

CASE STUDY



Background

As one of the nation's largest retailers with more than 1,700 stores and revenues exceeding \$65 billion annually, the Target Corporation takes pride in providing an exceptional shopping experience. In 2009 the retail chain decided to add refrigerator cases to expand the grocery section of their existing stores. Based on engineering, Target understood that retrofitting existing stores would result in higher humidity levels. This knowledge made it necessary to implement a system that would properly control the higher humidity, which would eliminate fog build-up on the door of the cases. An added benefit would be to find a more efficient, cost effective way to provide the ideal shopping climate.

AN OPEN AND SHUT CASE AGAINST HUMIDITY

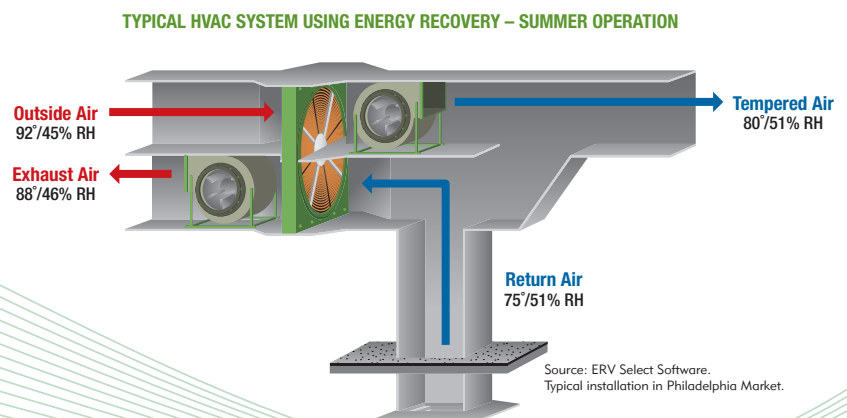
Target carefully engineered and designed the retrofit grocery additions, taking into consideration the resulting higher levels of humidity and the need to suppress it within the store. Target realized the original HVAC equipment would need to be enhanced in order to meet ASHRAE fresh air standards, as well as their own indoor air quality standards.

Historically Target would run all rooftop units (RTU) 24 hours a day, 7 days a week. If there was no demand for heating or cooling, the units would run in fan-mode only. However, the new retrofit store design, with the increased number of refrigeration cases, created a situation where the existing equipment was not sufficient to suppress the humidity. So, it was necessary to modify the HVAC system in order to have better control of the humidity level within the store and help eliminate fogging on the cold cases as guests open and shut the doors.

ENERGY RECOVERY OPTION

While Target considered a couple of design options, they ultimately decided to implement a design that features Ruskin Rooftop Systems' manufactured Energy Recovery Ventilators (ERVs). One of the great advantages to systems using ERVs is their efficiency. ERV's recycle about 70% of the energy from the exhaust air to heat, cool, dehumidify or humidify the incoming fresh air, which removes that portion of the load from the rooftop units and provides tremendous energy savings.

The design team decided to equip two 20-ton units on the sales floor with Ruskin Rooftop Systems' ERVs and deliver all of the fresh air required with those two units – 5,000 cfm of total fresh air. In order to test this solution prior to a larger scale rollout, Target installed the ERVs on a newly renovated store in the Philadelphia area.



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A WIN-WIN SOLUTION — HUMIDITY CONTROL AND ENERGY SAVINGS

In Philadelphia, the Ruskin Rooftop Systems' ERV helps Target effectively control the humidity and maintain their high standards for indoor air quality in the stores. Now, instead of running all the rooftop units 24/7, they run only two. The other units cycle completely off when there is no cooling or heating demand. In addition to humidity control – which helps create a better shopping experience for guests – Target realizes significant energy savings from pre-conditioning the fresh air and also by allowing the remaining rooftop units to cycle off when there is no demand.

The pilot program in Philadelphia is proving that ERVs can deliver significant energy savings:

ESTIMATED ENERGY SAVINGS

| | ANNUALLY |
|--|------------|
| Energy savings delivered directly from the ERVs pre-conditioning the fresh air | \$8,700 * |
| Energy Savings from allowing remaining rooftop units to cycle off during unoccupied time | \$6,900 ** |

* Savings amount using Ruskin Rooftop Systems' ERV selection software, which takes into account design conditions, climate and utility rates

** Assuming 6 RTUs consuming 3.5 brake horsepower each cycled off for 12 hours a day, using a utility rate of \$.10 per Kw/hour



Crew lifts the Rooftop Systems' ERV into place during the initial installation at the Target Store in Philadelphia.

THE RIGHT CHOICE

Based on the success of the initial installation in Philadelphia, Target did a larger rollout in the metro area. This led to an 18-store test in various markets to ensure the solution would work in different climates. Those tests proved to be successful as well. Today this solution remains the primary option for Target to deliver fresh air to their stores while properly controlling humidity.

