



Achieving Pollution Prevention Success

Using Waste-to-Profit and Economy, Energy, and Environment (E3) models to Conserve Resources and Energy in Illinois

Project Description

Funded by a 12-month U.S. Environmental Protection Agency (EPA) Pollution Prevention (P2) Source Reduction Assistance Grant, the Illinois Sustainable Technology Center (ISTC) at the University of Illinois assisted industrial facilities in southern Cook County to conserve resources and energy.

ISTC developed partnerships in the Calumet and south suburban Chicago areas, promoted the Waste-to-Profit/E3² Assessment program to area businesses, completed assessments at five of these businesses, developed recommended changes based on the assessments, assisted in implementation of recommendations through the piloting of technology at the facility and/or demonstrations of appropriate technologies, and tracked and reported the environmental outcomes and metrics resulting from the facilities' implementation of the recommendations.

E3 Assessments

ISTC worked with the Illinois Manufacturing Excellence Center (IMEC), Commonwealth Edison Company, and Nicor Gas by combining the E3 assistance model with the Chicago Waste-to-Profit Network's byproduct synergy (BPS) and green supplier network (GSN) programs. Together, they formed an "E3 Team" which conducted two-day assessments at five industrial facilities and identified opportunities for lean manufacturing, energy use reduction, waste reduction, and reductions in water usage and greenhouse gas emissions. As a result of the site assessments, the grantee made more than 180 recommendations for increased efficiencies in lighting, compressed air, water, waste water, waste heat, and variable frequency drives for motors. Thirty-five percent of the recommendations were implemented by the facilities during the project period.

Technology Demonstrations and Pilot Projects

The use of the Accelerated Diffusion of Pollution Prevention Technologies (ADOP2T) model by ISTC has been proven to significantly increase the implementation rate of assessment recommendations. Integration of pilot equipment and demonstrations at the facilities are important elements of ADOP2T. Pilot testing of equipment is performed with equipment loaned to the facilities by ISTC that demonstrates the benefits of the recommended equipment compared to the equipment the facility had been using. ISTC pilot evaluations were conducted to demonstrate the use and benefits of the following technologies: higher efficiency T8 fluorescent lighting; a fluid purification unit in a recirculation tank to extend the useful life of the coolant at a metal working facility; and, a cardboard baler to increase the efficiency of cardboard collection and recycling.

Technology demonstrations are performed on site as well, but typically require less time to demonstrate the technologies. The E3 technology demonstrations conducted at manufacturers included: replacement of open-tube air guns with high-efficiency safety air guns that waste less compressed air, save money, and are safer; the use of an "OSHA meter" for testing the air guns; and, an increase in the temperature of work area lamps to 5000 Kelvin, to generate higher-quality lighting in an area where final product visual inspections are conducted.

Snapshot

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

Title: Regional ISTC/IMEC Waste-to-Profit E3 Project

EPA Funding: \$53,147

Total Funding: \$55,947
Project Period: 10/1/2014 – 9/30/2015

EPA Pollution Prevention Source Reduction Assistance¹ Grant Number: 00E01324

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Results

The waste-to-profit/E3 project exceeded expectations for water conservation, and produced greenhouse gas emissions reductions, electricity usage reductions, and cost savings. Implemented recommendations saved facilities \$158,566. Environmental benefits are as follows:

- 159,462 kWh electricity conserved³ (equivalent to the electricity that 17 people consume in Illinois each year)
- 792,012 gallons of water saved⁴ (equivalent to the amount of water in 1.2 Olympic-size swimming pools)
- 380 metric tons of greenhouse gas emissions⁵ (MTCO₂e) reduced (equivalent to removing 80 cars from the road each year)
- 1,440 Therms of natural gas saved

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.

The Source Reduction Assistance Grant is open to not for profit organizations who provide a 5% financial match.

² E3 coordinates federal, state and local resources to provide technical assistance that supports sustainable manufacturing through increased efficiency and conservation of natural resources. E3 is supported by six federal agencies, and state and local entities. An E3 assessment combines a facility P2 assessment with an energy efficiency and a production efficiency assessments to produce recommendations for improvement, which when implemented typically results in cost savings.

³ kWh = kilowatt hour. To calculate the equivalent of the electricity saved (equivalent to what 17 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 1.2 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 greenhouse gas emissions reduced (equivalent to removing 80 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>