



Case Study

Effluent Measurement Saves Beer!



ENVIRO —
STEWARDS



BEAU'S

SUMMARY

Beau's Natural Brewing Co. is Canada's largest organic craft brewery. It is also employee owned, a Certified B Corporation and powered by renewable energy and natural gas.

An environmental leader among Canadian breweries, Beau's was already responsibly managing trucked organic wastes and had engaged a university and an engineering firm to upgrade its onsite wastewater pre-treatment facilities to accommodate growth. Even so, Beau's was open to further gains.

In 2018, Beau's partnered with the Commission for Environmental Cooperation and Enviro-Stewards to undertake a Food Loss Prevention Case Study focused on food loss to the drain. The assessment was part of the Canadian Food Loss + Waste Cost-Share Program, supported by the Walmart Foundation and established by the Canadian Centre for Food Integrity and Provision Coalition.

Enviro-Stewards carried out the assessment using the CEC's [Why and How to Measure Food Loss and Waste: A Practical Guide](#). Results confirmed that the brewery's effluent organic loadings were equivalent to about eight weeks per year of total production.

The assessment identified three food loss prevention opportunities that would allow Beau's to increase production, save money and reduce embedded emissions. By implementing these measures, Beau's could increase product yield by 7.4 percent, with a payback of less than one year and savings of C\$722,000 per year. Implementing these measures would also significantly reduce organic waste haulage, reduce loadings entering the effluent treatment system, reduce embedded greenhouse gas (GHG) emissions by 590 tonnes per year, and preserve food calories equivalent to 165,000 meals per year.

KEY FACTS

- ❖ **Beer Saved:** 395,000 liters per year
- ❖ **Money Saved:** C\$722,000 per year
- ❖ **Average Payback:** 0.8 years
- ❖ **Embedded GHG:** 590 tonnes per year
- ❖ **Equivalent Meals:** 165,000 per year

Profiting from Sustainability

Beau's Natural Brewing Co. is Canada's largest certified organic craft brewery. A trailblazer among Canadian breweries, Beau's is the first craft brewery in Canada to use 100 percent green natural gas, 100 percent green electricity and green fuelling for two of its delivery trucks. It is also the first Canadian brewery to achieve Benefit Corporation certification (Certified B Corporation), a third-party measurement of a company's commitment to people and the planet.

Beau's believes that beer tastes better when you can feel good about drinking it. In support of this belief, Beau's goes to great lengths to ensure its product is environmentally and socially responsible, including:

- Making certified organic beer;
- Using locally sourced hops, malt, yeast and spring water;
- Choosing green electricity and natural gas;
- Printing labels, posters, cards, brochures and coasters on recycled paper; and
- Establishing an Employee Share Ownership Plan.



Food Loss Measurement

Even with such excellent credentials, environmental leaders like Beau's are frequently those most open to further gains.

In August 2018, Beau's hosted a visit by the Commission for Environmental Cooperation (CEC) expert group on food loss and waste measurement in North America. During the visit, Beau's quality manager and brewer outlined Beau's food loss management practices, including:

- Reusing the brewery's spent brewers' grain as cattle feed; and
- Diverting spent yeast and organic by-products to a biodigester to create energy for running a local farm.

However, as is the case for many processors, Beau's food loss metrics did not measure product losses to the sewer.

Effluent Measurement

Based on the volume of water consumed, the loadings of organic material found in Beau's wastewater, and the typical organic content of beer products, a back-of-the-envelope calculation found that organic loadings reaching the effluent pre-treatment system were equivalent to as much as 15 percent of annual beer production!

At the time of the visit by the CEC expert group on food loss and waste measurement, Beau's had already engaged a university and a consultant to design larger wastewater treatment facilities to address increases in effluent loadings.

Loss Prevention Assessment

Upon learning the potential magnitude of food loss to the drain, Beau’s underwent a Food Loss Prevention Assessment, with the support of the CEC and Enviro-Stewards. The assessment was part of the Canadian Food Loss + Waste Cost-Share Program, supported by the Walmart Foundation and established by the Canadian Centre for Food Integrity and Provision Coalition.

- Interviews/Surveys;
- Mass Balance;
- Proxy Data;
- Record; and
- Direct Measurement.

Effluent monitoring results, combined with a corresponding analysis of Beau’s best-selling product (Lug-Tread), confirmed that effluent organic loadings were equivalent to about eight weeks per year of total production.

While these results showed that not all of the effluent organics would be associated with product loss, and not all lost product is potentially preventable, the magnitude of potential loss was sufficient to justify further study.

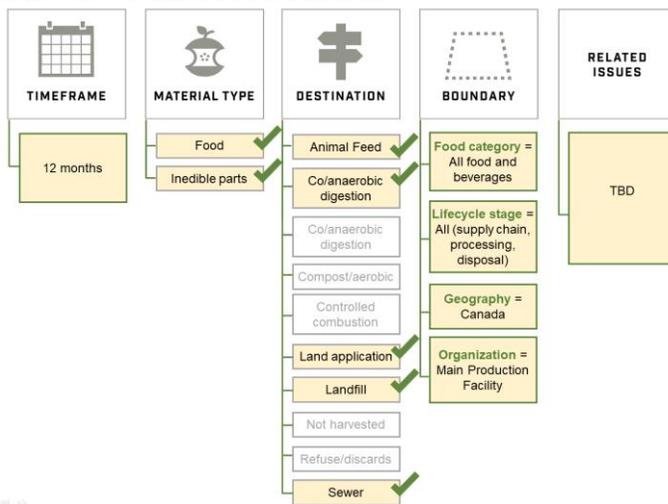
Review of records, mass balance analysis, interviews, and direct measurements were employed to identify and quantify three substantial remediation opportunities. Root-cause analysis, change management, and engineering design were then used to develop and vet specific remedies and to quantify their associated business cases for implementation.

The food loss prevention approach identifies different opportunities for each facility based on that facility’s largest losses.

In Beau’s case, three food loss prevention opportunities were quantified:

1. Recovery of additional wort from brew kettles following each batch;
2. Recovery of additional beer from fermenter yeast; and
3. Reducing product loss during keggling.

Beau’s All Natural Brewing Company



Food Loss + Waste Protocol [template](#) completed for Beau’s Brewery’s Food Waste Destinations. Measurement of loss to sewer lead to large gains.

In carrying out the Assessment, Enviro-Stewards employed its’ root-cause analysis based approach that is incorporated into Provision Coalition’s Food Loss + Waste Toolkit.

It also made use of the following food loss and waste measurement methods, which are outlined in the CEC’s [Why and How to Measure Food Loss and Waste: A Practical Guide](#):

Results

The food loss prevention opportunities identified at Beau's would collectively increase Beau's yield by 395,000 liters per year (7.4 percent), with a net savings of C\$722,000 and an average payback of 0.8 years.

They would also prevent 590 tonnes per year of greenhouse gas (GHGs) emissions embedded in the brewer's grain during the agricultural process (supply chain) and onsite processing operations.

The nutritional content of the conserved grains would be equivalent to 165,000 meals per year.¹

Implications

Growth

Increasing product yield by 7.4 percent will enable Beau's existing production facilities to accommodate an additional year of growth without requiring equipment upgrades to add capacity.

Profit

The 7.4 percent of additional beer yield will be exceptionally profitable as input costs for the grain, hops, energy, water, and labor needed to make this product have already been paid by the facility.

Footprint

Avoiding this loss of beer volume will reduce the amount of energy and water the facility had required to process each liter sold by close to 7.4 percent. It will also reduce the energy required to

grow and transport ingredients to the facility by about 590 tonnes per year of GHGs.

Furthermore, it will reduce haulage costs and emissions for trucked organic wastes, as well as the treatment capacity (size) and energy required to treat losses to sewage.



FLW Reporting

Food Loss and Waste (FLW) Reporting enables tracking of changes over time and their associated benefits.

The planned upgrades are projected to reduce by 18 percent the quantity of organic material hauled for land application and digestion. By reducing the organic loading of the system's effluent by some 3,400 kilograms per year, the upgrades will also substantially reduce the Biochemical Oxygen Demand (BOD) of the facility's onsite treatment system.

For further information about food loss and waste reporting, see the CEC's [Why and How to Measure Food Loss and Waste: A Practical Guide](#).

¹ This estimate is based on the caloric value of the grains if destined for human consumption.

“We are very privileged to have been part of this program. Preventing food loss furthers our goal of being a force for good while also improving our financial performance, which will allow us to continue to grow and thrive.”

We put so much effort into brewing world-class beer, that to think of how much of it was going down the drain makes me shudder. Thanks to the CEC and Enviro-Stewards, more of that delicious beer will go into people’s mouths, which is really what it’s all about.”

Steve Beauchesne, CEO and Co-founder, Beau’s Brewing Co.

More than just beer

Effluent measurement at Beau’s has conserved more than just beer. The benefits to the environment and to Beau’s bottom line show that food loss measurement can be an important component of sustainable manufacturing.



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