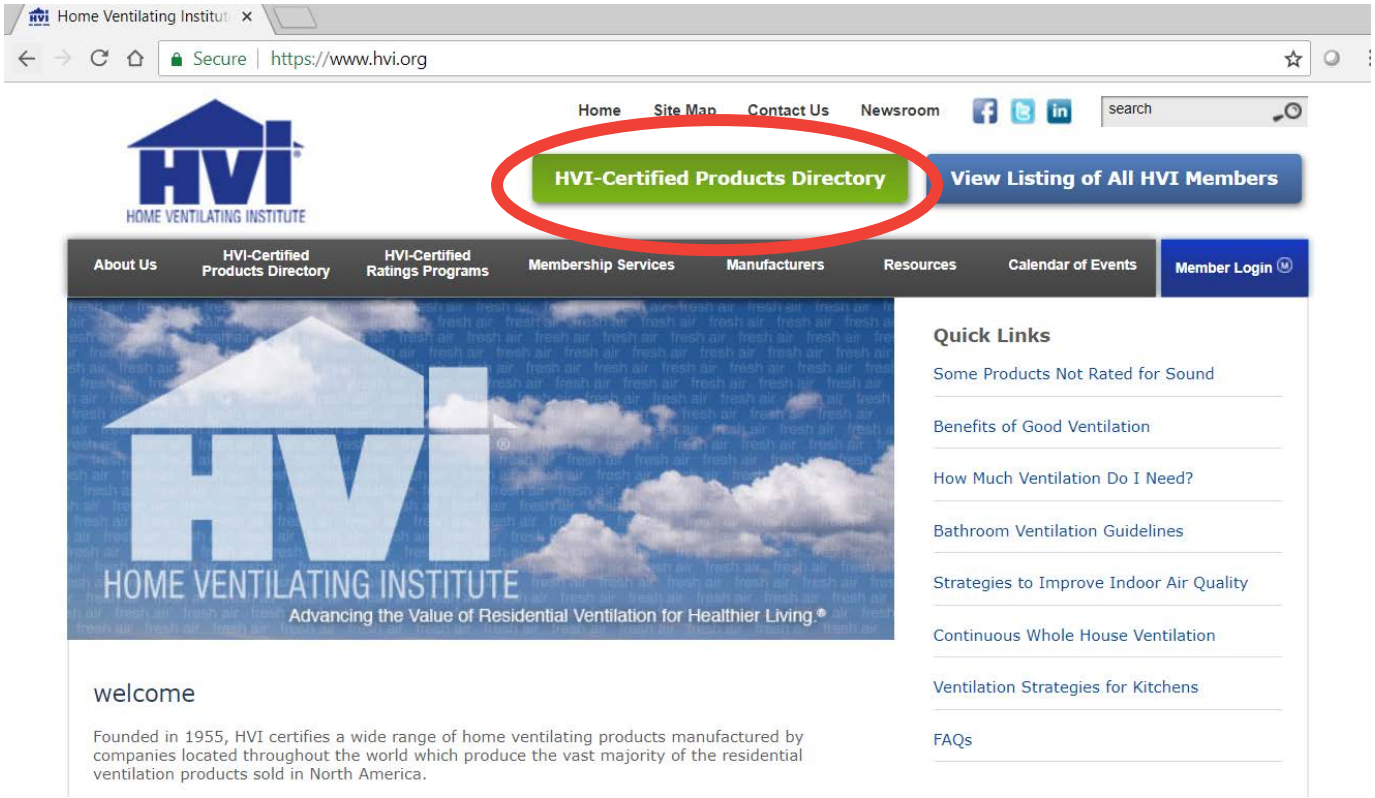
Graph courtesy of BetterBuilt[NW]

DEFINITIONS & EFFICIENCY DATA ONLINE

- **Heating and Ventilation Institute: www.hvi.org**



NEW CONSTRUCTION VS. RETROFIT CONSIDERATIONS

Consideration	New Construction	Existing Buildings
Ventilation requirements	**MUST** meet ASHRAE 62.2 or 90.1	*Should* meet ASHRAE 62.2 or 90.1
Constructability	Can design your system early and build around it. Think VHAC for balanced ventilation	May be limited by building dimensions and more typically approach as H/AC and V
Need	Tighter buildings need well controlled ventilation for fresh air and thermal comfort	Typically leakier buildings, but may have strategies designed to tighten as part of retrofit
Design	Control strategies for tighter buildings, may incorporate spot exhaust plans	Control strategies for moderately tight buildings, may need to integrate into existing systems

HRV/ERV: CONTROL STRATEGIES

Climate	Airtightness [ACH @ 50 Pa]	Minimum Control Strategy
Coastal /Maritime Climate Zones *(Higher Humidity Springs/Winters)*	≤ 3.0	Continuous low speed with manually operated high speed
	3 to 5	
	5 to 7	Time-of-day timer with ability to operate continuously
• Zone 4C in Oregon	≥ 7	On/off, time-of-day timer
Non-Coastal / Continental Climate Zones *(Lower Humidity Winters)*	≤ 3.0	Continuous low speed with manually operated high speed
	3 to 5	Time-of-day timer with ability to operate continuously
• Zone 5 in Oregon	≥ 5	On/off, air time-of-day timer

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INFLUENCE ON OR-MEP INCENTIVES

Tier	Savings Threshold	Incentive
Tier 1	≥ 20% kWh savings compared to baseline*	$0.80 / kWh saved
Tier 2	≥ 25% kWh savings compared to baseline*	$0.90 / kWh saved
Tier 3	≥ 30% kWh savings compared to baseline*	$1.00 / kWh saved

**baseline is code in New Construction and existing conditions for retrofits*

Incentives for Whole Building Path calculated as follows:

[% Savings Incentive Tier Rate ($/kWh)] X [Total kWh Modeled Savings]

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THANK YOU FOR ATTENDING

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www.oregonmultifamilyenergy.com

Dan Wildenhaus

dwildenhaus@trcsolutions.com

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