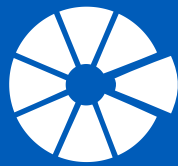


A full-page background image showing a vast mountain range under a clear sky. In the upper right, a paraglider with an orange and white striped canopy is visible. The mountains are layered, with some peaks covered in snow and others in dense green forests. The overall tone is serene and clean.

A CLEAN ENERGY SOLUTION FOR OUTDOOR AIR VENTILATION





AIRXCHANGE

THE CHALLENGE

Today's commercial building requirements challenge owners, architects, engineers, and facility managers to minimize energy use and its effect on carbon emissions, maximize comfort, create productive, safe work environments, and select reliable mechanical systems that are easily maintained. In addition to these challenges, building owners have the added responsibility of providing ventilation air for the health and well-being of building occupants.

THE SOLUTION - AIRXCHANGE ENERGY RECOVERY VENTILATION TECHNOLOGY

Shrink both the physical footprint of the HVAC system and the carbon footprint of the facility with energy recovery ventilation (ERV). The technology works quietly and diligently for years to slash energy cost and boost indoor air quality.

ERV is a proven technology that is readily available to answer today's building challenge.



OUTDOOR AIR VENTILATION

THE INTERSECTION OF HEALTH, ENERGY, AND ENVIRONMENT

Fresh air is a requirement for a healthy environment. Without a continuous supply of oxygen, emissions from building materials, people, and indoor activities become concentrated in the air we breathe. Constant exposure to indoor contaminants such as airborne viruses, radon, formaldehyde and a host of other pollutants impact occupants' health and productivity becoming major liabilities for building owners and managers. Fortunately, these liabilities can be easily avoided with proper ventilation.

Common tenant and occupant complaints related to poor indoor air quality:

- | | | | |
|------------------------|--------------|--------------------|----------------------|
| » Asthma and Allergies | » Humidity | » Fatigue | » Low morale |
| » Mold | » Stuffiness | » Low productivity | » Dry skin and mouth |

Building codes require **minimum** ventilation rates to satisfy 80% of building occupants. However, ventilation rates above these minimums have demonstrated improved occupant health and productivity. As a result, many building owners use increased ventilation rates to improve occupant satisfaction and help attract and retain tenants. Providing healthy buildings is only the first part of a critical equation. For building owners, success also relies on doing so in an energy efficient and sustainable manner.



EPA studies of human exposure to air pollutants indicate that indoor levels of pollutants may be two to five times - and occasionally more than 100 times - higher than outdoor levels. EPA and its science advisory board consistently rank indoor air pollution among the top five environmental health risks to the public.

United States Environmental Protection Agency, IAQ Tools For Schools Action Kit, July 2019

ENERGY RECOVERY VENTILATION (ERV)

UNITING HEALTH, ENERGY, AND ENVIRONMENT

Outdoor air ventilation accounts for up to 50% of a building's HVAC design load and operating cost. High-grade energy in the form of electricity or natural gas is required to comfortably condition outdoor air before it enters the indoor space. The more extreme the outdoor conditions, the greater the energy load and demand for fossil fuels. At the same time, low-grade thermal energy is continually wasted during the ventilation process as indoor air is exhausted and replaced with fresh outdoor air. (Figure 1)

EXHAUST AIR IS THE LARGEST SOURCE OF WASTED ENERGY

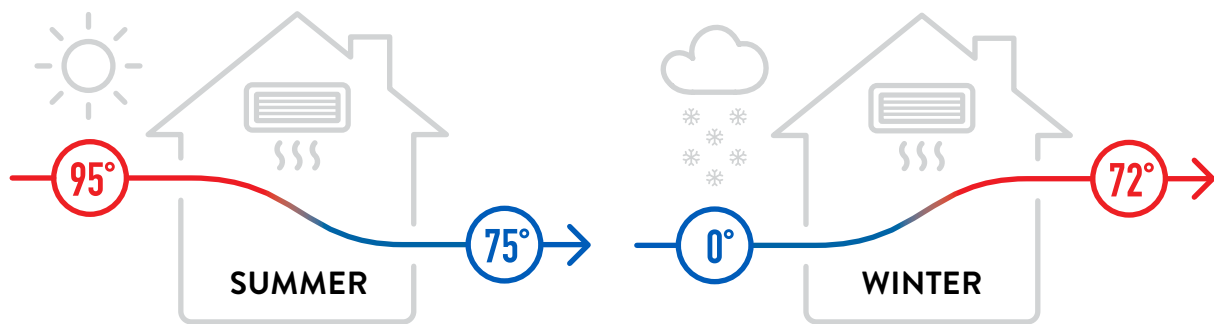


FIGURE 1: In summer and winter, significant energy is expended to cool, heat, humidify or dehumidify outdoor air. That energy is wasted as the air exits the building.



“The use of energy recovery improves indoor air quality by allowing you to bring in adequate amounts of outdoor air to dilute contaminants while reducing operating costs by transferring energy that’s already been applied to the air in the building to the outside air coming in.”

Tim Lehman, Mechanical Department Manager, Fanning and Howey



ENERGY RECOVERY VENTILATION TECHNOLOGY REPLACES DEMAND FOR ELECTRICITY AND NATURAL GAS by recycling energy from building exhaust air to pre-condition outdoor air ventilation. As a result, ERV technology reduces costly peak demand charges and greenhouse gas emissions while lowering ventilation operating cost up to 80%, regardless of your desired outdoor air ventilation rate. (Figure 2)

The notion of recycling energy from the indoor air to reduce energy needed to condition outdoor air is simple. Creating a highly effective, low maintenance solution is far more challenging.

REDUCE OUTDOOR AIR ENERGY COSTS UP TO 80%

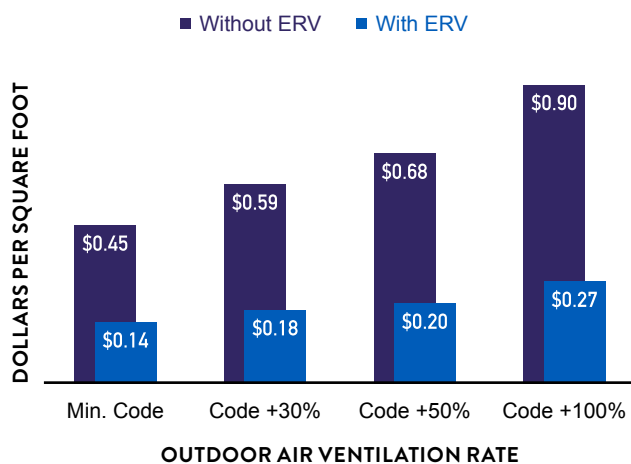


FIGURE 2: Increase ventilation rates for health and reduce energy costs with ERV. Double the ventilation and reduce costs by up to 40%.*

*Building type: 100,000 Square Foot Retail Store, Boston, MA

Energy costs, gas: \$1/therm, electric \$0.13/kwh

70% ERV Effectiveness

16/7 operation, 24,000 cfm outdoor air ventilation

AIRXCHANGE ENERGY RECOVERY WHEELS

AN INNOVATIVE, LOW-MAINTENANCE, AND HIGHLY EFFECTIVE SOLUTION

ERV systems rely on Airxchange energy recovery wheels to transfer energy between two counter-flowing and divided airstreams. As the wheel rotates, energy is recycled from the exhaust airstream and introduced to the fresh airstream providing a low cost, clean energy solution for conditioning outdoor ventilation air. (Figure 3)

In summer, Airxchange wheels recycle energy to cool and dehumidify outdoor air, reducing demand for electricity. In winter, recycled energy heats and humidifies the outdoor air providing a low cost, environmentally friendly energy alternative to fossil fuels.

A unique sustainable wheel design enables segmented energy transfer media to be easily removed for effective cleaning or replacement, ensuring optimal performance for the life of the HVAC system. Airxchange wheels are AHRI certified, giving customers the assurance of third-party performance validation.



“For roughly the same price as a larger, more energy intensive rooftop unit, we can provide the same amount of work with a smaller, wheel based unit that performs with up to 40% greater efficiency. This translates to significant energy savings over the life of the equipment.”

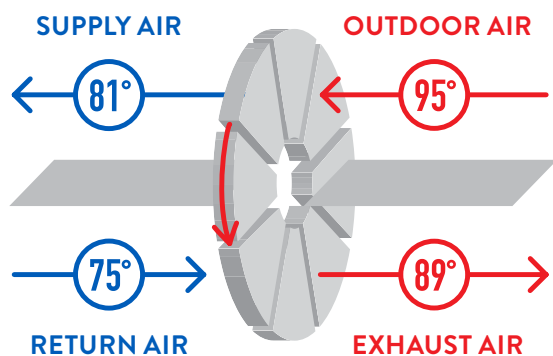
Craig Campbell, Trumbull and Campbell Associates (equipment rep)



RECYCLED ENERGY IN THE SUMMER AND WINTER



SUMMER CONDITIONS



WINTER CONDITIONS

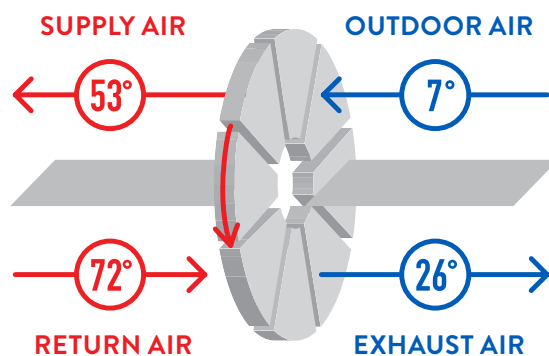


FIGURE 3: In summer, as cool air exits the building and warm outside air enters to improve indoor air quality, the Airxchange wheel uses the indoor air's stored energy to pre-condition the outdoor air. This dramatically reduces workload on the air-conditioning system.

In winter, as cold outdoor air flows in to improve indoor air quality, the Airxchange wheel pre-conditions it using energy from the exiting warm air. The HVAC system benefits from dramatically reduced workload.

AIRXCHANGE ENERGY RECOVERY PLATE EXCHANGERS

ENERGY RECOVERY PLATES (ERP)

AVAILABLE TO BOTH THE COMMERCIAL AND RESIDENTIAL MARKETS



SELECT FROM MULTIPLE PLATE SIZES TO MAXIMIZE PERFORMANCE

Airxchange's Energy Recovery Plates (ERP) are customizable, low maintenance, and provide air-to-air energy recovery at the highest level - making it the perfect solution for small and medium air volumes in residential, institutional, industrial or commercial applications.

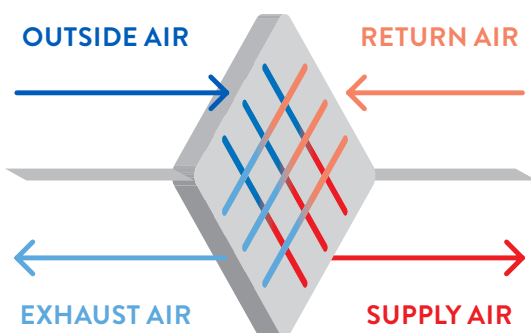
Airxchange Energy Recovery Plate exchangers are manufactured using raw materials designed for optimal heat and moisture exchange within a total energy recovery ventilation device.

Airxchange offers two different types of plate heat exchanger: Counterflow (sensible and latent) and cross-flow (enthalpy) designs.

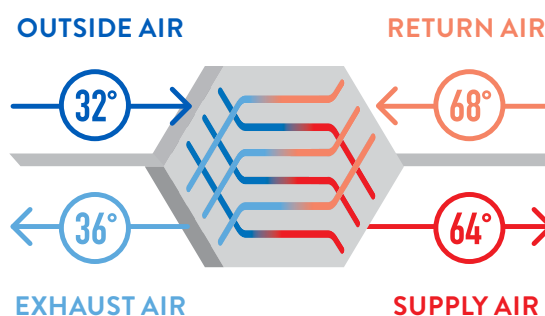




CROSS-FLOW ENERGY RECOVERY PLATES



COUNTERFLOW ENERGY RECOVERY PLATES



FEATURES & BENEFITS

- » High structured plate strength – up to 5" differential
- » High efficiency enthalpy exchange
- » No deformation under humid conditions
- » Excellent gas barrier properties
- » Antibacterial coating
- » Multiple sizes up to 4,000 CFM
- » UV resistant
- » UL 723 compliant

TECHNOLOGY PARTNER



ADVANCING THE HVAC OF TOMORROW

HVAC EQUIPMENT MANUFACTURERS OFFER AIRXCHANGE ENERGY RECOVERY WHEELS TO PROVIDE THREE DISTINCT SYSTEM DESIGN IMPROVEMENTS

1 INCREASED SYSTEM EFFICIENCY

Airxchange ERV Components improve HVAC system efficiencies up to 50% by contributing recycled “free” energy to reduce system requirements for electricity or natural gas. The resulting improvement in system efficiency translates to reductions in fossil fuels, greenhouse gas emissions, and annual operating costs for the life of the system.

To estimate the impact of Airxchange components on your HVAC system, visit airxchange.com to use the free AIRX Estimators. These tools enable a customized evaluation of energy savings, greenhouse gas reductions, return on investment, and simple payback.

2 IMPROVED HUMIDITY CONTROL

Research shows that energy recovery wheels significantly improve an HVAC system’s ability to control humidity. This provides a healthier indoor environment while protecting the building from the negative effects of excess humidity. An Airxchange wheel, in conjunction with standard heating and cooling equipment, maintains indoor humidity levels even in challenging hot and humid climates. Compared with other humidity control technologies, this approach provides the most cost-effective, energy efficient option. The study can be found at airxchange.com/learning-center/white-papers/

3 REDUCED HVAC EQUIPMENT LOAD

Airxchange ERV Components recycle energy from building exhaust air, minimizing outdoor air loads while reducing heating and cooling equipment size. (Figure 4) For building owners, this translates into reduced mechanical equipment costs and significant long-term energy savings.

In addition, further savings can be achieved in new construction by sizing ductwork and electrical to the downsized HVAC equipment. In most cases, the added investment in ERV is entirely offset by the initial cost savings on the HVAC system.

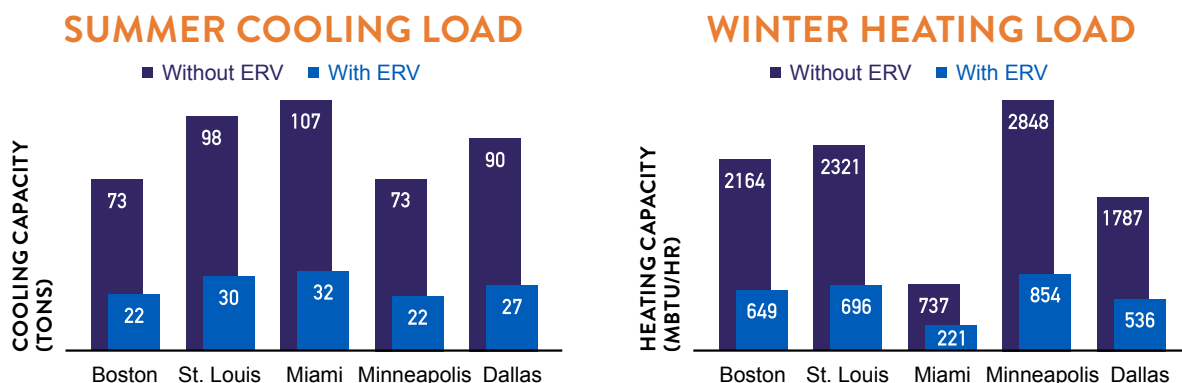


FIGURE 4: Energy recovery components reduce outdoor air heating and cooling loads up to 80%.*

*Building type: 100,000 Square Foot Retail Store 70% ERV Effectiveness
24,000 cfm outdoor air ventilation



ERV APPLICATIONS

A RECREATION CENTER IN NEW YORK

- » Mechanical cooling load reduction with ERV wheel - 92 tons
- » Mechanical heating load reduction with ERV wheel - 179 tons
- » Demand reduction (KW) - 110
- » Estimated annual operating savings of \$63,150

A CORRECTIONAL FACILITY IN VIRGINIA

- » \$12K estimated annual savings
- » 30+ tons of cooling capacity saved
- » 1 year return on energy recovery investment
- » 638 MBH of heating capacity saved

A CASINO IN PENNSYLVANIA

- » 24/7 operation - 550,000 CFM
- » Over \$800,000 in energy savings
- » Serviceable energy transfer media avoids future wheel replacements

A NURSING HOME IN NEW YORK

- » 40% reduction of summer operation load (6.1 tons)
- » 40% reduction of winter operation load (11.75 tons)
- » Energy efficiency ratio (EER) of HVAC unit: 11.2
- » Estimated first-cost savings from unit downsizing - \$20,208
- » Annual savings of \$23,168

A SCHOOL IN MASSACHUSETTS

- » \$60K approximate annual savings
- » 4,727 MBH of heating capacity saved
- » 115 tons of cooling capacity saved
- » Estimated 265 ton reduction in annual CO2 emissions
- » Less than one year return on investment

A UNIVERSITY IN SOUTH KOREA

- » \$52K approximate annual savings
- » 21,484 CFM of outdoor air
- » 143 tons of cooling capacity saved
- » Estimated 80 ton reduction in annual CO2 emissions

A STADIUM IN NORTH CAROLINA

- » Four story 117,000 SF structure 100% outside air rooftop units with energy recovery
- » 35-40% of unit capacity provided by wheel
- » Energy recovery wheel nearly doubled rooftop EER

A LUXURY CONDOMINIUM IN FLORIDA

- » Twin Tower Luxury Condominium installs four 12.5 ton rooftop units
- » 343,632 MBTU total recovered cooling energy
- » 280,184 MBTU total recovered heating energy
- » Estimated annual energy savings - \$11,296
- » Awarded a commercial rebate from utility provider as a result of energy savings



CONTACT US

To learn more about Airxchange Technology and our OEM partners, please visit airxchange.com.



Airxchange's 35 years of extensive experience in manufacturing energy recovery ventilation products and components has culminated in designs having outstanding performance, reliability, and maintainability. Airxchange energy recovery technology provides a stable, robust product developed from the experience of more than 285,000 installations.

The company has played a pioneering role in the development of standards and codes for energy recovery ventilation technology (ERV) and remains active in their ongoing development.

Airxchange's technology is now widely available in many sizes and configurations for new or retrofit applications through most HVAC equipment manufacturers.

INDUSTRIES SERVED

All comfort HVAC markets such as institutional, hospitality, commercial office, retail, medical, government, light industrial, entertainment, fitness, restaurant, and more.



85 Longwater Drive, Rockland, MA 02370

781.871.4816 • contact_us@airxchange.com • airxchange.com

