Philips Lightolier

Water Conservation Case Study

Summary

Through a commitment by company management and a series of process changes, Philips Lightolier reduced their water consumption by 64 percent and saved nearly $242,000 annually starting in 2007. The company put together a team from different departments to evaluate manufacturing operations to find water conservation opportunities. By installing new equipment to reduce water pressure and improve the efficiency of rinsing processes, Philips Lightolier reduced annual water use by 58 million gallons. The cost for the changes was about $65,000 and the payback period was only three months. By updating current technology and implementing new conservation mechanisms, Philips Lightolier achieved significant water reductions throughout its entire facility.

TUR & Energy Efficiency Success

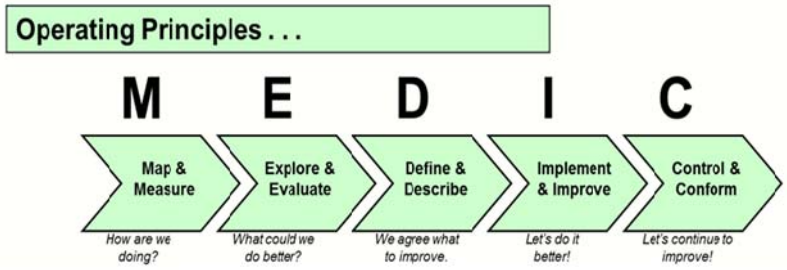
Philips Lightolier previously eliminated the use of approximately 1.25 million pounds of trichloroethylene in its Fall River, MA plant by adopting less toxic alternatives and modifying the production process. Additionally, the company reduced its electricity use by 1.1 million kWh, natural gas consumption by 42 percent, installed a wind turbine and is expected to save more than $700,000 per year

Background

Philips Lightolier is a vertically integrated reflector factory headquartered in Fall River, MA. The Fall River plant is about 310,000 square feet on 31 acres of property and enjoys annual sales of approximately $155 million. The plant employs approximately 425 individuals and has implemented toxics use reduction methods since the late 1980s. More recently, Philips Lightolier has enacted specific measures to improve toxics use reduction, energy efficiency and water conservation throughout its facility.

Water Conservation

Philips Lightolier began seriously examining water conservation opportunities in 2007. First, a six-person Water Conservation Implementation Team was formed, consisting of representatives from the following departments: Finishing, Anodizing, Maintenance, Powder Coating, Chemistry, and Operations.



The team held training sessions and reviewed the details of the facility's water consumption with operations personnel. The movement towards water conservation was a facility-wide effort, and also included networking with contractors, suppliers, and peer groups. The company developed a formal water conservation plan, including measureable goals and an implementation schedule. Adopting the acronym "MEDIC" [Map & Measure, Explore & Evaluate, Define & Describe, Implement & Improve, Control & Conform], Philips Lightolier developed a series of strategies for facility-wide water conservation that included maintaining consistent communication across various

departments via regular team and mini meetings. Generally three to four people attended each regularly scheduled mini meeting, which were intended to focus on a specific aspect of water conservation.

The entire water conservation team met regularly in order to facilitate communication and to ensure uniform conservation measures were taking place throughout the facility. The team determined a baseline water usage rate to be 251,000 gallons of water per day, or 91 million gallons of water per year. Based on the team's identification of feasible options, Philips Lightolier then developed a set of measurable goals that were to be accomplished following the implementation of several new water conservation methods. These included reducing plant booster pump pressure, enhancing the use of non-contact cooling water, eliminating water "flow through," and reducing and balancing rinse rates. The expected result of implementation was projected as a decrease in annual water usage of 30 percent, or 27 million gallons. By 2008, Philips Lightolier had exceeded this goal and reduced facility-wide water consumption by 70 percent, or 58 million gallons per year. This translated to $242,000 in annual savings.

Reduction of Plant Water Pressure

The plant booster pump pressure was operated at 80 pounds per square inch (psi) but the team determined by testing and trial and error that 50 psi was the optimum pressure level and 52 psi provided an adequate buffer. There are two pumps as part of this system, and one is allocated as backup, running at 48 psi only if necessary. Through the installation of a new system with variable frequency drives (VFDs), the pressure was reduced, yielding a 16 percent reduction in water usage. The new system cost $27,000, which conserved more than 14 million gallons of water and saved the company $55,000 [less than a 6-month payback period] per year.

Plant Booster Pump

"Implementing toxics use reduction and resource conservation has helped us to provide Green Products from Green Processes. We've made a lot of friends over the years at OTA and TURI and look forward to our continued relationship with them and many more successful projects in the coming years."
- Ron Westgate - Plant Engineer, Phillips Lightolier

Cooling Water "Aqueduct" and Oil Monitoring Technology

Philips Lightolier installed a non contact cooling water "aqueduct" to carry used non contact cooling water from the hydraulic equipment in the fabrication departments to rinses in the Anodizing department. Additionally, the company implemented continuous oil monitoring technology, which allowed the company to detect contaminants before this reused non contact cooling water enters any critical rinses, and is able to redirect this monitored flow from the process if it is contaminated. Note: The technology monitors for hydraulic oil that may have contaminated the non contact cooling water if a heat exchanger submersed in the hydraulic oil reservoir should have a leak or a hole allowing the oil to enter the heat exchanger coil where only water should be. The aquaduct runs approximately 700 ft and is slightly pitched so gravity is used to move the water without any pumps or motors. The oil monitoring technology cost $19,000 to install and start up, which conserved 11,121,000 gallons of water annually and saved the company $46,375 per year, a payback period of 22 weeks.

Elimination of "Flow Through"

Philips Lightolier discovered that temperature controlled valves were prone to rust, which reduced the quality of the valves and allows flow through. Solenoid-actuated valves were installed to better monitor the water temperature and eliminate flow through, only allowing water to pass through when needed. The solenoid valves cost $7,643, which reduced 7.3 million gallons of water and saved the company $30,441 per year. The payback period for the valves was about three months.

Solenoid Actuated Valves

Reduction of Rinse Rates

Several measures were adopted to reduce the rinse rates at the company's Fall River facility. Philips Lightolier added flow valves to its five-stage wash line to ensure that overflow was kept to a minimum. The new system has significantly reduced overflow rates from 3-6 gallons per minute to 0-1½ gallons per minute and allowed the company to reduce the frequency of its system cleaning and tank refilling, while still closely monitoring the processes via conductivity readings. This was a $300 investment that yielded $9,576 in annual savings, paying for itself in less than two weeks, and conserved 2,296,540 gallons of water per year.

Balancing and Reduction of Rinses (Anodizing)

The balancing and reduction of rinses was achieved in the process of anodizing the reflectors. This process is done by three computer controlled lines and provides the reflectors with a clear and protective surface. Though the amount of water used in the rinses has been reduced, the company still has enough cooling water to pump into line #3 of the anodizing process. All three lines were balanced for proper flow by throttling the ball valve orifice at each tank, which allowed the company to turn off the city water used for rinses to this process (city water is still used to feed the deionization system). The manual ball valves maintain a constant, balanced flow, requiring no new equipment to manage. The cost of making this change to the anodizing process was $11,400 and yielded $68,492 in annual savings, and conserved 16,425,000 gallons of water per year.

Project	Water Conservation	Cost	Annual Savings
Reduction of Plant Water Pressure	14,169,000	$27,000	$55,000
Oil Monitoring Technology	11,121,000	$19,000	$46,375
Elimination of "Flow Through"	7,300,000	$7,643	$30,441
Reduction of Rinse Rates	2,296,540	$300	$9,576
Balancing and Reduction of Rinses (Anodizing)	16,425,000	$11,400	$68,492
Miscellaneous Projects	6,688,460	$0	$32,116
Total	**58,000,000**	**$65,343**	**$242,000**

Results

Since implementing these water conservation technologies, Philips Lightolier has reduced its facility-wide water consumption by 64 percent, or 58 million gallons of water per year. The total investment made for the project was $65,343, and the annualized savings are $242,000. In addition to the multiple larger projects described above, the company has also implemented several other smaller, lower budget water conservation measures that have also contributed to its savings. In 2009, the Fall River plant increased production and saw a change in the product mix with the manufacturing of LED fixtures, which requires more water. This changed the annual savings to 40.5 million gallons (44% percent) and $169,000, which is still a significant improvement from the baseline usage rates.

This case study is one in a series prepared by the Office of Technical Assistance and Technology (OTA), a branch of the Massachusetts Executive Office of Energy and Environmental Affairs. The Office of Technical Assistance and Technology (OTA), the Commonwealth's center for technical information and assistance, helps businesses and other organizations improve their environmental performance and conserve energy, water and other resources. This information is available in alternate formats upon request. OTA's **non-regulatory** services are available at **no charge** to Massachusetts businesses and institutions. For additional information about this or other case studies, or about OTA's technical assistance services, contact:

Office of Technical Assistance and Technology, 100 Cambridge Street, Suite 900, Boston, MA 02114
Phone: (617) 626-1060 Fax: (617) 626-1095 Website: http://www.mass.gov/eea/ota