



## SUSTAINABILITY PRACTICES FOR NORTH CAROLINA CRAFT BREWERIES

According to 2018 statistics published by the Brewer's Association, North Carolina's craft brewing industry, comprised of 291 craft brewers, had an economic impact in excess of two billion dollars. The industry generated 1,254,024 barrels of craft beer. North Carolina ranks seventh in the nation in the number of craft brewers and tenth in the nation in the size of its economic impact.

Sustainability issues are a top priority for the craft brewing industry, and for many craft beer enthusiasts. Consequently, the Brewers Association has provided guidance on many of these issues, as available at the link shown in the Resources section of this document.

Energy, water, wastewater, and solid waste issues are major components of a brewery's environmental sustainability. Here are some simple suggestions towards achieving effective management of these issues.

### ENERGY

**Establish your benchmarks.** The highest energy use in breweries is typically related to steam generation. When natural gas is used, roughly 70 percent of energy generation will be from natural gas, with the remaining from electricity. However, due to unit cost differences, 70 percent of the cost will be from electricity. Average energy resource use in the industry is 41 to 75 kBTU/bbl electricity and 130 to 150 kBTU/bbl natural gas.

**Convert to LED.** Not only does LED lighting use much less energy than other lighting options, it lasts longer and lessens maintenance costs. Additional savings on lighting can be achieved through the selective use of lighting controls such as timers, photocells or motion detectors where appropriate.

**Motor-driven equipment.** Use variable frequency drives in lieu of single speed motors where applicable. Power consumption varies with motor speed and VFD's typically reduce wear and tear due to starts and stops.

**Pneumatic equipment and controls.** Compressed air systems can be huge energy wasters. Follow a strict maintenance program calling for regular leak detection and repair.

**Boilers and steam system.** Minimize steam leaks and maintain systems regularly. Keep in mind that effective management and minimization of waste heat effects will also promote more efficient comfort control in work areas.

### ASSISTANCE AND RECOGNITION

Assistance in sustainability programs is available to North Carolina industries from a number of sources through NC DEACS, a non-regulatory division within the NC Department of Environmental Quality, including:

**Waste Reduction Partners (WRP)** is a state-wide team of retired engineers and scientists that provide no-cost technical assistance related to energy efficiency, water conservation and solid waste reduction. [WasteReductionPartners.org](http://WasteReductionPartners.org)

**The Environmental Stewardship Initiative (ESI)** is a free recognition program designed to promote and encourage superior environmental performance by NC's regulated community. It provides technical assistance and valuable networking opportunities to stimulate the development of programs that use pollution prevention and innovative programs to meet and go beyond regulatory requirements. [ncesi.org/](http://ncesi.org/)

## ENERGY (Continued)

**HVAC system.** Know the age of all equipment and plan for periodic replacement of major HVAC units with energy-efficient equipment. Programmable thermostats offer an automated approach to conserving energy during non-occupied hours.

**Renewable energy.** As a matter of corporate philosophy, the craft brewing industry has embraced and promoted the use and implementation of renewable energy sources.

## WATER

**Establish your benchmarks.** Breweries use an appreciable quantity of water: in production, in process cleaning, in floor and facilities cleaning, for utility purposes (e.g., steam generation, cooling water), for domestic purposes, and for other purposes. A 2011 study by the Beverage Industry Environmental Roundtable (BIER) showed that the average water use ratio was 4.28 liters of water used per one liter of beer produced. When on-site wastewater treatment or pretreatment facilities exist, any non-product water has an additional cost associated with its subsequent treatment.

**Minimize leaks and spills.** Leaks and spills will frequently imply not only lost profits but a loss in energy and materials. Identify particularly problematic areas of the plant for inclusion in preventive maintenance programs. Use the plant's work order system to respond quickly to problems and to improve systems for problem prevention.

**Low-flow fixtures and spray nozzles.** Be familiar with means of using water as efficiently as possible in all areas of the plant where cleaning takes place. Upgrade rest rooms and employee break rooms with low-flow fixtures.

**Use and maintain a clean-in-place (CIP) system.** Clean-in-place systems significantly lessen water use for cleaning of process equipment.

**Heat exchanger.** Water consumption can potentially be reduced by cooling hot water and heating cold water which can be returned to a hot water tank ready for next brew or usage elsewhere in the brewery.

## ASSISTANCE AND RECOGNITION

### The Recycling Business Assistance Center:

<https://deq.nc.gov/conservation/recycling/recycling-business-assistance-center>

The RBAC maintains the following resources:

### NC Directory of Markets for Recycling

<http://www.p2pays.org/dmrm/start.aspx>

### NC Waste Trader

[www.ncwastetrader.org/home.aspx](http://www.ncwastetrader.org/home.aspx)

**NC Green Travel** is a statewide recognition program for hospitality sector businesses in pursuit of environmental goals.

It's free, easy to apply, and provides market tools that can help your business promote its progress towards sustainability.

<https://deq.nc.gov/about/divisions/environmental-assistance-customer-service/nc-green-travel-program>

Set a good example for sustainability and get rewarded in the process! Apply for recognition as a sustainable brewery through NC GreenTravel Initiative and the Environmental Stewardship Initiative.

## WASTEWATER / STORMWATER

**Establish your benchmarks.** Like many food processing industries, breweries generate a quantity of high-strength wastewater. Most breweries discharge 70% of water purchased as wastewater. Challenges with the management of these streams are well established and there are a number of proven strategies for their implementation. Consider effective pretreatment processes, which can range from simple equalization to anaerobic digestion. Keep an eye on water use per gallon of finished beer (generally from four to ten liters of water purchased per liter of beer produced), a good indication of how your brewery is performing in both water conservation and wastewater minimization.

**Know your community.** As a conscientious corporate citizen, an understanding of the watershed you reside in can frequently allow a holistic approach to wastewater issues. A number of developing concerns are related to impacts of materials sent to surrounding farms (see Solid Waste section below) that have a tremendous potential to impact the quality of stormwater runoff. Consider an audit of your partners and put them in the best position to successfully manage your materials.

**Consider the benefits of pretreatment.** Brewers who discharge their wastewater without pretreatment are typically billed a surcharge for their high strength organic content as measured by BOD or COD analysis. Pretreatment can substantially reduce the associated surcharges. The decision to make this investment should also include metering capabilities, so that sewer charges are based on metered wastewater flows, not water use.

## SOLID WASTE

**Establish your benchmarks.** There are four general solid waste streams produced at craft breweries: spent grains and hops from the brewing process, packaging wastes, food service wastes, and wastes generated during special events. Establish relationships with your solid waste services that permit you to know the weight of what you are sending where. This will provide you a good picture of existing levels of recycling and landfill diversion.

**Know your community.** Much of the process waste from brewing can either be used as animal feed or in composting. By knowing what opportunities there are in your community, avenues for environmentally-preferable reuse options will be apparent, permitting your business to make appropriate decisions on when to develop in-house capabilities.

**Dumpster dives.** A useful tool in determining the effectiveness of in-house efforts to recycle is to periodically perform a dumpster dive. These frequently lead to revelations on where improvements need to be made to in-house programs.

**Packaging matters.** Packaging costs can account for 30% to 50% of total finished goods costs. Effective strategies for reducing costs in this area is vital to the industry overall.

**Reduce/ Reuse/ Recycle:** Make your employees a partner in efforts to effectively manage solid waste issues on site. Provide incentives for innovative reduction strategies and take pride in an effective recycling program.

## RESOURCES

Brewers Association - [www.brewersassociation.org/best-practices/sustainability/sustainability-manuals/](http://www.brewersassociation.org/best-practices/sustainability/sustainability-manuals/)



This guidance is produced by Waste Reduction Partners, a program of the Land of Sky Regional Council (LOSRC) in partnership with the North Carolina Department of Environmental Quality (NCDEQ), Division of Environmental Assistance and Customer Service. Any opinion, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of either the NCDEQ or LOSRC.