



EXECUTIVE OFFICE OF
ENERGY AND
ENVIRONMENTAL AFFAIRS

Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Office of Technical Assistance and Technology

February 2008

Delaware Valley Corporation Energy Efficiency Case Study Heat Recovery

Summary

In 2006, Delaware Valley Corporation installed an air-to-air heat exchanger at their Tewksbury facility to recover heat for both process and space heating from two of their natural gas-fired textile heat-setting ovens. It cost \$27,000 to purchase and install the new system. The company expected about a one-year payback from savings in gas related expenses. However, OTA worked with the company and identified utility incentives available from their gas provider, which reduced the payback period to eight months. In addition to cutting energy costs, the heat exchanger installation has resulted in more comfortable working conditions for their employees, because the workplace is now maintained at a constant, uniform temperature. Delaware Valley has been so pleased with their heat recovery system that they have gone on to install a second heat exchanger on the third oven, and are investigating the installation of yet another at their Lawrence facility, to capture waste heat from all their ovens. Finally, savings from the heat recovery system will be reinvested to implement future energy related projects.



Roll of Black Industrial Mat Coming Out of a Delaware Valley Oven

Background

Delaware Valley Corporation is a family-owned specialty non-woven textile manufacturer and has been headquartered in Lawrence, MA, since its establishment in 1961. They have a second production facility in Tewksbury, MA, and employ a total of 44 people at these two facilities. Their products are mainly used in the automotive industry, although Delaware Valley also supplies products to the medical, roofing, flooring & matting, marine, and recreational vehicle industries.

Energy Efficiency

In 2003, Delaware Valley president D. Paul DiMaggio Jr. realized that the Tewksbury facility's winter process and space heating costs were almost double the summer process heating costs. Since there seemed to be a good match between the winter space heating needs and the supply of waste heat from their ovens, he thought that capturing this 230°- 240°F waste heat in winter and using it to heat the Tewksbury factory would be a good opportunity to reduce energy costs. DiMaggio considered the idea of building an air-to-air heat exchanger in-house, but after experiencing "sky high energy costs," during the winter of 2005-06 (following Hurricane Katrina), he made the decision to hire Pre-Heat, Inc. to build a heat exchanger for the company.

During the company's Christmas shutdown in 2006, Delaware Valley installed a flat plate air-to-air heat exchanger fabricated by Pre-Heat to recover exhaust heat from two of their textile heat-setting ovens. The installation took three Delaware Valley employees five days to complete plus another month of working, as time allowed, to finish the system connection. Hiring an outside company to build the heat exchanger ended up being a good decision. In retrospect, DiMaggio says they not only saved money on the heat exchanger, but also Pre-Heat, Inc. incorporated a summer use for the captured heat into the design of the heat exchanger, which further improved their payback. The system features a control that allows the recovered heat to be redirected from factory heating in the winter to pre-heating fabric entering the oven during the summer, which allows them to take advantage of the heat exchanger all year long.



Delaware Valley's First Heat Exchanger

Delaware Valley's waste heat recovery system is part of an overall effort to become a zero-waste company. The company currently recovers some of their waste fiber and is working to expand this fiber recovery to include not only all of their own waste but also the post-industrial waste from their customers.

“In the end, we are all thrilled with the investment in this technology, as it is saving us money in utility bills every month – for life – and it keeps the factory a more uniform temperature in the winter.”
– D. Paul DiMaggio, Jr.,
President



Delaware Valley's Second Heat Exchanger

Results

In total, the Delaware Valley heat exchange system cost \$27,000 including equipment, delivery, and labor. After adjusting for increased sales, decreased gas prices, difference in winter temperature, and decreased heat exchanger efficiency in the summer, they calculated a payback of 61 weeks. By working with OTA, financial incentives from Keyspan, their natural gas provider, were identified that reduced this payback to only 35 weeks.

Delaware Valley still needs to use their original space heaters in the winter, but to a lesser extent, and employees report being more comfortable in the factory even during colder temperatures as compared to years prior to installing the heat recovery system. The system will reduce NOx emissions from fuel combustion by about 180 lbs/yr. Savings from the heat recovery system will be reinvested to implement energy efficiency projects, including upgrading lighting and electric drives at both of their facilities, and installing solar photovoltaic panels. Overall, Delaware Valley has had such a positive experience with their air-to-air heat exchanger that they subsequently installed one on a third oven at their Tewksbury location and are investigating one for their facility in Lawrence.



One of Delaware Valley's Textile Heat Setting Ovens

Successful heat recovery projects such as this are likely to be broadly applicable to companies with operations producing waste heat.



Plastic Bags are an Inexpensive Alternative to Metal Ductwork



Textile Entering a Heat Setting Oven



One of Delaware Valley's Automotive Interior Products

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