2015 24–WEEK PROJECT

SIVYER STEEL CORPORATION

MADISON CURRIE
MECHANICAL ENGINEERING
IOWA STATE UNIVERSITY

BETTENDORF

COMPANY PROFILE

Sivyer Steel Corporation was founded in 1909 as one of the first big steel foundries in the United States. The company produces steel castings for various industries including mining, military, energy, agriculture, railroad, and construction. The company is an ISO 9001:2008 certified steel foundry devoted to safety and quality of the products and services the company provides. Sivyer Steel is also committed to continuous improvement of plant operations to ensure safety of the employees and to be a good steward of the environment. The plant is currently located in Bettendorf, Iowa, operates 24 hours per day, 5 days per week, and employs approximately 250 people.

PROJECT BACKGROUND

Sivyer Steel's metal casting process consists of several steps that can be broken down into three main stages: pre-casting, casting, and post-casting. The metal casting process requires large amounts of energy to power the equipment or in performance of the manufacturing function. Reducing energy intensity and establishing an energy management program will help Sivyer accomplish their energy reduction goals and support substantial decreases in annual energy costs for both electricity and natural gas.

INCENTIVES TO CHANGE

Sivyer Steel Corporation has set a goal to reduce energy usage by 10 percent in the next five years. To achieve this goal, Sivyer entered into a partnership with the U.S. EPA's ENERGY STAR Program and has also committed to participation in the ENERGY STAR Challenge for Industry (The Challenge). This program encourages a team within the company to develop a strategic action plan for reducing energy usage, associated costs and environmental impacts. Having a strategic plan will help the company maintain a focus on continuous development of best practices for source reduction and energy efficient alternatives to achieve their reduction goals.

RESULTS

Energy Baseline & Equipment Audit: Initially, the intern enrolled Sivyer Steel Corporation in The Challenge and established a formal site file containing all of the information necessary to verify the company's participation. Additionally, the intern developed an energy intensity tracking tool used to monitor the plant's performance and progress toward The Challenge. A plant-wide assessment was conducted to evaluate all energy consuming support equipment. Once an energy baseline was established, the intern completed a Prado Analysis to determine the top energy consumers and greatest opportunities for reduction efforts.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
ENERGY BASELINE & EQUIPMENT AUDIT	$5,500 (one time)	N/A	IMPLEMENTED
OFFICE LIGHTING PROGRAM	$809	17,880 kWh	IMPLEMENTED
COMPRESSED AIR LEAK DETECTION & REPAIR	$12,735	193,753 kWh	IN PROGRESS
COMPRESSED AIR SURVEYS	$4,245	64,584 kWh	RECOMMENDED
DUST COLLECTOR MOTOR CONTROLS (VFD)	$37,744	551,112 kWh	RECOMMENDED
LED LIGHTING REPLACEMENT	$28,864	458,166 kWh	RECOMMENDED

Office Lighting Program: There are varying levels of occupancy in the office areas. This leaves room for efficiency improvements to reduce energy use. Signs have been placed at every office light switch on company property reminding employees to shut off the light in their office space or restroom when the area is unoccupied. Enforcing the lighting program will reduce annual energy consumption by 17,880 kWh and a cost savings of $809.

Compressed Air Leak Detection & Repair: The compressed air system currently operates four air compressors. Using an ultrasonic leak detector, the intern completed a leak detection survey of the system. The survey revealed 58 leaks throughout the plant, which were quantified and tagged for repair.

Compressed Air Surveys: Maintaining the compressed air system is essential to improving the air compressors' performance and reducing excess noise within the plant, especially in high traffic areas. Scheduling and completing compressed air surveys four times per year has the potential to save an additional 64,584 kWh in energy and associated costs per year.

Dust Collector Motor Controls (VFD): The dust collection systems are some of the top electricity consumers at the plant. It is only necessary to run the dust collection function at full capacity when the specific process is in operation. Installing a variable frequency drive (VFD) on the motors can reduce the total operating cost of the motors by decreasing the speed of the motor when not in use. Based on the nature of their operation, two dust collectors at the plant are good candidates for VFDs, which could substantially reduce annual energy use at the plant.

LED Lighting Replacement: Current lighting in the plant is inadequate for the tasks being performed and is not efficient to operate. Updating the lighting system with LED fixtures in the cleaning departments, heat-treat process, and the main-bay areas of the plant could significantly reduce energy usage and improve lighting quality. The improved lighting quality could also impact the quality of casts and reduce scrap and repair costs.