Crane & Co., Inc.

Renewable Energy Case Study

Case Info Line

Summary

With the implementation of 2 energy efficiency projects, Crane & Company utilized new technology and implemented process changes to conserve energy and save money. The company explored several options and installed a turbine generator and combined heat & power (CHP)/back-pressure steam turbine, which saved the company nearly $275,000 annually in reduced energy costs. The new equipment also had an added benefit of reducing carbon dioxide emissions by more than 2 million pounds per year, sulfur dioxide emissions by 11,000 pounds per year and nitrous oxide (NOx) emissions by 7,000 pounds per year.

Background

Founded in 1801, Crane & Company, Inc. (Crane) is located in Dalton, Massachusetts and is the oldest, continuously run paper manufacturer in North America. Crane is a specialty mill that produces paper requiring highly technical specifications, mostly from cotton and other natural and synthetic fibers. Company products include 100% cotton social stationery, commercial printing papers, reprographic papers, synthetic fiber non-wovens, and currency and security papers. Crane has been making currency paper for the United States government since 1879.

Renewable Energy

In 2003, Crane & Co. put together a team to review their processes to find ways to implement renewable energy options into their manufacturing operations. The company's mission "…to ensure and influence the effective management and use of energy, materials, natural resources, and by-products of our business in an environmentally responsible, cost –effective manner." Crane had already adopted several energy efficient practices such as installing energy efficient lighting and variable frequency drives (VFDs) and had upgraded their compressors.

Crane explored several options such as solar arrays and wind turbines but the projects were not feasible for the company. However, there were two projects that the company could integrate into their operations. The first was a hydroelectric power generation project.. The Byron Weston Dam No. 2 had previously been a hydroelectric power turbine plant and the company owned all the property within the project boundary. The company was able to apply for and receive an exemption from licensing from the Federal Energy Regulatory Commission (FERC). The Kaplan turbine generator set will be capable of generating 250 kW that will be used on site. There were available funding for these projects from the Massachusetts Clean Energy Center, US Treasury grants from the 1603 program, and grants from the utilities.

The second was a Combined Heat & Power (CHP)/Back-Pressure Steam Turbine at their Pioneer Mill. The steam turbine reduced approximately 220 pounds per square inch gauge (psig) thermal energy (steam) at 460 F generated from the combustion of regional refuse at Covanta energy to 100 psig for use at the Wahconah Mill for paper making and building heating. The process generates electricity that is used on site. This pressure reduction was done with a pressure reducing valve that previously wasted energy to the atmosphere.

For both projects, Crane assembled a team that consisted of purchasing, engineering, environmental, and management staff. Both projects took several years to study and implement; the deciding factors to do so, included the available funding and the efficiencies created by the systems. The projects did not require any changes to their operating processes and had no effect on product quality.

Table 1: Project Cost & Savings				
System	**Cost**	**Funding**	**Savings**	**Payback**
CHP	$418,000	$168,000	$135,000	1-2 Years
Hydro	$2,700,000	$911,000	$138,000	6 Years
Total	$3,118,000	$1,079,000	$273,000	

Results

The Combined Heat & Power (CHP)/Back-Pressure Steam Turbine and Hydroelectric Power Generation Project has enabled the company to achieve significant reductions in energy use and costs with an added benefit of lower emissions of carbon dioxide (CO_2), sulfur dioxide (SO_2), and NOx. Table 1 shows to project costs, outside funding, estimated savings and payback period for each project. Taking into consideration state, federal, and utility grants the company received, the total cost to the company was $2 million, with a savings of $273,000 per year in reduced energy costs about a 7.5 year payback period. Table 2 shows the avoided emissions from both projects. Annually, the company reduced emissions of more than 2 million pounds of carbon dioxide, 11,000 pounds of sulfur dioxide and 7,000 pounds of nitrous oxide emissions.

Table 2: Avoided Emissions			
System	**CO_2**	**SO_2**	**NOx**
CHP	773,860	4,076	2,495
Hydro	1,425,379	7,508	4,595
Total	**2,199,239**	**11,584**	**7,090**

This case study is one in a series prepared by the Office of Technical Assistance and Technology (OTA), a branch of the Massachusetts Executive Office of Energy and Environmental Affairs. The Office of Technical Assistance and Technology (OTA), the Commonwealth's center for technical information and assistance, helps businesses and other organizations improve their environmental performance and conserve energy, water and other resources. This information is available in alternate formats upon request. OTA's **non-regulatory** services are available at **no charge** to Massachusetts businesses and institutions. For additional information about this or other case studies, or about OTA's technical assistance services, contact:

Office of Technical Assistance and Technology, 100 Cambridge Street, Suite 900, Boston, MA 02114
Phone: (617) 626-1060 Fax: (617) 626-1095 Website: http://www.mass.gov/eea/ota