

Optimizing Compressed Air Usage Leads to Greater Energy Efficiency



Waupaca Foundry has a 10-year vision for sustainability with goals to reduce its environmental impact. Working closely with the Department of Energy on its Better Plants program, the company has achieved a 13.5% increase in energy efficiency through the Compressed Air Optimization Project. This project improved the system's reliability and smart capabilities to meet operational needs at a high energy efficiency level.

Waupaca Foundry Plant 1, located in Waupaca, Wis., operates two compressor rooms. Compressed air is one of its top three significant energy users and represents 10% of the facility's annual electricity usage. Compressed air supports critical operations such as pneumatics, robotics, and environmental control systems.

There were three primary challenges with the compressed air system:

1. Leaks and inefficiencies in the system prevented steady air pressure.
2. Equipment overutilization and underutilization led to inefficient operation.
3. Troubleshooting was overly complex due to the two competing systems.

To resolve the challenges, Plant 1 committed to a multi-year project to design, build and operate a world-class compressed air system.

The first phase was completed in 2016. Outdated compressors were replaced with new, more efficient units in a new room. This improved piping layouts and captured and used the waste heat from the foundry's cupola to heat the building and reduce natural gas use during the winter months.

In 2019, a portfolio of projects started a second phase of the project that increased the plant's energy efficiency and reliability. This included improvements in the supply and demand portions of the system, replacing remaining outdated units with new high-efficiency units, installing a master control system and energy monitoring capabilities, reducing the plant's overall pressure from 95 to 87 PSI, and improving operations and management practices.

As a result, the US Department of Energy recognized the multi-year compressed air system optimization project at Plant 1 with a **2022 Better Project Award**.

Win-Win

- Increased overall energy efficiency by 13.5%.
- Reduced energy usage by 18,000 MMBtu/year — the equivalent energy consumed by 20 U.S. single family homes annually.
- Reduced water usage by 13 million gallons of water/year — the equivalent of nearly 20 Olympic-sized pools.
- Eliminated 1,240 tCO₂, or 1%, GHG emissions — the equivalent of CO₂ released by 620 people annually.
- Energy usage reduction of 1,100,000 kWh — equivalent to kWh to power 36,666 electric cars for 100 miles.



Waupaca Foundry is leading the industry in environmental innovations and sustainable practices.

Connect with our team at green@waupacafoundry.com