



2022 CIRCUIT RIDER

Intern: Keely Hutchinson
Major: Mechanical Engineering
School: Kansas State University



Company background

A Kansas State University Pollution Prevention Institute, or PPI, 2022 circuit rider intern assisted an animal health group, a carbon black manufacturing plant, a metal fabrication facility and a cold storage warehouse to reduce their use of energy and water, identify compressed-air leaks and effectively dispose of regulated waste.



Project background

Each company was contacted to schedule a site visit and a pre-assessment was performed to determine the project needs. On-site visits were conducted to identify and research pollution prevention, or P2, opportunities. A P2 report was provided to each company following necessary research after the visit. The reports contained P2 recommendations along with environmental, social and economic impacts.

Incentives to change

Implementing P2 projects benefits the environment, the community and employee health. Reducing chemical waste, energy and water consumption are common methods to reduce environmental impact and save money. Additionally, many companies are setting sustainability goals and deadlines for these goals to be achieved.

Many of the companies the circuit rider worked with did not have time nor dedicated staff to assess P2 projects, although the improvement could result in significant positive impact to company operations and economics, as well as reaching any set goals. By raising awareness and presenting innovative and feasible alternatives, the Pollution Prevention Institute assists small businesses in reducing fiscal and environmental costs related to their current processes and practices.

PROJECTS REVIEWED FOR P2 POTENTIAL

Compressed-air audit

The intern conducted compressed-air audits at two of the four facilities. An ultrasonic detector from UE Systems was used to identify leaks and a leak survey app, developed by the same company, to calculate annual savings obtained from repairing the leaks. At one facility, the compressed air audit revealed argon leaks as well. Combined savings from fixing identified leaks totaled 67.34 MTCO_{2e}, 63,975.30 kWh, and \$4,547 annually.

Water reduction

Two out of the four facilities had water-reduction projects. One project is regarding a reverse osmosis, or RO, water-filtration system. In some parts of the system, the seals have degraded over time and now cause the system to leak at a constant rate. The leak volume was measured and added to the water-reduction totals. The other facility is using a two-step wash-down process for a meat-handling area. Switching to a one-step process was considered and was added to the water-reduction totals.

It was found that the savings would be 292,061.26 gallons of water, 112 kWh, 1.92 MTCO_{2e}, and \$2,582 annually if these leaks were repaired and the wash-down process was simplified.

LED conversion

At one of the facilities, a lighting survey was conducted in a small office space area. The benefits of LED over fluorescent are that LEDs do not contain mercury or other hazardous substances, have a longer lifespan and provide more lumens. By installing LED ballast-bypass bulbs, the annual savings are 6.00 MTCO_{2e}, 5,701 kWh and \$314.

Regulated medical waste handling

The animal health group production facility is generating a large volume of regulated medical waste, or RMW. This waste is currently being disposed of using a commercial-haul away service designed for this type of waste disposal. This is problematic for the company as getting this large volume of waste to the pick-up location is a tedious

PROJECTS REVIEWED FOR P2 POTENTIAL, CONTINUED

process, the waste does not pack efficiently and this haul-away service is costly. The intern explored two machines that pulverize and sterilize regulated medical waste on-site. One machine was recommended, and it was found that the savings would be \$240,000 annually, as well as 1,431.38 MTCO₂e saved, by not incinerating the waste.

a temperature difference in excess of 60 degrees Fahrenheit. A thermal audit was performed to quantify the amount of energy lost when the doors are open unnecessarily. It was found that 44.31 MTCO₂e, 42,095 kWh and \$1,995 could be saved by closing the doors when possible.

Thermal energy loss

The cold storage warehouse has many dock doors that lead directly from their cooler area to an outside dock and loading area. In the summer, this can be

SUMMARY OF 2022 P2 INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings (\$/year)	Status
Compressed-air audit	67 MTCO ₂ e, 63,975 kWh	\$4,547	Partially Implemented
Water reduction	2 MTCO ₂ e, 112 kWh, 292,061 gallons	\$2,582	Recommended
LED conversion	6 MTCO ₂ e, 5,701 kWh	\$314	In-Progress
Regulated medical waste handling	1,431 MTCO ₂ e	\$240,000	Recommended
Thermal energy loss	44 MTCO ₂ e, 42,095 kWh	\$1,995	Recommended
Total¹	111,883 kWh, 292,061 gallons	\$249,314	
GHG reductions^{1,2}	1,551 MTCO₂e		

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

²EPA P2 GHG Calculator with Cost, Apr. 7, 2016 & EPA WARM Tool- Version 14, Mar. 13, 2018