RenewAire®
Energy Recovery Ventilation

ERV GUIDE

BENEFITS OF INCREASED VENTILATION

- BETTER HEALTH
- REDUCED VIRAL SPREAD
- IMPROVED COGNITIVE FUNCTION
- INCREASED PRODUCTIVITY

RENEWAIRE EVERYWHERE

EVERY GEOGRAPHY, EVERY CLIMATE, EVERY HOME, EVERY BUILDING AND EVERY APPLICATION

INDOOR **AIR QUALITY MATTERS**

DEFICIENT INDOOR AIR QUALITY IS A THREAT

As **buildings get tighter to seal weather out, they seal in contaminants**, causing deficient indoor air quality (IAQ). Typical contaminants include off-gassing from carpeting, furniture and building materials,excess humidity and mold, odors, cooking and cleaning fumes, CO2, hair and fibers, to name a few.

Deficient IAQ is a threat since it can harm occupant health and cognitive function, damage structures and hurt the bottom line. It's especially concerning since people spend about 90% of their time indoors, and indoor air can be two to five times—and up to 100 times—more polluted than outdoor air. The EPA ranks indoor air pollution as a top-five health risk.[1]

ADVERSE EFFECTS OF DEFICIENT IAQ

HEALTH PROBLEMS

Deficient IAQ can cause allergies, headaches, coughs, asthma, skin irritations and breathing difficulties, as well as cancer, liver disease, kidney damage and nervous-system failure.

COGNITIVE IMPAIRMENT

Harvard and Berkeley Lab found that CO2—a constituent of exhaled breath—negatively impacts thinking and decision-making at levels commonly found indoors.[2]

DISEASE TRANSMISSION

Ventilation with outdoor air is vital to diluting airborne contaminants and decreasing disease transmission rates.

REDUCED PRODUCTIVITY

Berkeley Lab found that deficient IAQ can cost $200 billion in debilitated worker performance and $58 billion in lost sick time.[3]

Ventilation can enhance IAQ and decrease the transmission of airborne infectious diseases, including COVID-19: **https://bit.ly/COVID19WP_RA**

RENEWAIRE VENTILATION SOLUTIONS IMPROVE HEALTH AND WELLNESS

[1] "Why Indoor Air Quality is Important to Schools," U.S. Environmental Protection Agency (EPA), https://bit.ly/2SoyRJc.

[2] Romm, "Exclusive: Elevated CO2 Levels Directly Affect Human Cognition, New Harvard Study Shows," Climate Progress, https://bit.ly/2Vp6AE2.

[3] Alevantis, Berman, Mills, Perlman, "The Costs and Financial Benefits of Green Buildings," U.S. Green Building Council (USGBC), https://bit.ly/2KnP5Oc.

PEOPLE SPEND 90% OF THEIR TIME INDOORS

Everyone is at risk of suffering from deficient IAQ. Due to weaker immune systems, children and seniors are the most vulnerable. Children are especially susceptible because proportionally they inhale more pollutants than adults and have narrower airways (World Health Organization).

1. **Contaminated Airborne Aerosols:** Aerosols generated by coughing, sneezing, talking and breathing can act as carriers for viruses and bacteria
2. **Humidity:** Exhaled breath, water sources (faucets, showers, leaks, floods)
3. **Carbon Dioxide:** Constituent of exhaled breath
4. **Formaldehyde:** Off-gassed from adhesives, fabric treatments, stains, varnishes
5. **Odors:** Bathrooms, kitchens, dry-erase markers, occupant odors (perfume, soap/shampoo residue, clothing detergent, general odors), pets
6. **Tobacco smoke:** Smoking areas close to building entrance
7. **Phthalates:** Off-gassed from adhesives, vinyl flooring, wood finishes, plastic plumbing pipes, other building materials
8. **VOCs, toxic gases, vapors:** Off-gassed from furniture, carpets, paints, cleaners, solvents, glues, building materials
9. **Ozone:** Off-gassed from copiers, electrostatic air cleaners, other office equipment

REDUCE INDOOR AIR CONTAMINANTS

IMPROVE IAQ AT HOME

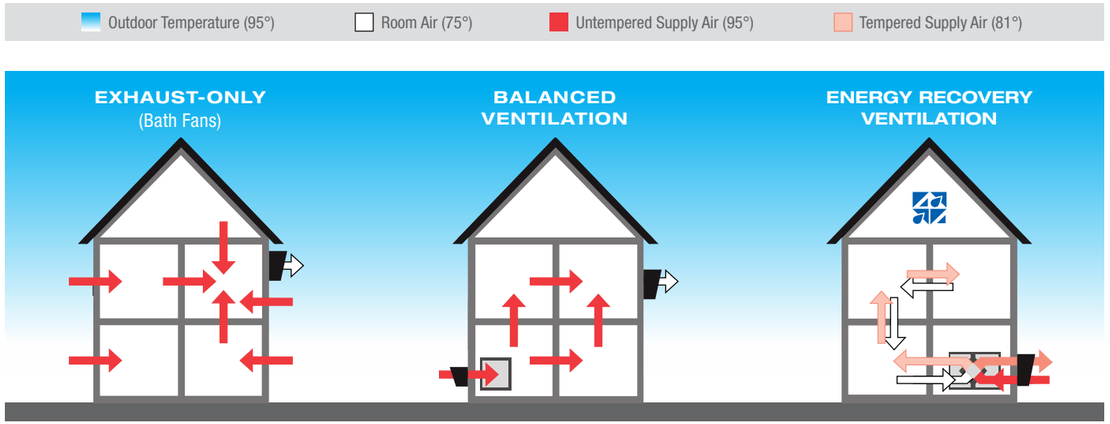
HIGHEST-QUALITY INDOOR AIR VIA VENTILATION

The solution to pollution is dilution achieved via **increased and balanced ventilation**, which is the most effective way to realize cleaner and healthier indoor air. With enough controlled fresh and filtered outdoor air coming in to replace equal parts of stale indoor air via balanced design, IAQ will be enhanced.

	FAIR	GOOD	BETTER	**BEST**
TYPES OF HOME VENTILATION	**EXHAUST ONLY** (bath fans)	**BALANCED VENTILATION**	**HRV**	**ERV**
EXHAUSTS CONTAMINANTS FROM WHOLE HOUSE: Generally, exhaust-only ventilation, such as bath fans and oven hoods, only expel contaminants from a localized single source. The optimal solution will provide whole-house ventilation.	✗	✓	✓	✓
PROVIDES FILTERED SUPPLY AIR: Exhaust-only units bring in uncontrolled outdoor air that has seeped through cracks and openings. Uncontrolled air is not filtered air. Controlled supply air is preferable as contaminants are filtered out.	✗	✓	✓	✓
PERFORMS WELL IN ALL CLIMATES YEAR-ROUND: Hot, humid or sub-zero extreme environments add a heavy load onto home heating and cooling systems. Because RenewAire ERVs temper the air (temperature and humidity) via energy recovery, they work well in all climates. Additionally, RenewAire ERVs do NOT have issues with freezing in winter conditions, which can be problematic for HRVs: ◆ Since humidity is transferred via core material in an ERV, the core itself will not freeze so there is no need for defrost (known issue with HRVs) ◆ There are no condensate lines to freeze in an ERV (known issue with HRVs)	✗	✗	✗	✓
OPTIMIZES ENERGY AND SAVES MONEY: Energy recovery recycles energy by reusing the otherwise-wasted energy and humidity from exhaust air to temper incoming outdoor air, which saves money year after year by lowering demand/load on your mechanical AC/heating equipment.	✗	✗	✗	✓
EASY TO INSTALL: RenewAire ERVs can be mounted in multiple orientations and they do not require drain pans, which makes them a breeze to install. By comparison, HRVs require drain pans, which can complicate installation. Also, ERVs provide a single exhaust point, which means less equipment to purchase and install (no need for individual bath fans).	✗	Maybe ?	✗	✓
EASY TO MAINTAIN: Since RenewAire ERVs do not require drain pans (like HRVs), issues with frozen drain lines in cold-weather applications are avoided. Additionally, since ERVs provide a single exhaust point, this means less maintenance and cleaning. Our ERVs are effortless to maintain—simply check and replace disposable filters as needed and vacuum the ERV core face once a year.	✗	Maybe ?	✓	✓

THE BEST SOLUTION

The best solution is RenewAire's energy recovery ventilation technology, which provides **enhanced IAQ**, greater **ventilation efficiency** and major **energy cost savings**.



Whole Home Ventilation:
No ✗, Single Space Exhaust

Filtered Supply Air: No ✗

Tempered Supply Air: No ✗

Whole Home Ventilation:
Yes ✓, push/pull provides optimized ventilation effectiveness to all spaces

Filtered Supply Air: Maybe ?

Tempered Supply Air: No ✗

Whole Home Ventilation:
Yes ✓, push/pull provides optimized ventilation effectiveness to all spaces

Filtered Supply Air: Yes ✓

Tempered Supply Air: Yes ✓

ASHRAE 62.2

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) 62.2 committee has established a residential ventilation standard, known as *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*. The goal of this standard and its continuous revisions are to not only **evaluate and recommend every building's minimum ventilation needs**, but also emphasize indoor air quality and its relationship with occupant health.

See the chart below to calculate the minimum ventilation required for your home: .03 x sq. ft. + 7.5(bedroom +1). For example, a 2,200 sq. ft. home with 4 bedrooms requires a minimum of 104 CFM.

MINIMUM VENTILATION AIRFLOW REQUIRED BY HOME SIZE*

SQUARE FEET	<500'	501'–1000'	1001'–1500'	1501'–2000'	2001'–2500'	2501'–3000'	3001'–3500'	3501'–4000'
1 BEDROOM	30	45	60	75	90	105	120	135
2 BEDROOMS	38	53	68	83	98	113	128	143
3 BEDROOMS	45	60	75	90	105	120	135	150
4 BEDROOMS	53	68	83	98	113	128	143	158
5 BEDROOMS	60	75	90	105	120	135	150	165

* Infiltration credit not considered, please contact RenewAire to assist in selecting a unit that is best suited for your home.

RENEWAIRE SINGLE/MULTI-FAMILY ERV FRESH AIR SYSTEM

EV SERIES PREMIUM

- 30–280 CFM
- Residential ERV certified for commercial-grade applications
- Features: EC motors, variable speed with boost-mode, Dial-A-Flow Easy Balancing, plug-in power
- MERV 13 filter accessory

NOW AVAILABLE IN THREE SIZES!

EV SERIES

- 30–540 CFM
- Four-duct design
- Indoor (EV450 also available as outdoor)

SL SERIES

- 51–76 CFM continuous mode, 76–94 CFM boost-mode
- Four-duct design
- Indoor

GR SERIES

- 40–110 CFM
- Contractor grade—four-duct design
- Indoor

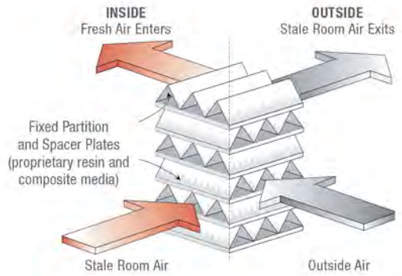
BR SERIES

- 40–140 CFM
- Two-duct design
- Indoor

OPTIMIZE ENERGY EFFICIENCY IN EVERY SPACE

OPTIMIZING ENERGY EFFICIENCY

RenewAire ERVs are a sustainable ventilation solution. **Our static-plate, cross-flow core separates the outgoing, polluted indoor airstream from the incoming fresh airstream—while simultaneously transferring total energy** (heat and water vapor) between the two. Airstreams do not mix and pollutants are not transferred across partition plates. In the winter, that means that the cold, dry outside air is preheated and humidified by the outgoing warm interior air. And in the summer, the warm, humid outside air is precooled and dehumidified by the outgoing air-conditioned interior air.



ASHRAE 90.1 ENERGY STANDARD

"Energy Standard for Buildings Except Low-Rise Residential Buildings" is a benchmark for commercial building energy codes in the U.S. and across the world. ERVs are required in several instances based on climate zone and percent of outdoor air at full design airflow rate.

RenewAire in Action: HVAC LOAD REDUCTION & HEALTHY IAQ AT GCU

- HVAC loads reduced by 40%
- Annual HVAC costs reduced by 40% every year for the life of the ERVs
- Excel in small spaces due to downsized HVAC equipment
- Work within limiting parameters of existing HVAC infrastructure

Read our case study, RenewAire ERVs Reduce University's Annual HVAC Cost by 40% Compared to Conventional Equipment: http://bit.ly/2JpAft5

RENEWAIRE CORE TECHNOLOGY

CERTIFICATION

- Commercial Units: Certified by the Air Conditioning, Heating and Refrigeration Institute (AHRI) for an industry-leading, low-to-zero Exhaust Air Transfer Ratio (EATR) at typical static pressure differential
- Residential Units: Certified by the Home Ventilating Institute (HVI) against standard CAN/CSA-C439-18 for an industry leading CFM/w and energy transfer effectiveness (except BR 70)
- Superior core flammability performance; passes UL-723 and UL-1812

MAINTENANCE

- RenewAire cores are easy to clean without removing them from the unit, and they never require washing

INNOVATIVE CONSTRUCTION

- Core exchanger material is cellulosic-based and doesn't contain or use halogenated flame retardants or PVCs
- Manufactured with a galvanized steel frame

RELIABILITY

- An industry-leading 10-year structural and performance warranty for the static-plate core, two-year warranty for commercial products and five-year warranty for residential products

EXCEPTIONAL PERFORMANCE

- Moderates heat and humidity via total energy recovery to maintain a comfortable indoor environment
- No need for frost protection or condensate pans
- Laminar airflow ensures that particulates do not accumulate in the core

REDUCED COSTS

- Optimized energy efficiency via core energy transfer decreases ventilation energy requirements, which can result in smaller air conditioning and heating needs

COMMERCIAL ERVs

The simplicity, flexibility, reliability and efficiency of the RenewAire HE and LE Series Commercial ERVs excel in every commercial application. The **packaged solutions** of the HE Series and the large capacity of the LE Series offer a **wide airflow range**, as well as static capacities. These innovative commercial ERVs can be applied in every type of building in every climate to **maximize energy efficiency, downsize HVAC equipment and reduce costs**.

HE SERIES

- Packaged solutions
- Indoor/outdoor
- 250–7,950 CFM

LE SERIES

- Large capacity
- Indoor/outdoor
- 1,500–11,000 CFM

APPLIED ERVs

The flexibility and efficiency of the RenewAire CA, PA and SA Series **Applied ERVs allow for numerous applications, airflows and configurations**. The CA Series modular cabinets house up to four energy recovery cores and can be installed individually or be stacked up to five cabinets high. The PA Series modular arrays of 6, 8, 9 or 12 energy recovery cores can be installed side-by-side for 1,500–unlimited CFM. The SA Series is designed for air-handling Original Equipment Manufacturers (OEMs) and caters to greater airflow needs. The combination of the CA, PA and SA Series provides many options to **optimize your ventilation strategy for larger applications.**

CA SERIES

- Modular cabinets
- Indoor/outdoor
- 500–4,400 CFM
- Stackable to 20,000 CFM

PA SERIES

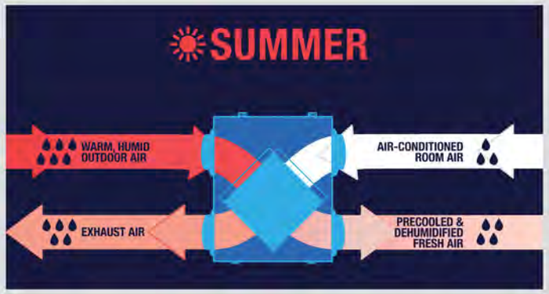
- Modular panels
- Indoor
- 1,500–unlimited CFM

NEW! SA SERIES

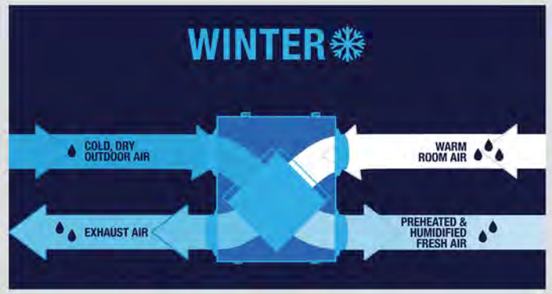
- 2,250–70,400 CFM
- Packaged core with plenum assembly
- Flexible and modular
- Large airflow capacities

RENEWAIRE ERVs TEMPER THE AIR

Our ERVs moderate the extremes of outdoor supply-air temperature and humidity year-round, providing a sustainable ventilation solution for every climate.



IN SUMMER, THE WARM, HUMID OUTSIDE AIR IS PRECOOLED AND DEHUMIDIFIED BY THE OUTGOING COOL INTERIOR AIR



IN WINTER, THE COLD, DRY OUTSIDE AIR IS PREHEATED AND HUMIDIFIED BY THE OUTGOING WARM INTERIOR AIR

DOAS SYSTEMS

Specific codes within various regions call for DOAS-type products to deliver 100% outside air to each occupied space. Additionally, many codes call for incorporating energy recovery. ASHRAE standard 90.1 and IECC require a minimum of 50% of total effectiveness for the energy recovery component. Even when not mandated, it is one of the **best ways to improve a building's energy efficiency**.

RD SERIES

- Commercial
- Indoor/outdoor
- 500–4,250 CFM

DN SERIES

- Commercial
- Indoor/outdoor
- 375–4,950 CFM

NOW AVAILABLE WITH PACKAGED REFRIGERATION!

OPTIONS & ACCESSORIES

OPTIONS

- Integrated Programmable Controls
- ECM motors
- Variable frequency drives
- Motorized isolation dampers
- Bypass economizers

ACCESSORIES

- Indirect gas-fired duct furnaces
- Electric duct heaters
- Combo curbs
- Filter alarms

RENEWAIRE ERVs ARE THE SUSTAINABLE VENTILATION SOLUTION

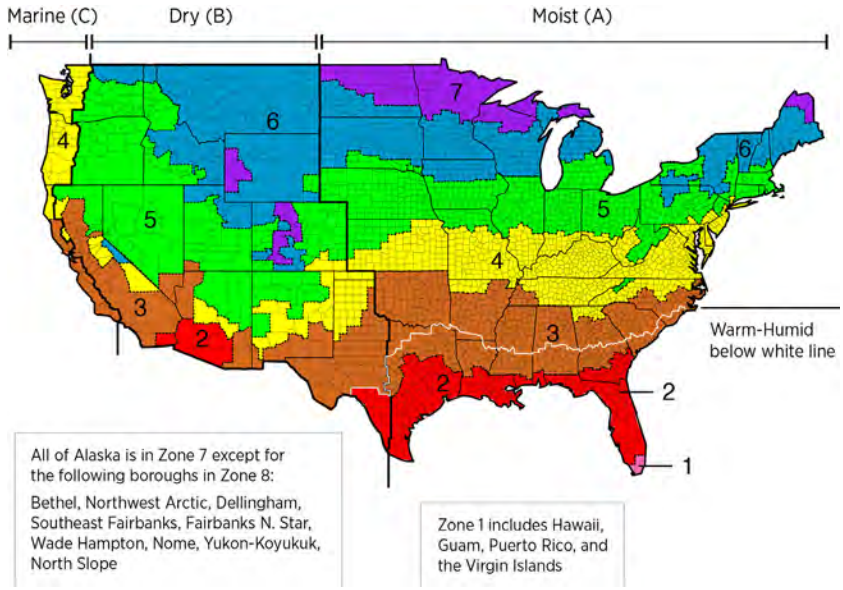
GREEN BUILDING TRENDS

High-performance, green-building standards seek to reduce energy use and increase ventilation to improve health, wellness, IAQ and indoor environmental quality (IEQ). Sustainable design initiatives like ASHRAE Standard 189.1, LEED, 2030 Challenge, Living Building Challenge and WELL Building Standard have grown in popularity among architects, engineers, contractors and building owners alike.

RenewAire ventilation technologies create healthier and more comfortable indoor environments, while optimizing energy efficiency. This is done by reusing otherwise-wasted total energy from the exhaust air to condition incoming outdoor air. The results are exceptional IAQ, IEQ, energy reductions and cost savings.

WHY **ENERGY RECOVERY IS CRITICAL**

The **main responsibility of a 100% outdoor air unit is to dehumidify** the incoming air. In this process, the system inherently handles large heating and cooling loads. Adding energy recovery significantly minimizes these loads and the HVAC equipment required to condition the air.



Map courtesy of International Code Council

ASHRAE 90.1-2010 requires the use of energy recovery based upon a unit's supply airflow, outdoor air percentage, geographic location and hours of operation. The standard mandates the total effectiveness (sensible and latent) by a minimum of 50% when required.

The effectiveness of energy recovery devices varies depending on the type, material and airflow balance. This value is determined based on the test procedure outlined in the Air Conditioning, Heating and Refrigeration Institute's (AHRI) Standard 1060.

ZONE	PERCENTAGE OF OUTDOOR AIR AT FULL DESIGN AIRFLOW RATE (CFM)					
	30% ≤ 40%	40% ≤ 50%	50% ≤ 60%	60% ≤ 70%	70% ≤ 80%	80% ≥
	Design Supply Fan Airflow Rate (CFM)					
3B, 3C, 4B, 4C, 5B	NR	NR	NR	NR	≥ 5,000	≥ 5,000
1B, 2B, 5C	NR	NR	≥ 26,000	≥ 12,000	≥ 5,000	≥ 4,000
6B	≥ 11,000	≥ 5,500	≥ 4,500	≥ 3,500	≥ 2,500	≥ 1,500
1A, 2A, 3A, 4A, 5A, 6A	≥ 5,500	≥ 4,500	≥ 3,500	≥ 2,000	≥ 1,000	≥ 0
7, 8	≥ 2,500	≥ 1,000	≥ 0	≥ 0	≥ 0	≥ 0

RENEWAIRE VENTILATION SOLUTIONS INCREASE MONETARY BENEFITS

RENEWAIRE SUPPORTS THE **PILLARS OF SUSTAINABILITY**

PEOPLE

Reduce acute and chronic health problems

Improve alertness and cognitive function

Boost productivity

PLANET

Committed to green manufacturing since 1982

Protect the environment with less energy use

Achieve a green structure with greater energy efficiency

PROFIT

Can benefit from a short payback period

Realize annual energy savings

Trouble-free operations and maintenance

For unit details and certifications, visit: **RenewAire.com/our-ervs**

Soler&Palau Ventilation Group

Member of the S&P Group Family of Brands

RenewAire® *Energy Recovery Ventilation*

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