2017 Case Study

Circuit Rider

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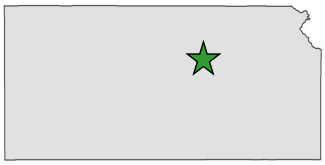

Company background
The 2017 circuit rider intern worked with Kansas State University's Pollution Prevention Institute (PPI) to contact food processors and manufacturing companies interested in reducing their energy, water, and natural resource use.

Project background
Once companies confirmed their interest, the intern analyzed their water and electric bills to determine baseline consumption trends. The intern later conducted one- or two-day site visits at five facilities in Eastern and South Central Kansas to identify and research pollution prevention projects. Final analyses for each project provided source-reduction recommendations and quantified potential energy, water, and financial savings.

Incentives to change
According to the EPA, industry was responsible for 21 percent of all greenhouse gases emitted in 2015[1], equivalent to more than 1.4 million metric tons of CO2. Roughly one-fourth of these greenhouse gasses are indirect emissions resulting from off-site power production. Additionally, Kansas' manufacturing industries consumed an average of 41.9 million gallons of water per day.[2]

Like most industries, food processors and manufacturers are constantly looking for ways to reduce production costs and become more efficient. Reducing product waste, energy use, and water use are some of the easiest ways to cut costs and make businesses more profitable, but many industries do not have the time to conduct these assessments. Collaborating with PPI to determine feasible ways of reducing natural resource use gave five different industries an opportunity to understand potential cost and environmental savings related to water and energy.

Projects reviewed for P2 potential

Water leak repairs
One facility used an average of five million gallons of fresh water over the last 12 months in its food processing procedures. During the second day of his site visit, the intern estimated flow rates and obtained run times for 10 water leaks that, if fixed, could save more than 2.46 million gallons of water per year.

Cleaning procedure changes
In addition to leaking water pipes, the intern identified fresh water conservation opportunities in the facility's cleaning procedures. The company currently uses more than 130 thousand gallons of water every year to clean floors in its mixing room. The intern recommended using a high-pressure sprayer and reducing the number of cleanings to twice per day. If allowable under regulatory guidelines (e.g. FDA or USDA), the changes could save roughly 96 thousand gallons of fresh water per year.

Wastewater isolation and recovery
The same facility disposes 70 thousand gallons of wastewater every week and pays to have it treated at a municipal wastewater treatment plant. The intern collaborated with PPI staff and local waste management consultants to initiate research into isolating and repurposing this waste stream for beneficial reuse. Given the scope of this project, PPI staff continued research after the 2017 intern program was completed.

[1] https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions
[2] https://water.usgs.gov/edu/wateruse/pdf/wuindustrial-2005.pdf

Compressed-air-leak repairs

The intern conducted compressed-air audits at three of the five facilities. He utilized an ultrasonic detector form UE Systems to identify leaks and a leak survey app, developed by the same company, to calculate annual savings obtained from repairing the leaks. In addition, the intern estimated repair costs to calculate a simple payback period for the repairs and provided the companies with detailed plans to implement their own leak-detection programs. Combined savings from fixing identified leaks totaled 373,200 kWh, or $39,090 annually. While energy savings from implementing the leak-detection program depends on the appearance rate of leaks and size of the facility, annual savings for one of the companies to implement a leak-detection program was estimated at 23,000 kWh, or $1,770.

Implementation update

In 2020, a follow-up survey was performed by PPI staff and it was verified that one facility implemented the compressed air repairs for an estimated annual savings of 125,523 kWh and $11,674.

Refrigerator consolidation

One of the facilities has more refrigerator and refrigerators would result in annual energy savings of 20,400 kWh and could be done without renegotiating vendor contracts.

Occupancy-sensing light switches

One facility had already had two other agencies complete lighting audits, but the initial investment to switch from fluorescent bulbs to the recommended LEDs made a complete retrofit impractical. To reduce energy usage from lighting, the intern researched the feasibility of installing occupancy-sensing light switches in three areas. The intern utilized HOBO data loggers to determine the average amount of time in a day lights in office spaces, breakrooms, and product storage areas were on while the spaces were unoccupied. The intern estimated the facility could reduce its energy consumption by 3,500 kWh per year by installing these light switches in product storage areas and employee breakrooms. He recommended the store utilize equipment available through the Kansas Energy Library to conduct similar studies on all other employee-only and storage areas.

Summary of 2017 P2 circuit rider intern recommendations

Project description	Annual estimated environmental impact	Annual estimated cost savings	Status
Water leak repairs	2.46 million gallons	$13,754	Recommended
Cleaning procedure changes	95.6 thousand gallons	$535	Recommended
Wastewater isolation and recovery	-	-	More research needed
Compressed air audit	373,200 kWh	$39,090	In Progress
Refrigerator consolidation	20,400 kWh	$1,680	Recommended
Occupancy-sensing light switches	3,500 kWh	$290	Recommended
Total savings[1]	**2.56 million gallons 379,100 kWh**	**$55,349**	
GHG reductions[1]	**397 metric tons[2] CO_2e**		

[1] Excludes projects where “more research needed”
[2] EPA P2 GHG Calculator with Cost, May 2014