

Crane & Company, Inc.

Renewable Energy Case Study

Energy Efficient Equipment Saves Crane \$273,000 Annually

Summary

Crane & Company, Inc. (Crane) has incorporated new technology and process changes to conserve energy and save money with the implementation of renewable energy and energy efficiency projects. After exploring several options, the company installed a hydroelectric power generator and a combined heat and power back-pressure steam turbine generator. Together, the projects save the company nearly \$273,000 annually in reduced energy costs. The new installations have the added benefit of significantly reducing carbon dioxide, sulfur dioxide and nitrous oxide emissions.

Background

Founded in 1801, Crane is located in Dalton, Massachusetts and is the oldest continuously run paper manufacturer in North America. Crane is a specialty company that produces paper requiring highly technical specifications, mostly from cotton and other natural and synthetic fibers. Crane products include 100 percent cotton social stationery, commercial printing papers, reprographic papers, synthetic non-woven fiber products, currency papers and security papers. Crane has been making currency paper for the U.S. government since 1879. It owns and operates several mills in the Dalton area and the facilities use electricity to power motors, pumps, compressors and equipment, while steam is used for production processes and space heating.

Energy Projects

In 2003, Crane put together a team to review its operations and look for ways to include a renewable energy source in the company's energy portfolio. The company mission is "...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 the installation of energy efficient lighting and variable frequency drives, and upgrading its compressors to more efficient standards. The team explored several renewable energy options, including wind and solar power, but the projects were not financially feasible for the company.

A hydroelectric power generation project was possible, and Crane was able to harness a renewable energy source that is unique to its property. The Byron Weston Dam No. 2 had previously supplied water for a hydroelectric power turbine plant that had since been decommissioned. Crane owns all the property within the project boundary, which made it possible for the company to apply for and to receive an exemption from licensing from the Federal Energy Regulatory Commission. The newly installed Kaplan turbine generator is capable of generating 250 kW for use on the site.



CHP Turbine & Generator

System	Cost	Funding	Savings
CHP	\$418,000	\$168,000	\$135,000
Hydro	\$2,700,000	\$911,000	\$138,000
Total	\$3,118,000	\$1,079,000	\$273,000

System	CO ₂	SO ₂	NO _x
CHP	773,860	4,076	2,495
Hydro	1,425,379	7,508	4,595
Total	2,199,239	11,584	7,090

The second project is the installation of a combined heat and power back-pressure steam turbine at the Pioneer Mill. The company purchases steam generated from the combustion of regional refuse by nearby Covanta Pittsfield, LLC. The purchased steam arrives at 220 psig and 460°F and is reduced to 100 psig in the turbine to generate electricity. The lower pressure steam is then used at the Wahconah Mill for paper making and building space heating. The process generates electricity that is used on site and the equipment upgrade is further able to capture valuable energy that was previously wasted to the atmosphere.

For both projects, Crane assembled a team consisting of purchasing, engineering, environmental and management staff. The projects took several years to study and implement and were made possible by both the efficiencies of the proposed options and by Crane’s ability to secure additional funding from the Massachusetts Clean Energy Center, the US Treasury 1603 program and utility companies. OTA helped to clarify options and to identify the funding that made these projects viable to pursue and implement.

Results

The hydroelectric power generation project and the combined heat and power back-pressure steam turbine have enabled the company to achieve significant reductions in purchased energy use and costs with the added benefit of lowering harmful emissions. Taking into consideration state, federal and utility grants, the total cost to the company was \$2 million, with a savings of \$273,000 per year in reduced energy costs. This is equivalent to slightly more than a seven year payback period. Table 1 shows project costs, outside funding and estimated savings for each project. Annually, the company has reduced emissions of more than 2 million pounds of carbon dioxide, 11,000 pounds of sulfur dioxide and 7,000 pounds of nitrous oxide. Table 2 shows the avoided emissions from both projects.



Water Supply to Hydroelectric Power Turbine

The projects did not require any changes to operating processes and had no effect on product quality, but by taking advantage of available assets and investing wisely in appropriate technologies, Crane was able to make a difference in the way they do business.

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. OTA promotes the implementation of management strategies, systems and technologies that enable businesses to enhance their competitiveness as they reduce the use of toxic chemicals, prevent pollution, conserve resources and ensure worker health and safety. 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:

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