


Intern: Carter Hassman
Major: Chemical Engineering
School: University of Kansas



Company background

The Kansas State University Pollution Prevention Institute 2023 circuit rider worked with eight different facilities to reduce their energy use, identify compressed-air leaks and assess chemical use. These facilities spanned various industries including health and fitness, dairy farming, wood and paper manufacturing, metal fabrication, flour milling and iron foundry.



*Facilities
throughout the
state of Kansas*

Project background

Each company was contacted to schedule a site visit and prior research was done to determine potential projects. On-site visits were conducted to assess and research pollution prevention, or P2, opportunities. Post-visit, each company received a detailed P2 report outlining recommended strategies to enhance environmental, economic and social outcomes.

Incentives to change

Implementing P2 projects benefits the environment, the community and employee health. Reducing energy and water use are the most common methods to reduce environmental impact and save money. Additionally, many companies have set sustainability goals to reduce their environmental impact and have deadlines to achieve these goals.

Many of the companies the circuit rider worked with did not have dedicated staff or time to assess P2 projects, even if the changes could significantly improve company operations and economics, as well as assisting in achieving environmental goals. By teaching about P2 and providing contemporary and practical alternatives to current practices, the Pollution Prevention Institute assists local businesses in lowering fiscal and environmental costs related to their current processes and practices.

PROJECTS REVIEWED FOR P2 POTENTIAL

LED conversion

A lighting survey was conducted at two of the facilities. The benefits of LEDs over fluorescents are that LEDs do not contain mercury or other hazardous substances, have a longer lifespan, provide more illumination (lumens), and consume less energy. By installing ballast-bypass LED bulbs, the estimated savings from the two projects are 181,160 kWh and \$12,204 annually.

Compressed air audit

The intern conducted compressed-air audits at five of the eight facilities. An ultrasonic detector from UE Systems was used to identify leaks and a leak survey app developed by the same company was used to calculate annual savings obtained from repairing the leaks. At one facility the compressed-air audit revealed oxygen, nitrogen, argon and carbon dioxide leaks as well. Combined savings from fixing identified leaks totaled 382,951 kWh and \$21,927 annually.

PROJECTS REVIEWED FOR P2 POTENTIAL, CONTINUED

Air compressor valves

At three of the eight facilities, the intern studied the energy loss during non-working hours due to leaks in the compressed-air system. During non-working hours, any leaks in the compressed-air lines will continuously drain pressure from the tank, forcing the air compressors to work to continuously provide more air. Installing timed valves would allow the air compressor to be shut off from the remainder of the system, decreasing the cost due to leaks. Combined savings from installing timed valves totaled 102,417 kWh and \$5,830 annually.

Fan efficiency

At one of the facilities, the intern studied the energy consumption rates of different fans in use to determine the most cost and energy efficient option. Four separate types of fans were in use at the facility, but one type provided much more airflow with the roughly the same energy consumption as the others, but a much a higher up-front cost. Multiple replacement methods were recommended with savings totaling 35,389 kWh and \$2,956 annually.

SUMMARY OF 2023 P2 CIRCUIT RIDER INTERN RECOMMENDATIONS

Project	Annual estimated environmental impact	Estimated cost savings (\$/year)	Status
LED conversion	181,160 kWh	\$12,204	Recommended
Compressed air audit	382,951 kWh	\$21,927	Recommended
Air compressor valves	102,417 kWh	\$5,830	Recommended
Fan efficiency	35,389 kWh	\$2,956	Recommended
Total¹	701,917 kWh	\$42,917	
GHG reductions^{1,2}	680 metric tons CO₂e		

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

²EPA P2 GHG Calculator with Cost, 29 November 2022