

2018 Case Study

CST Storage

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Company background

CST Storage is a leading manufacturer and supplier of factory-coated steel storage tanks and aluminum storage tanks. CST was established in 1893 and its existing company portfolio consists of CST Storage, CST Covers and Vulcan Tanks. Five manufacturing facilities and technical design centers, and multiple regional sales offices are located throughout North America and the United Kingdom. International offices are in Argentina, Australia, Brazil, India, Japan, Malaysia, Mexico, Singapore, South Africa, Spain, United Kingdom, United Arab Emirates and Vietnam.

Project background

CST storage is committed to continual improvement processes and environmental sustainability. The company has partnered with the Kansas State University Pollution Prevention Institute, or PPI, to host P2 interns since 2011. CST has implemented several intern projects and has been recognized twice in the last decade with the Kansas Pollution Prevention (P2) Awards.

The 2018 intern projects included a comprehensive study to compare the current liquid (solvent) coating process to a new a powder-coating process; installation of energy-monitoring devices to record performance losses, a compressed-air leak audit and a feasibility study related to compressed air lines upgrades.

Incentives to change

As a large manufacturer, CST has significant utility, material and labor costs. Improving natural resource use and reducing emissions to the environment improve the work environment, but also decrease operating costs. Using a P2 intern each year has helped the facility gain a fresh

perspective on new opportunities for reducing their environmental footprint, saving money and improving the health of the environment.

Projects reviewed for P2 potential

Liquid to powder coating process change

The first project at CST was to research the environmental impacts of switching from a liquid top-coat process to a powder-coating process. The facility, which had been using the traditional solvent-based liquid top-coating process in its paint line for surface finishing, is now enthusiastically looking at a conversion to powder. Making the conversion from liquid paint to powder paint would be a major financial and plant layout commitment for the facility. The intern prepared all the key comparisons between the two processes, documenting the potential differences in air pollutants, environmental health exposure and the financials.

Switching to a powder coating process would improve performance by 18 percent and provide an annual savings of about \$850,000 dollars with a payback of one-year. In addition to the significant financial savings, the company would reduce about 49 tons per year of volatile organic compounds (VOCs) and 5 tons per year of combined hazardous air pollutants (HAPs). Despite the significant financial and plant layout commitment, this change is highly recommended.

Electric submeter digital monitoring

The intern conducted an analysis on CST's power consumption and power supply. He found that all machines in the facility were connected to a single meter, which shows the total power consumption of the facility. To monitor the power flow to the devices that enable detection of

equipment defaults such as operating efficiency and power quality, the intern suggested installation of a digital monitoring device. He designed a circuit to install the devices to all the equipment in the facility's CNC station. This change could reduce electrical consumption by 111,000 kWh and generate an annual savings of \$11,000 for the facility. Payback period of the project is three years and five months.

Compressed air audit

The intern performed an air-leak audit as part of preventive maintenance in the facility and found 55 potential air leaks that if repaired would save \$26,000, 205,656 kWh of power consumption and 201 metric tons of carbon dioxide equivalent emissions.

Implementation update

A follow-up survey performed by PPI staff indicates the compressed air repairs were made

shortly after the internship ended for an annual cost savings of \$12,100, reduction of 119,949 kWh and 126 MTCO_{2e}.

Compressed air-saver research

The intern also provided research on an air-saver unit device that could help avoid air leaks by regulating the pressure flow in the pipes. It was determined that the device is not functionally feasible since the device cannot withstand the high pressure of the CST air supply. Therefore cost savings and environmental impact were not calculated and the project was not recommended. If the device manufacturer or others develop a device that can withstand the air pressure of CST's compressed air system, it would be recommended to be re-evaluated at that time.



Summary of 2018 P2 intern recommendations for CST Storage

Project Description	Annual Estimated Environmental Impact	Annual Estimated Cost Savings	Status
Liquid to powder coating process change	5 tons of combined HAPs and 49 tons of VOCs	\$851,000	Recommended
Electric submeter digital monitoring	111,000 kWh	\$11,000	Recommended
Compressed air audit	119,949 kWh	\$12,100	Implemented
Total¹	5 tons of combined HAPs and 49 tons of VOCs 317,000 kWh	\$888,130	
GHG reductions^{1,2}	235 metric tons CO_{2e}		

¹Does not include projects “not recommended” or with “more research needed”

²EPA P2 GHG Calculator with Cost, Apr. 7, 2016