

Delaware Valley Corporation

Energy Efficiency & Renewable Energy Case Study

Heat Recovery, Lighting & Solar Electric Projects

Summary

The Delaware Valley Corporation has implemented several energy efficiency projects and a renewable energy project over the last six years that have not only improved their operations but also saved the company approximately \$38,000 in gas and electric costs in 2011. These projects include the installation of three air-to-air heat exchangers, an upgrade of lighting and controls, and an investment in a solar photovoltaic (PV) system at their Tewksbury location. The total capital cost of these projects was \$778,700.



One of Delaware Valley's Textile Heat Setting Ovens

Following the installation of the first two heat exchangers, OTA visited the facility and identified available rebates from the company's gas and electric utility providers and funding opportunities for the solar PV system. Energy efficiency rebates from their local utility companies, coupled with state and federal renewable energy incentives, reduced the project costs to \$207,000, a savings of about \$571,000. The air-to-air heat exchangers saved the company almost \$14,000 in gas costs in 2011. The energy efficient lighting saves the company about 89,700 kWh per year, or about \$11,000 in annual electricity costs. The solar PV system generated more than 104,000 kWh in electricity in 2011, which saved Delaware Valley an additional \$12,800 in electricity costs for that year. This system also generates Solar Renewable Energy Credits (SRECs) which produce between \$3,000 and \$5,000 per year in revenue.

In addition to these projects, the company has also enrolled in a demand response reduction program with a demand response provider in which they shut down most of their production during periods of high power demand on the electric grid (typically during the hottest summer days - production is made up during cooler night time periods.), which currently generates \$2,200 in revenue annually.

Background

Delaware Valley Corporation is a family-owned specialty non-woven textile manufacturer and has been headquartered in Lawrence since its establishment in 1961. They have a second production facility in Tewksbury, and employ a total of 46 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.



One of Delaware Valley's Automotive Interior Products

Energy Efficiency

History

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.

Air-to-Air Heat Exchangers

To date, the Tewksbury facility has installed three air-to-air heat exchangers from their four natural gas-fired textile heat-setting ovens to recover heat for both process use and space heating needs. DiMaggio had previously 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 decided to build, with design help from a contractor, a heat exchanger for the company. The first flat plate air-to-air heat exchanger to recover exhaust heat from two of the heat-setting ovens was installed during the company's Christmas shutdown in December 2006/January 2007. The contractor designed the system for year-round use by including 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. The cost of this heat exchanger was \$27,000. A second heat exchanger was installed in the fall of 2007 to recover exhaust heat from a third oven at the same cost.



Delaware Valley's First Heat Exchanger



Delaware Valley's Second Heat Exchanger

At this time, OTA had visited the facility and identified natural gas incentives available from National Grid (NGRID), Delaware Valley's gas provider. NGRID offered \$20,268 for both heat exchangers [\$11,513 for the first exchanger and \$8,755 for the second exchanger], which was based on the \$54,000 total cost. The rebates from NGRID also lowered the payback period from 61 weeks to 35 weeks. Besides cutting energy costs, the heat exchanger installations also resulted in more comfortable working conditions for employees, because the workplace is now maintained at a constant, uniform temperature. In 2010, Delaware Valley installed a third heat exchanger to recover waste heat from a fourth oven at their Tewksbury facility. The initial cost for this heat exchanger was \$30,400. A rebate from NGRID reduced this to \$15,200.

"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

With the three heat exchangers installed, Delaware Valley has reduced natural gas use by approximately 2 CCF (hundred ft³) per production hour from 2006 to 2011. Based on 7,231 production hours in 2011, this corresponds to a savings of about 14,500 CCF in gas use in 2011, or about \$13,700 at current gas rates.



Textile Entering a Heat Setting Oven

Additional Resource Conservation

Delaware Valley's energy efficiency and renewable energy projects are part of an overall effort to become a zero-waste company. The company installed waste fiber reclamation machines that reprocesses up to 80 percent 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.

Energy Efficient Lighting

The savings from the first heat exchanger allowed Delaware Valley to upgrade to more energy efficient lighting at their Tewksbury facility in 2007. The company installed 130 high efficiency T5 and T8 fluorescent fixtures and 58 new lighting controls. The initial cost of the project was \$45,270. National Grid funded 40 percent of the project cost through their electric energy efficiency incentive program, reducing Delaware Valley's cost to \$27,160. This project resulted in electricity savings of about 89,700 kWh per year, producing an annual cost savings of about \$11,000.

Solar Photovoltaic (PV) System

Delaware Valley wanted to install a solar photovoltaic (PV) system as a socially responsible investment. When they first looked into the installation, the payback period was too long. OTA provided the company with information on available government funding opportunities that shortened the payback period to slightly less than 4 years. These funding programs made the installation of a solar PV system worth the investment. The company invested in a 103 kW PV system in September 2009 and began generating electricity in July 2010. The cost of this project was \$649,000, which was reduced to \$130,000 as a result of several rebate and incentive programs which covered 80 percent of the total costs. Delaware Valley obtained a rebate of \$324,500 from the Massachusetts Commonwealth Solar program [this incentive program has been replaced by the Massachusetts Department of Energy Resources'



Solar Array on the roof of Delaware Valley's Tewksbury facility

Solar Carve-Out program, where generators obtain Solar Renewable Energy Credits (SRECs)]. They also obtained the federal business energy investment tax credit in the form of a \$194,000 grant from the U.S. Treasury Department (it is no longer possible to receive this tax credit as a grant).

In the first full year of operation (2011), the solar array generated 104,579 kWh of electricity, saving the company about \$12,800 in electricity purchases. In addition, the sale of SRECs has generated an additional \$3,000 to \$5,000 per year depending on the value of RECs at the time. The estimated payback period for the system was 3-4 years and the company expects it to be achieved.

Demand Response Reduction

In 2008, Delaware Valley entered into an agreement with a demand response provider to shut down most of their production during periods of high power demand on the electric grid (mostly on the hottest summer days), which would free up 200 of the company's 300 kW electricity requirements to the grid. The company typically shuts down production on these days and switches production to cooler nights to make up for lost time. This program generated \$4,700 in revenue for the company in the initial year, with almost no loss in production time. After the installation of the solar array, the daily generation of photovoltaic electricity has lowered the baseline electricity need from NGRID, reducing the amount of load (kW) the company can drop during a demand response event. As a result, the annual payments from the Demand Response Program have dropped to about \$2,200 per year.

Future Plans

The company is currently investigating installing a back up diesel generator for protection of its continuous operation during power outage shutdowns (that they expect to occur more frequently). The investment decision is taking into account the ability during demand response events to be able to operate the generator to supply most, if not all, of the company's electrical needs during an event, thereby increasing the amount of electric load the company can drop during an event. It is anticipated that this would increase the annual demand response payments, resulting in reducing the payback period of a generator.



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

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