



## SHOWCASE PROJECT: JOHNSON CONTROLS: COMPRESSED AIR EFFICIENCY PROGRAM

### SOLUTION OVERVIEW

The Continuous Improvement team at Johnson Controls' Middletown, Delaware, manufacturing plant implemented a comprehensive program to reduce compressed air leaks and inefficiencies in the plant production process. The 275,000 square foot facility manufactures automotive lead acid batteries. Thanks to the efficiency program, the plant reduced its compressed air electrical costs by 37%.

Johnson Controls plans to expand the compressed air program to other plants, which could result in total electric savings of \$1.5 million if implemented at all U.S. manufacturing sites.

Compressed air is used at the Middletown facility for the processes and machines used during battery assembly and bag house purging. Improvements implemented through this program helped reduce the facility's air electricity usage per unit production by 39% and monthly compressed air electricity costs by 37%.

The program was implemented by the Middletown plant's continuous improvement team. Every Johnson Controls manufacturing plant has at least one Continuous Improvement/Best Business Practice (CI/BBP) team and manager, who leads the plant's efforts in implementing projects that help make overall processes more efficient. The CI/BBP team focuses on all cost saving opportunities, including energy and resource efficiency. The team leads a standard energy hunt process that identifies low-cost/no-cost and capital investment opportunities to reduce energy usage and demand. An enterprise-wide online database stores all project information and allows best practices to be shared among CI/BBP leaders, plants, divisions, and regions.

### SECTOR TYPE

Industrial

### LOCATION

Middletown, Delaware

### PROJECT SIZE

275,000 Square Feet

### FINANCIAL OVERVIEW

Project Cost \$11,560

## **SOLUTIONS**

The Compressed Air Program encompassed multiple initiatives to improve the Delaware plant's compressed air efficiency, ranging from simply detecting and repairing air leaks to installing new technologies like smart filters and regulators and reusing heated exhaust air to warm the facility.

Johnson Controls' Compressed Air Program took a multi-pronged approach to improve facility energy efficiency, including:

- Identifying and reducing air leaks and other non-productive air uses
- Turning idle equipment off for energy savings
- Reducing air pressure by installing smart filters and regulators
- Reusing heated air exhaust from the facility compressor to warm the facility during winter
- Upgrading to more energy efficient vibrator boards, flow and pressure meters, and other technologies
- Installing compressed air flow, pressure, and compressor current meters connected to a web-based continuous monitoring system.

## **OTHER BENEFITS**

The Compressed Air Program implementation process helped identify and address challenging compressed air systems issues. For example, installing flow and pressure meters helped pinpoint multiple air leaks inside bag houses that could not be seen or heard. Engineers were prompted to install current meters, and use a web-based system for monitoring air compressor performance in real-time. Compressor power levels, airflow and pressure are monitored, and any new leaks can be quickly identified and addressed.

Johnson Controls plans to replicate the Compressed Air Program's success at the company's other manufacturing sites. The company estimates that if all its US manufacturing plants implemented the program, energy saving would amount to 20 million kWh. This usage reduction would bring \$1.5 million in annual electricity spend savings.

Currently the company has started the program's implementation with a standardized compressed air leak management program. Plants are expected to perform a baseline measurement, estimate the cost of air leakage, find and document leaks, fix the leaks, and then measure and verify savings. Teams at each location have been given a standard set of tools and resources, and are expected to perform these steps every quarter to achieve consistent compressed air system efficiency.

\*Savings represent compressed air electricity use

### Annual Energy Use



**Energy Savings**  
**39%\***

### Annual Energy Cost



**Cost Savings**  
**37%\***



Johnson Controls, Inc.