Olympus Surgical Technologies

Noah Roe
Physics
University of Minnesota Duluth

Company Background

Olympus Surgical Technologies America is located in Brooklyn Park, MN and manufactures various surgical instruments. These medical devices are used to cut tissue, seal tissue and even break apart kidney stones. The facility is 180,000 square feet and has approximately 350 employees. Olympus was founded in Japan in 1919 in order to produce microscopes and has grown into a leading optical and medical device manufacturer.

"My time working with MnTAP allowed me to utilize my talents in technical problem solving. I was able to make new connections, manage projects, and develop a new appreciation for environmental conscientiousness" ~ NR

Project Background

Olympus is continuously improving their energy efficiency through adoption of new technology, better process design, and fostering an environmentally conscientious work environment. Energy is mostly used in HVAC, motors, lighting, and production machines. Recent audits by Xcel Energy and CenterPoint identified energy efficiency opportunities. Humidification and irrigation were the key focus areas for water conservation.

Incentives To Change

Olympus has set the goal of achieving carbon neutrality by 2030 with all manufacturing sites reducing their carbon footprint to zero. Another key goal is conformance with ISO 14001 Environmental Management System certification standards. The Brooklyn Park facility also has a water reduction goal of 25% for 2023. Overall, Olympus seeks to become a leader in the global push for environmental conscientiousness and sustainability.

SOLUTIONS

Install Warehouse Energy Recovery Ventilators

Due to potential EtO residues from sterilized products, the warehouse is constantly ventilated to meet OSHA employee exposure limits. Since exhaust air has already been humidified or dehumidified and brought to a set temperature, this creates a big opportunity for Energy Recovery Ventilation (ERV). ERVs transfer humidity and thermal energy between intake and exhaust ducts, allowing for large energy savings. By implementing this technology in the warehouse, Olympus will recover about 280,000 kWh/yr which equates to about $30,000.

Optimize Compressed Air System

Pneumatic systems are known for being inefficient. Olympus has three air compressors on site, each delivering about 100 cfm of air at 135 psi. An ultrasonic leak detector was used to audit the facility, with 54 leaks detected. Leak detection procedures and training were created and implemented, including a recurring work order to ensure the system will be audited at least once a year. Repairing these leaks will save about 200,000 kWh and $22,000 per year.

The compressed air system is set to 130 psi in order to accommodate one packaging sealer that requires 120 psi. Replacing that sealer and reducing the overall system from 130 psi to 100 psi would save an additional 15% of the system's energy use.

"Noah's hands-on approach and dedication helped our efforts for greener energy and water conservation. Our partnership with the University of Minnesota has been an invaluable asset, and we look forward to future interns like Noah!"

~ Keith Jacobson, Sr. Facility Manager
Olympus Surgical Technologies America

Solutions

Shut Off Unused Equipment

Two opportunities were identified for energy savings due to equipment being left on when not in use. Several machines in the molding room are left idling at all times even when not used. Electrical current measurements found that shutting this equipment off during weekends would save about 18,000 kWh/yr. Steam humidifiers were found to be idling and boiling water in the summer when no humidification was needed. Manually shutting these down during the summer months saved another 18,000 kWh.

Water Softener Optimization

Soft water is heavily used in the humidification system at Olympus during winter months. Resin bed tanks typically deteriorate about 1-3% each year. Since the current tanks are 9 years old they have deteriorated about 9-27%. It is recommended that the tanks be replaced with new, larger volume tanks, which will significantly reduce unnecessary salt use.

Irrigation Optimization

The irrigation system at Olympus accounts for about 2/3 of the total water use during summer months. Following an irrigation system audit, several solutions were implemented to reduce water waste including: early winterization, reducing run times, installing a rain detection sensor, reorienting sprayers, repairing leaks, and creating recurring maintenance work orders. These solutions reduced water use by almost 40% while maintaining lush green grass.

Reroute Reverse Osmosis Water

Reverse osmosis water is a highly filtered and purified water which is atomized to humidify the air supplied to the cleanroom. This process is the largest water use (30-50%) during the winter months. Not all of the water gets absorbed into the air stream. Currently the excess is sent to the drain. Collecting this excess RO water and rerouting it back into the humidification system would reduce both water use and the energy associated with this expensive water. Olympus plans to further investigate this opportunity this winter.

Recommendation	Annual Reduction	Annual Savings	Status
Install Warehouse ERVs	280,000 kWh	$30,000	Planned
Compressed Air System Optimization	264,000 kWh	$29,000	Partially Implemented
Shut Off Unused Equipment	36,000 kWh	$4,000	Partially Implemented
Water Softener Optimization	13,000 lbs salt 5,000 gal water	$2,000	Implemented
Irrigation System Optimization	980,000 gal water	$4,400	Implemented
Reroute RO Water	240,000 gal water	$12,000	Investigating

MnTAP Advisor: Jane Paulson, Senior Engineer