

# GREEN BREWERY

## PROJECT

Thanks to an EPA Pollution Prevention grant awarded to UMass Boston, the following pages showcase examples of best practices in a variety of operations within the craft beverage industry. Identified through research by sustainability professionals who conducted more than 30 brewery site visits, these ideas often increase efficiency, decrease waste, improve safety, save money, and are widely adoptable.



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# SOURCING RAW MATERIALS + INGREDIENTS

Buying Local: Sourcing local ingredients, especially malt (the principal ingredient by weight and volume), can often decrease Scope 3 greenhouse gas emissions (those that come from supply chain deliveries) while supporting local and often regenerative agriculture.

- Small breweries (less than 1,000 bbls in annual production) such as **CraftRoots** in Milford, mid-sized breweries (1,000–10,000 bbls annually) like **Exhibit 'A'** in Framingham or **Lamplighter** in Cambridge, and large, regional brewers (more than 10,000 bbls annually) including **Wormtown Brewery** in Worcester are currently sourcing substantial amounts of malt from local suppliers in New England or New York.
- The Craft Maltster's Guild has a [useful list of local suppliers](#) such as Valley Malt in Holyoke and Stone Path in Wareham (its line of Nor'East Gold Malts are grown locally), along with 8 other maltsters located in the Northeast.
- Though currently there is only one substantial commercial hops provider in Massachusetts, [Four Star Farms](#) in Northfield, more than 50 breweries around the state are sourcing some portion of their hops from this farm.
- Fruit, honey, and other specialty ingredients can often be sourced from small, local farms throughout Massachusetts. You can use the [Massachusetts Grown](#) web page and map to locate seasonal crops and products grown near you.
- A good place to start is by brewing a special-release beer made with 100% local malt/hops/ingredients. Highlight the environmental benefits of sourcing locally and consider joining a local agriculture group like the [Northeast Grainshed Alliance](#), which promotes the benefits of growing and eating local grains through its [SQFT Project calculator](#) tool and label logo.

# BUY *Organic*

Organic farming methods don't use pesticides/herbicides or chemical/synthetic fertilizers and are significantly less harmful to the environment than conventional/industrial methods. Choosing organic ingredients supports sustainable agriculture and surveys have shown that many consumers will pay a premium for beer that is more sustainably produced.



Many malt providers offer organic options for a wide variety of their products.



Yakima Chief Hops offers several organic hop varieties.



RiverWalk Brewing in Newburyport sources its Pacific Northwest varieties from Crosby, a certified B-Corp business. Though not USDA organic, their hops are sustainably sourced and meet both Salmon Safe and Global G.A.P. standards.



Sourcing other organic ingredients such as fruit, honey, etc. is commonplace. This Mass.gov web page provides a map of the commonwealth's organic growers.



# Buy in Bulk

Purchasing raw ingredients in bulk, especially malt, is typically more economical and eliminates significant packaging waste, much of which is difficult to recycle. It also decreases Scope 3 greenhouse gas emissions (those that come from the supply chain) because of fewer delivery trips and in some cases more efficient delivery transport such as rail.



In Waltham, regional brewer **Mighty Squirrel** orders most of its malts in supersacks, which hold ~2,200 lbs of malt, the equivalent of 40 industry standard 55-pound bags. This typically results in savings of 5 cents per pound, or \$110 per supersack order. It also prevents hundreds of hard-to-recycle grain bags from filling up their dumpster and ending up in landfills or incinerators.

Other regional breweries including **Trillium Brewing** in Canton and **Castle Island Brewing** in Norwood have invested in grain silos that hold 45,000–50,000 lbs of malt and allow them to pay a significantly lower price for their base malt than even supersacks. This results in a savings of thousands of dollars per silo fill and prevents thousands of plastic grain bags from going to waste.

**Aeronaut Brewing** sources hops from vendors who offer them in cryo format (more concentrated than pellets) which decreases Scope 3 GHG emissions because of fewer deliveries. It also increases efficiency during the brewing process by producing better wort yield, thereby increasing the profitability of every batch of hoppy beer they produce.

## Case Studies:

- [Wormtown Brewery Sourcing Local Ingredients](#): An overview of sourcing ingredients for production of Mass Whole Lager, a flagship offering that inspired the “Piece of Mass in Every Glass” motto.
- [Pure Project Brewing Sources Local Ingredients](#): A case of how one brewery incorporates local ingredients and highlights local flavors in its production decisions.

# SOURCING RENEWABLE ENERGY

Basic service from Massachusetts electricity utilities (Eversource, National Grid, Unitil) currently consists of only 59% renewable energy, but businesses can choose a third-party supplier that offers up to 100%. This supports the renewables market by increasing demand, ultimately resulting in cleaner and healthier air quality for all.

**Community Choice Aggregation (CCA):** Sourcing electricity through a municipal CCA renewable energy option reduces Scope 2 greenhouse gas (GHG) emissions (purchased electricity) and sometimes results in lower cost and/or advantageous contract terms. Its fixed rates are guaranteed for a specified length of time with low or no cancellation fees.

- **Portico Brewing** in Somerville signed up for its municipal CCA “100% Local Green” option without changing its utility provider, secured a favorable kWh rate for a fixed time, and met its sustainability goal of decreasing emissions.
- The Massachusetts Department of Utilities maintains a [list of approved municipal aggregations](#) you can reference to see if your city or town offers CCA.

**Community Solar:** Subscribing to community solar allows breweries to source renewable energy generated by off-site solar arrays. As a result of federal subsidies, community solar rates provide [savings of between 5% and 10% in Massachusetts](#). The discount depends on your utility company and the specific solar farm operator.

- Breweries of all sizes are eligible. Recent converts include **Lost Shoe Brewing** in Marlborough, **Coastal Mass Brewing** in Beverly, **Moby Dick Brewing** in New Bedford, **Exhibit ‘A’ Brewing** in Framingham, and **Amherst Brewing**, all of which subscribed through MBG Associate Member [East Coast Renewable Energy](#).
- For a full list of subscription managers, visit the [Mass. Clean Energy Center](#).

## Case Studies:

- [Short’s Brewing Company purchased RECs](#): Short’s Brewing purchased 538,552 (kWh) of RECs generated by wind farms across America. The RECs offset 100% of its electricity use.
- [Applying renewable energy strategies in the brewery](#): Breweries in Ohio, California, and Colorado serve as examples on how to incorporate renewable energy and sustainable practices into their businesses. Topics include solar arrays, wind turbines, RECs, battery storage, and biogas.

# SOURCING RENEWABLE ENERGY CONTINUED

**Power Purchase Agreement (PPA):** Sourcing renewable energy through a PPA is another way to take advantage of guaranteed rates, often at discounted cost, through what are known as Renewable Energy Credits (RECs). These efforts support renewable energy projects that contribute to a cleaner electricity grid for everyone and allow a business to demonstrate its commitment to renewable energy.

- The easiest way to compare options is to visit the state's [EnergySwitch](#) website, which provides a list of third-party suppliers (as well as their rates and contract terms) in any of the Commonwealth's municipalities.
- Breweries like **Lamplighter Brewing** in Cambridge and **Gentile Brewing** in Beverly, have secured PPAs through third-party suppliers without having to change their utility provider.
- **Cambridge Brewing Company** has been using wind energy RECs through Constellation Energy for years. It recently found out it was also eligible for community solar, and by signing up took advantage of the 7% savings it offers.

**On-Site Solar/Wind:** Breweries that own their building or property and are willing to make a capital investment can install on-site renewable energy, such as a solar array or wind turbine. Incentives like [the 30% federal tax credit](#) greatly improve the economics, but careful ROI analysis should be utilized.

- **Barrington Brewery** in Great Barrington provides 85% of its electricity needs with an on-site 144 KW solar system. It produces 168,000 kWh annually.
- **7th Wave Brewing** in Medfield installed a 500-kilowatt rooftop solar array that produces 200% of the entire building's electricity needs. By selling the unused kWhs of electricity to the grid, the owner significantly improved his ROI.
- **RiverWalk Brewing** in Newburyport leases space from a building with an on-site wind turbine and rooftop solar array. As a result, Riverwalk gets nearly 100% of its electricity from that onsite renewable energy at an affordable and predictable cost.

# SOLID WASTE REDUCTION

Reducing solid waste by adhering to the EPA's REDUCE-Reuse-recycle hierarchy decreases local greenhouse gas (GHG) emissions, lessens land, air, and water pollution associated with landfills and incinerators, and improves operational efficiencies that often lower purchasing and waste hauling expenses.

## REPURPOSING BREWERS SPENT GRAIN (BSG)

Representing up to 85% of a brewery's solid waste production, organics like spent grain have drawn increased attention from states and municipalities. Because Massachusetts lowered its threshold on the allowable amount of commercial organic waste to one-half ton per week in November of 2022, and because hauling fees can quickly add up, it's imperative for breweries to have a protocol for repurposing BSG.

## COMMON SOLUTIONS

- Many breweries partner with local farmers and arrange for regular pickups of BSG to be hauled to the farm and used as animal feed or compost.
- Alternatively, smaller breweries can pay a fee to have a commercial composter such as [Black Earth Compost](#) haul it to a composting facility.
- For urban breweries not in proximity to farms, or for those producing large enough quantities, a broker can arrange to haul BSG to farms for them.
- Mid-sized brewery **Lamplighter Brewing** in Cambridge contracts with specialty disposal company [Against the Grain](#) to have its BSG regularly hauled to local farms.
- Large regional breweries like **Jack's Abby** in Framingham collect BSG in quantities that require a separate silo which is mechanically emptied into a large truck by a broker who hauls it to local farms. At this scale, service typically requires no cost or sometimes results in revenue for the brewery.
- Other regional breweries including **Berkshire Brewing** in South Deerfield and **Tree House Brewing** in Charlton contract with [Vanguard Renewables](#) to have their BSG, and sometimes other organic waste including liquids, hauled to a local anaerobic digester where it is converted to biogas.

REDUCE  
REUSE  
RECYCLE

## ALTERNATIVE USES FOR BSG

- Local snack foods producer [Brewers Foods](#) uses BSG as an ingredient in its line of commercial products made from upcycled grains.
- [Brewers Biscuits](#) crafts dog biscuits from BSG provided by Massachusetts breweries.



# Reducing Waste *especially plastic*

To be in compliance with Massachusetts [waste ban regulations](#), cardboard, aluminum, glass and plastic containers should be collected for recycling rather than disposed of with other trash. Several problem materials, including most grain bags, can label backing/rewind, or stretch wrap and other plastic film (not accepted in single stream recycling) require alternative collection methods or extra effort to keep them from filling up dumpsters.



## Operations Waste

- Mid-sized brewery **Untold Brewing** applied for a [Reduce, Reuse, Repair Grant](#) from the MassDEP to pilot the idea of replacing stretch wrap with reusable [Pallet Wrapz](#), which it now uses for moving cans and kegs throughout the brewery. The switch reduced waste, saved money, and has been replicated by other South Shore breweries.
- Small breweries like **Lost Shoe** in Marlborough and **East Regiment** in Salem have found creative uses for grain bags such as donating them to farmers, or to entrepreneurs as material for custom reusable bags, and even using them for litter pickups or as trash can liners.
- Others, like **Redemption Rock** in Worcester and **Exhibit 'A'** in Framingham have decreased grain bag waste substantially by sourcing malt from suppliers that use recyclable paper bags, like Valley Malt.
- Mid-sized and regional breweries like **True North Ales** in Ipswich and **Bent Water Brewing** in Lynn reduce single-use grain bags by receiving base malt in silos.
- **Wormtown Brewery** reduces solid waste in a variety of ways, from using pre-printed cans instead of labels for its flagship IPA to purchasing cleaning chemicals in bulk with refillable containers.

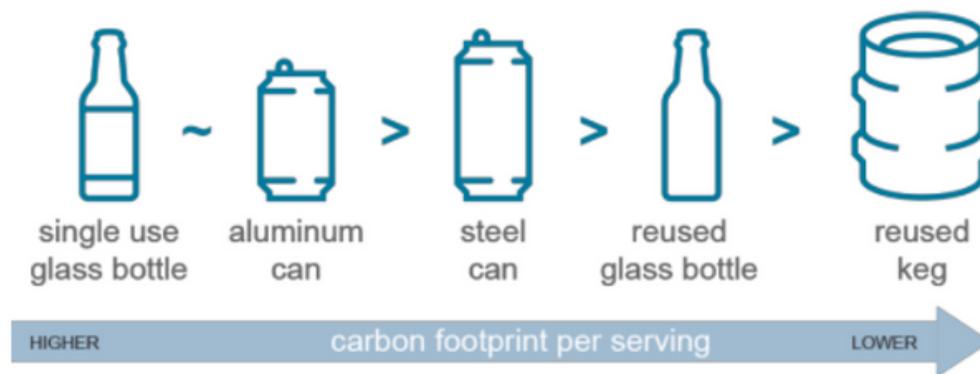
## Taproom Waste

- Both **Lamplighter** and **Redemption Rock** provide 3-stream waste collection setups with clear signage (recycle, compost, trash), that notably decrease their landfill waste.
- **Portico Brewing** received a Reduce, Reuse, Repair Grant from MassDEP to outfit its taproom with reusables for beer, water and food service.
- **Remnant Brewing** in Somerville and **Vitamin Sea** in Weymouth offer customers self-serve water stations that provide reusable cups.
- **The Brewery at Four Star Farms** uses electric hand dryers in its bathrooms that eliminate paper towel waste.
- **Brick & Feather Brewing** in Turners Falls and **Coastal Mass Brewing** in Beverly offer consumer take-back programs for plastic can carriers that can be reused. Popular with customers, reused packaging also reduces the brewery's packaging cost.

*Reducing, reusing, and recycling materials in taprooms often saves money and typically resonates with environmentally conscious consumers*

# ENVIRONMENTALLY CONSCIOUS PACKAGING

A key finding from a review by the Oregon Department of Environmental Quality on various lifecycle analysis (LCA) studies reveals that packaging format is typically responsible for the most significant environmental impact in the life cycle of beer. Fortunately the most sustainable option, reusable kegs (especially when the beer is sold on-premise at the brewery), is also the most profitable.



**Emphasize Local Sales of Draught Beer:** On-premise taproom sales of draught beer served in reusable glassware is the most efficient sales strategy, yielding the greatest profit margin and creating the lowest environmental impact of any packaging format.

- **Democracy Brewing** in Boston sells the vast majority of its beer straight from serving tanks and in reusable glassware at its beer hall. Such efficiency requires less labor and fewer materials, wastes less beer, and yields more profit.
- Regional brewer **Wormtown Brewery** in Worcester sells nearly 60% of its beer in reusable kegs and focusses on local distribution and high sales volume.

**Offer Refillable Growlers To Go:** A thoughtful growler filling policy provides a greener option for environmentally conscious consumers and further decreases the environmental impacts of takeaway beer with each reuse. Educating consumers on safety, state compliance, and post-fill quality of growler use is necessary, but the profit margin and potential for repeat business often makes the effort worthwhile. The Brewers Association growler fact sheet is a helpful resource.

- **Cambridge Brewing Company** sells pre-filled growlers from a consumer accessible retail beer refrigerator, saving time for taproom workers and consumers alike.
- Other breweries have offered a “frequent filler” incentive program that rewards customers with a free refill after a specified number of fills have been purchased.

# ENVIRONMENTALLY CONSCIOUS PACKAGING

## **Reduce Plastic Packaging Waste Associated with Can Sales:**

Reducing, reusing, or properly recycling packaging materials (especially plastic) can improve efficiency, decrease waste, save money and build brand affinity with environmentally conscious consumers.

### Can Labels

- Large breweries like **Harpoon**, **Jack's Abby**, **Lord Hobo** and **Wormtown** purchase cans with pre-printed labels instead of vinyl stickers or shrink-wrap for their flagships.
- **Lamplighter Brewing** in Cambridge sources vinyl sticker labels from [Amherst Label](#), which offers a label backing/rewind take-back program that collects and properly recycles the material for them.

### Can Carriers

- **Gentile Brewing** in Beverly and **Redemption Rock Brewing** in Worcester have opted for compostable can carriers made by [E6PR](#) from 100% plant fiber (no plastic at all).
- **Remnant Brewing** in Somerville, **Lost Shoe Brewing** in Marlborough, and **Navigation Brewing** in Lowell offer consumer take-back programs at their retail counters for their hard-to-recycle plastic can carriers (which are not accepted by single-stream curbside programs). Popular with consumers, the programs enable them to reuse the carriers when returned, reducing each brewery's packaging cost.
- **Tree House Brewing** in Charlton sells on-site retail cans without any additional packaging at all (loose), providing only recyclable/reusable cardboard flats for its consumers.

### Securing Cans/Kegs on Pallets

- **Untold Brewing** in Scituate received a [Reduce, Reuse, Repair Grant](#) from MassDEP to pilot the idea of replacing single-use plastic stretch wrap with reusable [Pallet Wrapz](#) for moving cans and kegs throughout the brewery. The switch reduced waste, saved money, and has been replicated by other South Shore breweries.
- Somerville's **Portico Brewing** successfully piloted a similar program, but with industrial strength rubber bands from [Aero Rubber](#).



# ENERGY EFFICIENCY

Efficient energy use is one of the most practical measures a brewery can implement to lower production costs, as well as associated Greenhouse Gas Emissions (GHGs), and is often incentivized by state or federal tax breaks. Additionally, free energy audits and consulting services are available for small business owners through [Mass Save](#) assessments and [Center for EcoTechnology](#) (CET) efficiency programs.

## Temperature Controls/Refrigeration

- According to Craft Brewing Business, a third of a brewery's energy costs typically go toward refrigeration. Optimizing equipment can reduce cost by 20% to 50% according to CoolPlanet. **True North Ales** saves big with spray foam insulation and indoor-outdoor air exchange during winter months. **Gentile Brewing** avoided the high price tag of a refrigeration system by installing a CoolBot to a high-BTU air conditioner.
- The **Brewery at Four Star Farms** saved energy by not installing HVAC in its brewhouse, instead using heat generated from the brewing process.
- Where HVAC does exist, as much as 10% can be saved annually by lowering temperatures 7°-10°F for 8 hours a day by using programmable thermostats.

## Efficient Lighting

- It's estimated that 17% of the electricity consumed in U.S. commercial buildings is for lighting. **Democracy Brewing** and **Lost Shoe Brewing** utilize LED lights, which can reduce energy use by 90% compared to traditional lighting.
- Additionally, motion detection sensors at **Exhibit 'A' Brewing** and **True North Ales** (which earned an efficiency award from its utility) provide further energy reduction.

## Proper Insulation

- Proper insulation of a brewery's building envelope (walls, ceilings, window/doors), as well as most piping, helps ensure efficiency and is inexpensive, especially when subsidies and tax breaks are available.

## Preventative Maintenance

- **Exhibit 'A' Brewing**, **Lamplighter Brewing**, and **Wormtown Brewery** have all implemented SOPs that include preventative maintenance such as regularly checking for leaks, changing filters, and adjusting equipment settings. Frequent maintenance reduces energy use and often extends the useful life of equipment.



# ENERGY EFFICIENCY

## Electrification of Equipment:

### Electric Brewhouse

- Investing in an electric brewhouse significantly decreases Scope 1 GHG emissions (fossil fuels burned on site) and improves energy efficiency for smaller or mid-sized brewing systems (those no larger than 10-bbl).
- **Roundhead Brewing** in Hyde Park, as well as **Remnant Brewing** and **Portico Brewing** in Somerville (the latter powers its brewhouse with renewable energy through the city's Community Choice Electricity program), all purchased electric brewing systems. In addition to better energy efficiency, their facilities also benefit from better air quality.

### Heat Pumps

- Replacing oil- and gas-powered HVAC equipment with electric-powered heat pumps not only lowers a brewery's Scope 1 emissions, but since heat pumps are so efficient at heating and cooling they also lower energy bills. Federal and state tax incentives make them especially attractive when replacing HVAC equipment.
- **Treehouse Brewing Company** in Charlton recently installed high-efficiency air source heat pumps when they renovated their office space.

### Electric Vehicles (EVs)

- Because electric vehicles don't burn fossil fuels, they lower a brewery's Scope 1 emissions, especially when charged with renewable electricity. EVs also offer lower cost of ownership over the long term, and leasing can eliminate the up front capital expense of a new vehicle. Small cars for salespeople offer the easiest point of entry, while electric delivery vehicles continue to emerge in the market.
- **Denver Beer** Company in Colorado recently purchased 3 EV cars and **Steamworks Brewery** (also located in CO) recently added 2 cars to their sales fleet. New York City distributor Manhattan Beer has a fleet of electric Volvo delivery trucks.

### Energy Storage

- Though electrifying multiple operations lowers a brewery's GHG emissions, careful planning is required for smaller breweries to avoid peak demand charges. One way is to store energy in batteries, discharging power at times of peak overall consumption.

# Energy Efficiency Operations Checklist



## Low/No Cost

1

Perform monthly leak checks on HVAC, CO<sub>2</sub>, and air compressor lines using a soap spray bottle.

2

Small breweries (under 3,000 bbl) should schedule a free energy audit with [CET](#), mid-sized breweries (over 3,000 bbl) with [Mass Save](#), and large breweries (over 10,000 bbl) with the [Industrial Assessment Center \(IAC\)](#).

3

## Moderate Cost

Installation and maintenance of insulation for the building envelope and all temperature sensitive piping.

4

Install variable speed drives on all process, HVAC, and auxiliary application motors that don't yet have them.

5

Where feasible, incorporate efficient on-demand hot water heaters in the brewhouse and taproom.

6

## High Cost/Investment with Favorable ROI Over the Long Term

Upgrade/replace end-of-life stage HVAC systems with high efficiency options, including heat pumps.

7

Utilize the 30% federal tax subsidy to Install an on-site solar array to offset some or all electricity use.

# WATER CONSERVATION



## Why it Matters

In addition to the many environmental factors for conserving the planet's fresh water supply, breweries can save money and help decrease risks such as regional water scarcity with thoughtful standard operating procedures (SOPs). It makes sense to start with careful tracking and benchmarking to assess current efficiency. The Brewers Association offers a valuable [water reduction manual](#) for its members.

## Actions You Can Take



01

### Monitor and Benchmark

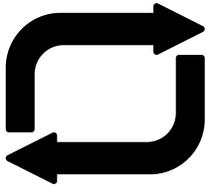
Breweries of all sizes should review water utility bills and compare their water-to-beer ratio to the industry average for their production size.



02

### Maintain and Repair

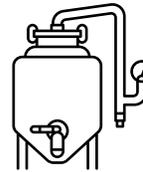
Regularly inspect, identify, and repair any leaks, malfunctioning float operated valves, water-sealed vacuum pumps, and any other likely sources of inefficiency.



03

### Utilize Closed Loop Systems and Reuse

Avoid once-through cooling water with chillers or cooling towers. Capture condensate and other potentially wasted water for reuse.



04

### Clean In Place (CIP)

**Untold** and **Democracy Brewing** use CIP, and **East Regiment** has a CIP cart. Automated cleaning typically uses just the right amount of water to get the job done., eliminating inefficiency.



05

### Don't Use a Hose If a Broom Will Do

Use a broom or squeegee on floors whenever possible. For large surface areas invest in an electric floor scrubber. Have a high-pressure, low-flow nozzle if using a hose.



06

### Can Rinse With Air

**Jack's Abby** and **Aeronaut Brewing** conserve water with ionized air can rinsing. If rinsing with water, don't forget to turn the canning line water source off when not in use.

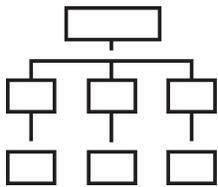
# WASTEWATER MITIGATION



## Why it Matters

Brewery wastewater eventually becomes effluent (after chemical- and energy-intensive treatment) that gets discharged into local waterways. Now that the industry has matured, municipalities more frequently require that craft breweries be permitted, monitored and assessed surcharges for the organics and solids in their wastewater. The Brewers Association offers a valuable guidance [manual](#) for its members.

## Actions You Can Take



01

### Monitor Your Wastewater

Build a simple water balance chart comprised of incoming water versus water accounted for in packaged beer or its byproducts (spent grain, etc.) and wastewater discharged through drains.



02

### Side Stream Solids

Physical treatment such as screening and settling, along with sedimentation, flotation and filtration can remove most solids and reduce BOD and TSS. Side streaming spent yeast and trub may be the most cost-effective way to lower surcharges.



03

### Don't Waste Finished Beer

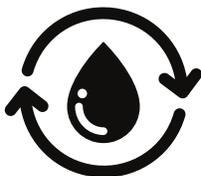
Prevent beer/money from literally going down the drain by emphasizing SOPs with production and taproom staff. Consider inventory monitoring technology.



04

### Find Outlets for Side Stream Waste

Large breweries like **Tree House** or **Berkshire Brewing** send side steamed material to [Vanguard Renewables](#) to be converted to biogas. Some small breweries send it to farms for feed or compost.



05

### Reduce, Reuse, Recycle

The easiest way to lower wastewater surcharges is to send less down the drain. Identify residual water during brewing, packaging, and cleaning operations and reuse it for landscaping, CIP pre-rinsing, or floor cleaning.



06

### Apply for Exemption

**Brick & Feather** and **Castle Island Brewing** lower sewer charges by only paying for what actually goes down the drain (not for water that goes into packaged beer) and documenting it with their local water utility.



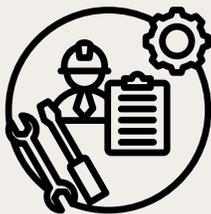
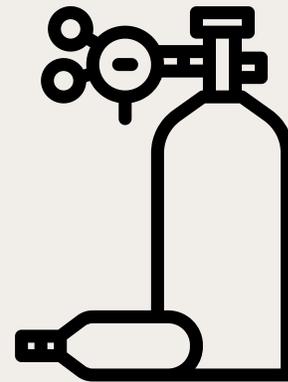


# REDUCING CO<sub>2</sub> CONSUMPTION

Decreasing the amount of purchased CO<sub>2</sub> your brewery uses offers many benefits, from cost savings and supply chain headaches to worker safety to lowering your carbon footprint.

## FOCUS ON EFFICIENCY

Brewers should review standard operating procedures (SOPs) and measure consumption of CO<sub>2</sub> to identify wasteful habits or inefficient practices when purging, blanketing, or carbonating. Knowing your CO<sub>2</sub>-to-beer (per bbl) ratio, identifying the processes that require the most use, and comparing them to industry norms can be faster, cheaper, and more practical for most breweries than investing in CO<sub>2</sub> recovery technology.



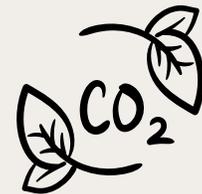
### MAINTENANCE & EFFICIENCY

Regular maintenance and leak detection should be a first step, followed by adjustments to CO<sub>2</sub> pressure and temperature, and then measurement of usage during specific process. **Lost Shoe Brewing** uses a dissolved oxygen meter to provide real-time data that helps reduce purge time and CO<sub>2</sub> use.



### REPLACE CO<sub>2</sub> WITH N<sub>2</sub>

For environmental & economical reasons, a number of operations can be carried out with N<sub>2</sub> (an inert rather than greenhouse gas). **True North Ales** installed a bulk nitrogen tank for cleaning and purging tanks. **Dorchester Brewing** and **Aeronaut Brewing** have also benefited by switching to N<sub>2</sub> for purging tanks, and as a blanketing gas during the canning and seaming processes.



### RECOVER YOUR OWN CO<sub>2</sub>

**Notch Brewing** and **Jack's Abby** use spunding valves to capture CO<sub>2</sub> for natural carbonation. The latter has even figured out a workaround for dry hopping. **Cambridge Brewing** and **Element Brewing** seal tanks as fermentation winds down to build up natural carbonation. **Trillium** and **Tree House** have installed carbon capture devices from [Earthly Labs](#).

**RESOURCES: [BREWERS ASSOCIATION](#) / [CRAFT BREWING BUSINESS](#)**



# Greener and Safer Cleaning & Sanitizing

Conventional chemicals are high in toxicity and global warming potential, pose risk for workers, and add to the burden of wastewater treatment facilities.



## Front of House/Taproom

Choose products that meet the EPA's Safer Choice standard. You can search its database for a variety of cleaners, detergents, disinfectants and more.

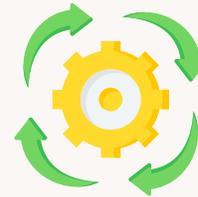
## Brewhouse Operations

The Toxics Use Reduction Institute or TURI provides resources for identifying and testing less toxic cleaning and sanitizing options for beverage producers.



## Efficiency = Cost Savings

Careful trial and analysis sometimes demonstrates that using lower concentrations and/or temperatures has no impact on the efficacy of some chemicals.



## Reuse & Save

**Wormtown Brewery** uses a phosphate-free, no-rinse peracetic/nitric acid blend called Reflex™ in a closed loop system that allows it to be used twice.



## Non-Toxic Alternative

**Merrimack Ales** switched from caustic sodium hydroxide to a safer alkaline cleaner, Powdered Brewers Wash (PBW), which proved to be equally effective even at a lower temperature.

## Non-Toxic Alternative

Island Dog Brewing (Portland, ME) switched from caustic sodium hydroxide to Surface-Cleanse/930® Neutral Cleaner, which proved to be equally effective even at a lower temperature.

# Sustainability Culture

Assign a “green team” or point person whose job includes implementing, monitoring, and promoting environmentally conscious business practices at your brewery. These efforts should be shared with all brewery and taproom staff.

## Measuring & Benchmarking

Castle Island Brewing, Element Brewing & Distilling, Old Planters and others have used the Brewers Association Benchmarking Tool to compare their water, energy, and CO2 efficiency against other similar sized breweries.

## Resources & Collaborators

Trillium Brewing was awarded a DOE grant for a rooftop solar array, Untold & Portico Brewing won MassDEP grants for reuse programs, and Pigeon Cove Ferments had a free energy audit by Mass Save.

## Win Over Green Consumers

To truly stand out, verify the social and environmental impact of your business by attaining B Corporation status or joining the 1% For The Planet network. Another way is to demonstrate your commitment by partnering with local environmental groups to help raise awareness or funds for their causes.

# Free Resources

- 1 [Mass Save](#) energy assessments
- 2 [Center for EcoTechnology](#) energy & waste audits
- 3 [MassDEP Reduce, Reuse, Repair Grants](#)
- 4 [Toxics Use Reduction Institute](#)
- 5 [Mass. Clean Energy Center](#)  
Community Solar Overview
- 6 [Energy Switch](#) electricity  
supplier listings
- 7 [Craft Maltsters Guild](#)  
malt finder map

