AIRXCHANGE®

partnering with industry for
sustainable **energy recycling technology**

Case Study: Applebee's Restaurants

Key Statistics

Location:	Applebee's restaurants throughout the United States
Project Completed:	1998
Project Scope:	Retrofit
Cooling System:	Direct Expansion Rooftop Units
Ventilation System:	Rooftop Units with integrated Energy Recovery Wheels

Airxchange Helps Keep Applebee's "Fresh"… And Profitable

Background

Applebee's® International, Inc., headquartered in Overland Park, Kansas, has over 1900 restaurants in 49 states and 16 international countries. With 2006 revenues in excess of $1.3 billion, Applebee's Neighborhood Grill & Bar is the largest casual dining concept in America.

A typical Applebee's restaurant requires two rooftop HVAC units to provide a comfortable, healthy indoor environment for their patrons. In 1998, the restaurant chain incorporated Airxchange energy recovery wheels into their rooftop design to create a more energy efficient HVAC system. The Result: lower operating costs and improved profit margins.

Energy Recovery for Energy Efficiency

The new HVAC system draws outdoor air through one half of the Airxchange wheel before delivering it to the heating and cooling coils. The system also pulls exhaust air from the dining room and bar area through the other half of the wheel. By rotating between the two airstreams, the Airxchange wheel recycles heating and cooling energy otherwise wasted to the outdoors.

Reclaimed energy is used to heat and humidify outdoor air in winter and cool and dry outdoor air in summer at an efficiency typically six times that of a system without energy recovery. The chart below outlines the energy savings expected in various locations.

Impact of Energy Recovery Wheels

Outdoor Air:	3,100 CFM (typical per restaurant)
Cooling Capacity Saved:	Approx. 5-9 Tons
Peak Load Reduction:	Approx. 7 kW
Annual Energy Savings:	Approx. $2,300-$4,500

Estimated Energy Impact on Typical Applebee's Restaurant

City	Cooling System Capacity Saved (Tons)	Annual Cooling Energy Saved (kWh)	Heating System Capacity Saved (MBH)	Annual Heating Energy Saved	Annual Operating Savings
Boston	**5.6**	**1,425**	**164**	**232,285**	**$3255**
Memphis	**8.9**	**12,309**	**141**	**127,003**	**$2633**
Miami	**8.2**	**27,078**	**56**	**7,43**	**$2355**
Minneapolis	**5.6**	**2,935**	**216**	**342,770**	**$4564**
Kansas City	**6.8**	**8,013**	**183**	**233,149**	**$3615**

Estimates based on 16x7 operation, $.08/kWh, $.95/therm, 16x7 operation

www.airxchange.com | 85 Longwater Drive | Rockland, MA 02370 | Tel. 781-871-4816 | Fax 781-871-3029

Incorporation of the Airxchange wheels also helped Applebee's avoid costly peak electric demand charges by reducing the size of the air conditioning system. Typically, the new system design offloads the conventional AC equipment requirement by approximately 6 tons, lowers the connected load by 7 KW, and saves between $2000 and $5000 per year in operating expense.

Realizing The Benefits

While these estimated savings and capacity reduction during the design phase are compelling, it is also important to ensure these savings over the life of the system.

To realize these savings, the energy transfer media in the wheel must maintain its ability to transfer heat and moisture. In an application like a restaurant, with smoke, grease, and other aerosols in the air, it is especially important to schedule regular maintenance in order to realize the savings.

Applebee's utilizes a unique Airxchange feature—easily removable and cleanable energy transfer segments to maintain like-new performance.

Innovative Cleaning Method

These segments make it possible for Applebee's to thoroughly clean the energy transfer media. Other energy recovery wheels can only be cleaned by spray rinsing the material in place. Not only is this method cumbersome, Airxchange determined that it is not effective and does little to restore energy transfer performance.

Bill Tierney, Airxchange Service Manager, demonstrates the easy segment removal on an HVAC system similar to those used by Applebee's.

However, soaking the media overnight, which is only possible with a segmented wheel, proves to be far more effective. Airxchange tests indicate that an overnight soaking restores performance to 90-95% of new. Airxchange's tech note "Recommendations for Maintaining Airxchange Energy Recovery Wheels in Applebee's Restaurant's" provides more detail on this topic.

In order to expedite the cleaning process, Applebee's decided to experiment with a faster alternate method: putting the segments through the dishwasher.

Airxchange energy transfer media ready for dishwasher cleaning.

By placing the segments in the dishwasher, Applebee's was able to reduce the cleaning time to just a few minutes. Airxchange testing determined that this method is extremely effective and was found to restore performance to nearly 100%. Additionally, the rugged segments withstood the dishwashing process with no structural deterioration.

Reliable Performance

Applebee's stores are now operating with thoroughly cleaned segments giving the restaurant chain ongoing energy savings. With this innovative maintenance method, these savings will continue to benefit the company for the life of the HVAC system.

"We installed the rooftop HVAC systems years ago and the Airxchange wheels have performed flawlessly."

Fred Barden

Director of Architecture at Applebee's

About Airxchange

Established in 1982 Airxchange has extensive experience in the design, manufacture, sale, and support of energy recovery ventilation components to manufacturers of Heating, Ventilating and Air Conditioning (HVAC) equipment. The company played a pioneering role in the formation of industry standards and third party performance certification programs, which validate their transformative technology. Airxchange technology is now widely available through leading HVAC manufacturers.

For more information about Airxchange, please visit www.airxchange.com.