



Pollution Prevention Summer Internship Case Study: June-August 2024

Company profile:



Maddie McGee's Mountain Munchies makes several types of freeze-dried pet treats from repurposed beef organs and fish skins. The business owner, Chris McGee created the company with hopes that he could produce a desirable pet treat with zero waste involved. This is why only repurposed food waste is used in the making of these treats. Maddie McGees has been up and running since 2023, has only one employee, Chris, and all their manufacturing work is done in a small warehouse in Bozeman MT. Chris involved his business in the Montana Pollution Prevention program in order to better improve his manufacturing process and become even more waste conscious.

Challenges:

Maddie McGee's uses frozen beef liver, heart, lung and other organs for two of their 3 products. This meat is shipped monthly from Wickens Ranch in Winifred, Montana to Maddie McGees warehouse where it is stored in freezers. By reviewing purchasing and sales data it was discovered that Maddie McGee's was buying up to 1500 lbs. of beef at a time and only processing about 200-400 lbs. each month. Because of this they were running out of freezer space to store new inventory and had been periodically buying new freezers to keep up with storage. Fixing the disconnect between purchasing and processing would save money for the business and save electricity from freezing extra meat.



Another problem was discovered before the internship started, which was the ability for the businesses freeze driers to freeze dry products in a high temperature climate. Typically, in low temperatures (below 70 degrees) a full cycle in the freeze dryers takes 24-36 hours, but at higher temperatures the cycle time increases to 36-48 hours. A reduction in cycle time would save energy and would allow for more frequent cycles each week.

Solutions:

The solution implemented for beef storage involves a pause in purchasing beef until inventory is widdled down to almost nothing, then beef is to be bought based off need and not reordered until inventory is depleted again. Once extra inventory has been used up, extra freezers can be removed in order to save space and electricity, and only two of the four current freezers will need to be used for monthly beef storage.

For the freeze driers it was suggested they be closed off in a separate room that could be kept cold so when the weather is warm the machines will stay cooler and will not contribute to heating the rest of the building. Both solutions are projected to be implemented within 6 months of the end of the internship, once inventory has decreased.



Projected results:

Each large freezer uses an estimated amount of 839.5 kwh of electricity per month, which costs the business \$98 per freezer every month. The freezers are rented at a charge of 40 dollars a month each. Removal of two freeze driers from the facility would save Maddie McGees \$276 dollars total because of lack of rent and electricity fees. An estimated 1,444 lbs. of CO₂ would also be saved assuming that 0.86 lbs. CO₂ is produced for every kilowatt hour based off the national average.

For the three freeze driers it can be estimated that 96 hours of cycle time would be saved each month (2 cycles a week, 12 hours saved per cycle) This equates to 144 kwh for each of the two large freeze driers and 96 kwh for the small freeze dryer, which would save 45 dollars and 331 lbs. of CO₂ per month for about 4 months of the year when the weather is warm.

Table 1.1: Annual savings estimated after implementation of P2 solutions.

Solution	Initial Cost of Implementation	Annual Savings	Annual Air Pollution Reduction (lbs.)
Freezer Removal	\$0	\$3,312	17,328
Freeze Dryer Room Construction	\$500	\$180	1,324
Total	\$500	\$3,492	18,652

