Achieving Pollution Prevention Success

Conserving Resources through On-Site Technical Assistance and Pilot Evaluations in Illinois

Snapshot

Grantee: Board of Regents, University of Illinois, Illinois Sustainable Technology Center

Title: Illinois Conservation of Resources and Energy Program

EPA Funding: $109,000

Total Funding: $118,000

Project Period: 10/1/2013 - 9/30/2014

EPA Pollution Prevention[1] Grant Number: 01E01044

Grantee Contact: Debra Jacobson, ISTC, djacobso@illinois.edu, (630) 472-5019

EPA Contact: Briana Bill, Source Reduction Section, bill.briana@epa.gov, (312) 353-6646

Project Description

Funded by a 12-month U.S. Environmental Protection Agency (EPA) Pollution Prevention (P2) grant, the Illinois Sustainable Technology Center (ISTC) at the University of Illinois implemented the Illinois Conservation of Resources and Energy (ICORE) project, targeting the west-central region of Illinois including portions of the St. Louis metro-East area. ISTC conducted P2 assessments and recommendations to 34 manufacturers, commercial establishments, water and waste water treatment plants and others to conserve water and energy, minimize wastewater generation, and reduce greenhouse gas emissions. ISTC marketed their services[2], recruited participants and local partners, conducted on-site assessments, and recommended improvements to the facilities. At four facilities, student interns sponsored by ISTC and the Illinois EPA Office of Pollution Prevention were placed on-site to provide technical assistance for the summer.

As a result of the technical assessments, the grantee made more than 200 recommendations such as upgrading to light emitting diode (LED) lighting, switching to compressed air safety guns, installing motor controls on centrifugal blowers and backwash pumps, adding counter current rinsing onto a plating line, increasing efficiency of compressed air system, installing motor controls, and setting up shutdown procedures to improve energy efficiency. Thirty-eight percent of the recommendations were implemented by the facilities during the project period. ISTC presented this ICORE project via a webinar: https://m.youtube.com/watch?v=ABs6es54SfA. In addition to on-site P2 assessments, ISTC conducted four multi-week pilot evaluations at three manufacturers to demonstrate the use and benefits of three different technologies:

- Replacement of open-tube air guns with high-efficiency safety air guns which waste less compressed air, save money, and are safer;
- Use of water-based aqueous small-parts washers to reduce solvent use and associated volatile organic chemicals;
- LED lighting demonstrations which result in 50% savings and significant environmental benefits over traditional high intensity discharge lighting.

Results

The ICORE project exceeded its goals for water savings, greenhouse gas emissions reductions, cost savings and number of participants recruited and assisted. Most of the implemented recommendations were associated with electrical conservation, which in large part were due to attractive financial incentives offered by Illinois' utilities and the Illinois Department of Commerce and Economic Opportunity. The combined energy savings and external incentives significantly reduce capital outlay and shorten the payback periods. The water savings were from flow restriction, counter-current rinsing and water conservation at three facilities. Implemented recommendations saved facilities $670,647.

Environmental benefits are as follows:

- 7,179,287 kWh electricity conserved[3] (equivalent to the electricity that 803 people consume in Illinois each year)
- 5.5 million gallons of water saved[4] (equivalent to the amount of water in 8.5 Olympic-size swimming pools)
- 50,391 lbs. of non-hazardous waste reduced[5] (equivalent to the amount of trash that 31 people annually generate in the U.S.)
- 7,020 metric tons of greenhouse gas emissions[6] (MTCO2e) reduced (equivalent to removing 1,478 cars from the road each year)
- 13,890 Therms of natural gas saved.

Lessons Learned

ISTC staff identified the following lessons learned:

- Start with no-cost, low-cost P2 opportunities before high-cost opportunities. Such opportunities include process changes, behavioral changes, and starting with low-tech then high-tech changes.
- Quantify costs and savings (direct and indirect) by using billing, records, meters, counts, baseline measurements, energy, raw materials, and treatment/disposal records.
- Identify external incentives (shorten payback) such as utility rebates, Federal incentives such as the Energy Policy Act. The Database of State Incentives for Renewables and Efficiency may be a resource: www.dsireusa.org
- Student interns can contribute substantially to environmental reductions and financial savings at their placement facilities. For every dollar spent, the facility saved an average of $14 as a result of improvements.

[1] Pollution Prevention involves the reduction or elimination of pollution at the source by modifying production processes, using less toxic substances, implementing resource conservation techniques, conserving water and energy, and reducing greenhouse gases. Energy and water conservation, hazardous materials and greenhouse gas reductions, and cost savings are all benefits of a P2 approach. EPA provides grant assistance to states and tribes to help businesses identify and implement P2 practices.

[2] For a sample presentation, see: https://www.youtube.com/watch?v=TnWljd-YarY&feature=youtu.be

[3] To calculate the equivalent of the electricity saved (equivalent to what 803 people consume in Illinois each year), the 2014 average per capita electricity consumption from the Illinois monthly electricity bill (745 kWh) was used. The source is the U.S. Energy Information Administration located at: http://www.eia.gov/electricity/sales_revenue_price/xls/table5_a.xls

[4] To calculate the equivalent of the water saved (equivalent to the amount of water in 8.5 Olympic-size swimming pools), Olympic sized swimming pool capacity of 660,000 gallons was used to calculate the water savings. The 600,000 gallon value was found at EPA's Water Trivia Facts found at: http://water.epa.gov/learn/kids/drinkingwater/water_trivia_facts.cfm

[5] To calculate the equivalent of the non-hazardous waste reduced (equivalent to the amount of trash that 31 people annually generate), we used a value of 1,617 pounds that the average person in the U.S. generates annually found in EPA's Electronics Environmental Benefits Calculator found at: http://www2.epa.gov/fec/publications-and-resources#calculator

[6] To calculate the equivalent of the greenhouse gas emissions reduced (equivalent to removing 1,478 cars from the road each year), we used a value of 4.75 MTCO2e emitted from the average vehicle, and using that, we calculated the equivalent. The 4.75 MTCO2e value is from EPA's GHG-equivalencies online calculator located at: http://www2.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references