

GREEN FOUNDRY CASE STUDIES

MATERIAL & RESOURCE CONSERVATION

Plant Compressed Air System Upgrade



BEFORE



AFTER



AFTER

Description

An energy audit identified an outdated compressed air system as the highest user of electricity in the plant. System use accounted for approximately 27% of the plant-wide electricity usage, at a cost of \$283,000 per year. In 2013, the system was upgraded through the implementation of two projects.

- 1) The first project replaced the outdated rotary screw compressors with new, more efficient centrifugal compressors. The old system was not monitored, and old compressors were manually switched on when a decrease in air pressure was noted due to an increase in usage. The new compressors utilize sequencer controls (i.e., smart valves) that monitor plant air usage and automatically adjust output to meet demand.
- 2) The second project re-plumbed the main compressed air line throughout the plant. The original lines were arranged in a loop and it was difficult to isolate a specific area during repairs. The new layout is not looped which makes it easier to isolate specific areas.

Environmental Benefits

Reduced energy consumption was verified as 1,060,800 kWh/yr based upon baseline system measurements from May 2010, data collected during the commissioning process in 2014 and supplemental data collected on the operation of the system in 2014. This is equivalent to a reduction of 870 tons of carbon dioxide per year, or the energy demand of 85 typical homes in America per year.

<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Cost & Savings

Actual cost of implementation, including equipment, labor, and commissioning, was \$255,115. Large initial capital and labor costs were offset by a rebate from the regional electricity provider of \$121,386. Cost savings are estimated as \$43,853 per year with a payback period of 3 years.

Other Benefits

- Compressor uptime has improved, freeing maintenance personnel to complete other tasks.
- More consistent compressed air feeds to pneumatic systems reduced process variability.
- New compressed air lines are clearly marked and equipped with the latest safety devices.

Applicability

Compressed air is widely used throughout the metalcasting industry. Although this project had high capital and labor costs, the anticipated cost savings and environmental benefit made it a reasonable investment. Any facility with an outdated compressed air system could benefit from this type of upgrade.

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