

Project Overview



Intern: Casey Nolte

Major: Chemical Engineering

School: University of Nebraska-Lincoln

Company Background

Novozymes Blair Inc. is an industrial enzyme producer located on the Cargill Biorefinery Campus in Blair, NE. The plant was originally constructed to make enzymes used in the first-generation biofuels industry. Now, the plant has expanded to produce a wider range of enzymes for second generation biofuels and animal feed. Novozymes is an international company with headquarters in Denmark. Novozymes has plants throughout North America, South America, China and India. Around 120 employees work in the Blair facility, and the plant runs 24 hours a day, 7 days a week.

Project Description

During the summer of 2021, Casey Nolte, a P3 intern, worked at Novozymes in Blair, Nebraska to develop potential Pollution Prevention (P2) opportunities. He investigated office utilities, the spend biomass waste stream, pump seal water use, and various fermentation electrical users. Novozymes has a commitment to environmental sustainability and the recommendations made by Casey serve as steppingstones in that path.

Pollution Prevention Benefits

During Casey's summer internship, numerous pollution prevention opportunities were developed. The largest proportion of savings comes from a reduction in electrical usage during fermentation, but water savings are also significant. Many recommendations only constitute a change in automation or procedure, which results in no implementation cost and instant payback, providing a strong incentive for implementation. Every recommendation made in this report has a low capital cost (<\$5,000) to ensure favorable prioritization and speedy execution if desired. In addition to the P2 recommendations made in this report, Casey also developed tools in Excel that use the plants data historian to analyze water and energy usage at a more precise level than utility bills allow. The possible savings if every recommendation were to be implemented is shown in the table below.

P2 Category	Annual Cost Savings	Annual Reduction of Resource
Electricity	\$84,000	1,410,000 kWh
Water/WW	\$26,000	6,850,000 gallons
Spent Biomass	\$24,000	~~
GHG	~~	560 mTCO ₂ e

This corresponds to an annual savings of **\$134,000**.