

EPA Sustainable Brewery Initiative:

Summary of Pollution Prevention findings from EPA Brewery Opportunity Assessments

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EPA Sustainable Brewery Initiative

An initiative to advance sustainability within the New York State (NYS) brewery industry was launched in 2020 by the New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology (RIT) and Cornell Craft Beverage Institute (CCBI)

The group assessed ten craft breweries around NYS. The project looked to document existing and potential best practices for reducing the environmental footprint of each brewery, as well as the NYS craft brewing industry as a whole.

We invite craft breweries to use any or all of the best practices collected in this presentation to further their sustainability goals.



**Assistance for NYS
Craft & Microbreweries**

Brewery Assessments

NYSP2I and CCBI project team conducted an assessment, engaging with key brewery personnel. They assessed the brewing operation, and baseline metrics for water, chemical, and energy usage. Additionally, wastewater discharge and waste generation data collected or confirmed from the initial self-assessments.



The project team identified pollution-prevention practices and opportunities for improvement and captured this in summary reports.

In addition to potential improvement opportunities, the summary reports also identified each brewery's existing environmental achievements. The reports were sent to the participating breweries, outlining sustainability best practices according to the metrics used in the original self-assessments (water, chemical, and energy usage; wastewater discharge; and waste generation)

Assessment Summary Goal

The goal of this assessment summary is to summarize all the findings from the 10 opportunity assessments and provide practical sustainability tools and approaches to craft breweries.



The assessment summary captures both potential improvement opportunities and brewery's existing environmental achievements.

Each section of the summary corresponds to the five focus areas addressed in the assessment:

- Reduce Water Use
- Monitor and Pre-Treat Wastewater
- Use Less Cleaning Chemicals
- Cut Down on Waste
- Become More Energy Efficient

Participating Breweries



Reduce Water Use

- Install water meters throughout the brewery to monitor how water flows through the brewing process; track water consumption to identify reduction opportunities; and target leaks, faulty equipment, or loose process controls.
- Reuse water for multiple purposes where possible, such as for rinses, cleaning cycles, or by condensing hot vapor from the kettle.
- Consider low-flow nozzles and fixtures as alternatives to the current units for cleaning hoses, faucets, toilets, and other appliances in addition to pursuing dry methods in place of wet ones where possible (e.g., sweeping floors).
- Implement sensors and precision-control methods wherever possible throughout the brewer. These may include visual indicators and automated tools to achieve uniformity and optimization.

Three Heads is one of the breweries from the EPA assessment that have installed water meters to monitor their water use. Read the case study [here](#).



Swiftwater is one of the breweries from the EPA assessment that reuses the final rinse of tank cleanings. Read the case study [here](#).



Sand City is one of the breweries from the EPA assessment that has installed reduced-flow fittings on all their water lines and implemented the use of iodine sensors. Read the case study [here](#).



Monitor and Pre-Treat Wastewater

- Monitor levels of total suspended solids (TSS), chemical oxygen demand (COD), biological oxygen demand (BOD), and phosphorus content in wastewater produced by the brewery in addition to the total volume sent to the sewer.
- Use mechanical separation or chemical oxidation to lower levels of TSS, COD, BOD and phosphorous concentrations in wastewater.
- Side-stream waste where possible to decrease the total volume of wastewater produced.



Industrial Arts, Paradox, and Other Half Brewing are three of breweries from the participating breweries that have already implemented several sustainability practices prior to our assessment , including centrifuge post fermentation beers to remove any remaining waste solids.

Use Less Cleaning Chemicals

- Reuse cleaning solution when possible. For example, use the final rinse of one cleaning cycle to start another cycle or to wash floors.
- Where possible, implement CIP systems to limit human error, reduce variation, and control chemical concentrations and water use.
- Rotate cleaning chemistries to decrease the chance of resistant bacteria growth.
- Replace traditional cleaning products with less toxic alternatives.

Sand City is one of the breweries from the EPA assessment that has implemented a Clean-In-Place (CIP) skid. They also started using citric acid in their passivation process, a chemical that is less harmful to the environment than their previous nitro-phosphoric acid used previously. Click on the case study image to learn more.



Cut Down on Waste

- Send spent grain to farms for animal feed or to organic-waste recycling facilities for composting or anaerobic digestion.
- Reuse yeast multiple times before disposal.
- Use super sacks or silos for bulk storage of commonly used feeds instead of single-use plastic bags.

Most breweries from the participating breweries have already implemented several sustainability practices prior to our assessment, including sending spent grain to farms for animal feed and reusing yeast multiple times before disposal.

Buried Acorn and Swiftwater have both installed a dry hopping device to their fermenter to reduce beer loss. Click on the case study image to learn more.

CASE STUDY

 New York State
Pollution Prevention Institute

Sustainable Solutions to Help Brewery Reduce Environmental Footprint



<p>Challenge</p> <p>Buried Acorn wanted to identify more ways that the brewery could reduce its environmental footprint.</p>	<p>Solution</p> <p>NYS P21 and CEEL performed an assessment to obtain metrics for a baseline. The evaluation helped to identify additional methods for sustainable brewing which Buried Acorn could choose to implement.</p>	<p>Results</p> <ul style="list-style-type: none"> Implemented sustainable practices such as sending spent grain to local farmers, capturing and utilizing CO₂ generated during operations, and reusing hot water from a heat exchanger and hot liquor tank for preheated water in next brew. The Brewery Sustainability Initiative assessment identified opportunities including the usage of water meters, reusing rinse water, and creating SOPs to standardize sustainable operating practices.
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Buried Acorn Brewing

Buried Acorn Brewing is a small brewery located in Syracuse, NY. Last year the brewery's annual production was 2,800 barrels of beer for consumption in the taproom and local distribution. The COVID-19 pandemic created an obstacle for Buried Acorn's plans for increased production; nevertheless, the brewery is still on track to increase its annual production. Additionally, Buried Acorn is continuing to strive for increased environmental excellence as its business continues to expand.


"Working with Ken and his team was extremely fluid. Given that it was 2020, virtual site visits and socially distanced site visits were productive and very educational. We are working together to this day to further modernize our facility and bring it up to date with current environmental protection standards."

Timothy Lucien Shore,
Buried Acorn Brewing


Challenges

Buried Acorn wants to reduce its environmental impact to continue to strive for environmental excellence. This small brewery has already implemented several methods to reduce its environmental footprint. New York State Pollution Prevention Institute (NYS P21) paired with Cornell Enology Extension Laboratory (CEEL) performed an assessment as part of the Brewery Sustainability Initiative to assist Buried Acorn's effort to increase sustainability.

CASE STUDY

 New York State
Pollution Prevention Institute

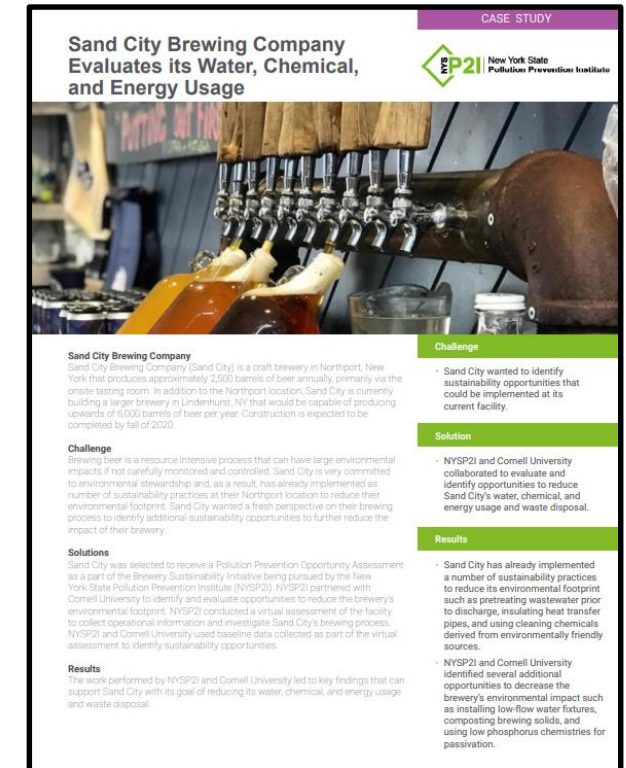
Swiftwater Brewing Company Seeks to Improve the Environmental Footprint of the Brewery



<p>Challenge</p> <p>Swiftwater Brewing Company (Swiftwater) is a craft brewery located in Rochester, NY that produces approximately 1,200 barrels of beer annually. Swiftwater has grown over the previous five years, and has incorporated a full-menu restaurant and bar.</p> <p>Challenge</p> <p>Swiftwater wants to understand and potentially lessen the environmental impact of the brewery as part of their commitment to environmental stewardship. Even as a small brewery, Swiftwater has exemplified a commitment to sustainability and has already incorporated methodologies and techniques to be more sustainable. However, Swiftwater wanted a new perspective to learn even more opportunities to further their sustainable practices. As part of the Brewery Sustainability Initiative being pursued by the New York State Pollution Prevention Institute (NYS P21), Swiftwater completed an initial brewery survey and were selected to receive an onsite opportunity assessment.</p> <p>Solutions</p> <p>NYS P21 collaborated with Cornell University to help evaluate and identify any opportunities to reduce Swiftwater's environmental footprint. NYS P21 conducted a site visit to collect baseline metrics and identify pathways for improving Swiftwater's existing sustainability practices.</p> <p>Results</p> <p>Swiftwater had already implemented a number of practices to reduce the brewery's environmental footprint when the onsite opportunity assessment was performed by NYS P21 and Cornell University. These include:</p> <ul style="list-style-type: none"> Providing spent yeast, grain, trub, and hops to a local farmer instead of disposing of it via landfill. Reusing yeast multiple times for brewing before considering it waste. 	<p>Challenge</p> <p>Swiftwater Brewing Company wanted to further improve sustainability practices in the brewery and decrease their environmental impact.</p> <p>Solution</p> <p>NYS P21 collaborated with Cornell University and conducted a site visit and a collection of baseline metrics to help evaluate and identify any opportunities to reduce Swiftwater's environmental footprint.</p> <p>Results</p> <p>Swiftwater had already implemented a number of sustainability practices to reduce their utility consumption and waste generation like utilizing a heat exchanger and providing their spent grain to a local farmer.</p> <p>NYS P21 and Cornell University identified a number of relatively simple ways to further decrease water, chemistry, and natural gas consumption in the brewery like testing low flow spray nozzles and recycling cleaning cycles and rinses for multiple purposes.</p>
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Become More Energy Efficient

- Implement heat exchangers to avoid using single-pass water to recover as much energy as possible from brewing.
- Schedule brewing to use hot water immediately rather than storing it for long periods of time.
- Insulate all pipes and tanks to ensure energy losses and gains from the environment are minimized.
- Install LED lighting with motion sensors or timers to conserve electricity.
- Encourage energy-smart habits like closing doors, replacing windows, performing maintenance, and regularly shutting down equipment when not in use.



Sand City has switched to LED lighting across their brewery. This change has resulted in the reduction of 72–80 percent in energy use (Per the U.S. Department of Energy), with an estimated annual savings of \$250. Click on the case study image to learn more.

Additional Brewery Resources

- Sharing resources related to:
 - Haulers/recyclers for composting, animal feed, etc.
 - Best practices and guides for sustainable brewing and sustainable supply chain ([click here](#))
 - Case studies from previous sustainable brewery assessments ([click here](#))
 - Past webinars and trainings



Thank You

Read craft-brewery sustainability [case studies](#) and find other sustainability [resources](#) for craft brewers on our website.

Contact our sustainability experts at nysp2i@rit.edu or (585) 475-2512.



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