



# BREWERS PUT ENERGY SAVINGS ON TAP

TAPPING INTO ENERGY EFFICIENCY AND RENEWABLE ENERGY CUTS OPERATING COSTS AND BOOSTS PRODUCT QUALITY

## Energy Trust can help with technical assistance and cash incentives for:

- High-efficiency boilers, stack heat recovery, pipe insulation, steam trap repair, sequencing
- High-efficiency chillers, free cooling, controls tuning
- Compressed air leak detection and repair, shut-off controls, open blowing reduction
- Refrigeration defrost float drains, compressor staging, condensing pressure reduction, high-speed doors
- High-efficiency heating, air conditioning and ventilation; programmable thermostats, economizer maintenance
- High-efficiency lamps, fixtures and controls

Crafting a cold brew is highly resource intensive. But dozens of breweries across Oregon are taking steps to reduce energy use and cut waste, making the state a beervana of sustainable brewing practices.

Energy Trust of Oregon works with many of these breweries to cut their production-related energy costs. Our highly skilled energy experts understand the unique needs of your business—from the brewhouse, to packaging, to running an efficient brewpub that has just the right ambiance. We provide technical services and cash incentives for capital equipment upgrades, operations and maintenance improvements, Strategic Energy Management and generating your own clean, renewable energy. These improvements not only trim energy use but also often deliver valuable side benefits such as saving water, reducing the use of chemicals, lowering maintenance costs and decreasing waste byproducts.

The sidebar to the left lists many of the ways Energy Trust can help your brewery. Turn the page to read how five Oregon brewers have used energy improvements to make their production lines more sustainable.



#### ENERGY-SAVING IMPROVEMENTS

- Passive cooling
- Energy-efficient lighting
- High-efficiency glycol pumps with VFD
- Compressed air leak detection and repair
- High-efficiency foodservice equipment

#### ESTIMATED SAVINGS

- 473,000 annual kilowatt hours
- 6,300 annual therms
- 217 annual tons of carbon dioxide

#### FINANCIAL ANALYSIS

- \$34,500 estimated annual energy cost savings
- \$153,300 project costs
- \$36,500 in Energy Trust cash incentives

## DESCHUTES ENJOYS A LONG DRAFT OF ENERGY-COST SAVINGS

Deschutes Brewery has a long history of engaging in energy-efficiency projects, and is reaping the rewards: \$34,500 in estimated annual energy cost savings.



**Beer production results in high-quality organic waste that can be used to generate electricity or heat through anaerobic digestion. If you're considering diverting your waste to a higher and better use, Energy Trust may be able to help you turn that waste into renewable energy.**

In 2004 when Deschutes Brewery went through a major expansion of its Bend brewing facility, the brewery made sure its new 40,000-square-foot warehouse was a model of efficiency. Built to exceed Oregon energy code, the well-insulated concrete warehouse maintains a 64° F temperature year-round by taking advantage of free cooling available from Central Oregon's cool night air. Both the warehouse and the packaging line have low-wattage T5 high-output fluorescent lighting and occupancy sensors.

Deschutes' brewing operation is fueled by energy-efficient boilers with stack economizers that reclaim heat from the flue gas and loop it back into the feed water. In addition, a vapor condensing heat exchanger on the brew kettle helps preheat the next batch of brewing water. Deschutes also replaced four inefficient glycol pumps on its chilled water system with two new efficient glycol pumps with variable frequency drives. "These new pumps help us to produce more beer with less energy," said Ron Shoemaker, maintenance manager, Deschutes. "They boost product quality, and they cool our fermenters faster, so we get more tasty beer out the door."

The brewery has worked closely with Energy Trust over the years, receiving a total of \$36,500 in cash incentives to support nine energy-efficiency projects. An effort that reaped considerable estimated savings—more than 181,000 kilowatt hours annually—resulted from participating in Energy Trust's custom operations and maintenance offer in which Energy Trust experts helped identify and repair compressed air leaks and set up an internal leak detection program so the savings persist.

Energy Trust also helped Deschutes outfit its Portland brewpub with a high-efficiency heating, ventilating and air conditioning system as well as energy-efficient foodservice equipment ranging from an infrared gas fryer to a high-efficiency freezer.

Deschutes is quick to share its experience with others. "Oregon breweries are a tight group," said Shoemaker. "We take advantage of what each of us has learned about making great beer using less resources."



**Energy Trust provides excellent engineering resources, helping us confirm those energy improvements that make economic sense and those that do not.**

Jason Randles, digital marketing manager, Deschutes







## WIDMER BROTHERS BREWING MAKES ENERGY EFFICIENCY PART OF ITS CRAFT

Widmer Brothers Brewing has made energy efficiency integral to its sustainable business practices, investing \$124,400 in energy improvements that will pay for themselves in about two years by delivering estimated annual energy savings of \$49,400. Along the way, Energy Trust has helped the Portland brewery achieve its energy-savings goals by providing cash incentives totaling \$57,200.

One of Widmer's first energy improvement projects involved installing a new screw compressor on a refrigeration system used for process cooling. Equipped with a variable frequency drive, VFD, the system saves energy by varying motor energy load to match actual cooling load. When it was time to expand production, Widmer upgraded its second refrigeration system with an efficient ammonia compressor with VFD. The brewery also replaced inefficient T8 fluorescent and metal halide lighting with efficient T5 high-output fluorescent lighting and installed occupancy sensors.

The lion's share of Widmer's energy savings came from participating in Energy Trust's Strategic Energy Management initiative. Widmer received technical support and employee engagement training and tools designed to teach their employees how to identify energy-saving opportunities and maximize savings for the long-term. "Strategic Energy Management helped us identify no- and low-cost improvements that dropped our kilowatt hours per barrel by 6.9 percent," said Julia Person, sustainability manager, Widmer Brothers. "A major contributor to these savings was condenser fan cycling in our refrigerated storage. We monitored temperature and humidity before and after the adjustment, finding that this energy-saving improvement also resulted in less temperature fluctuation. So we are enjoying an unexpected side benefit."

Widmer is participating in Energy Trust's 90x90 custom operations and maintenance offer. At no charge, Energy Trust is providing recommendations on the compressed air system. If Widmer makes the recommended improvements within 90 days, the brewery will qualify for a cash incentive of up to 90 percent of the installation cost. The brewery is also embarking on major upgrades to its heating, ventilating and air conditioning systems that should trim energy costs by thousands of dollars more per year.

### ENERGY-SAVING IMPROVEMENTS

- Strategic Energy Management
- Energy-efficient lighting
- High-efficiency screw compressor with VFD
- VFDs on existing ammonia refrigeration compressor and condenser fans

### ESTIMATED SAVINGS

- 800,500 annual kilowatt hours
- 304 annual tons of carbon dioxide

### FINANCIAL ANALYSIS

- \$49,400 estimated annual energy cost savings
- \$124,400 project costs
- \$57,200 in Energy Trust cash incentives



Energy Trust has been a valuable partner in helping Widmer Brothers Brewing achieve our sustainability goals.

Ann Widmer, Ph.D.  
chair of the Sustainability Committee  
Widmer Brothers Brewing



Participating in Strategic Energy Management can trim energy costs at your brewery by up to 20 percent through simple behavioral changes and no- or low-cost operations and maintenance improvements.



## ENERGY-SAVING IMPROVEMENTS

- New building constructed to exceed energy code
- Energy-efficient lighting
- High-efficiency condensing furnace and unit heaters
- Solar electric
- Solar hot water
- High-efficiency steam boiler
- High-efficiency process chiller
- High-efficiency foodservice equipment

## ESTIMATED SAVINGS

- 110,900 annual kilowatt hours
- 10,700 annual therms
- 105 annual tons of carbon dioxide

## FINANCIAL ANALYSIS

- \$15,900 estimated annual energy cost savings
- \$311,000 project costs
- \$78,900 in Energy Trust cash incentives

## AT WORTHY BREWING, LIGHTS OUT STOUT SAYS IT ALL

Worthy Brewing Co. was built to be sustainable from the ground up. "Do more with less" is an anthem the Bend brewery embraces fully in both its business practices and its approach to energy management.

Working with Energy Trust, Worthy built its 28,000-square-foot-brewery and restaurant to exceed Oregon's already stringent energy code. The high-performance building is well insulated, has high-efficiency condensing heating systems and boasts so many windows and skylights that the lights are out in the brewhouse most of the time.

The brewing operation is fired by a 95-percent-efficient condensing steam boiler with a flue gas economizer that captures heat from the flue and uses it to preheat the boiler's feed water, reducing both energy use and brew time. The walk-in coolers also have economizers that allow the brewery to take advantage of free cooling when the outside air temperature is low. The high-efficiency chiller is not only equipped with a variable frequency drive, but is so smart it actually talks to the master brewer. "She sends me a text message if the refrigeration system is experiencing an unusually high load," said Chad Kennedy, brewmaster, Worthy Brewing. "Invariably, it means we've left a door ajar."

Worthy also generates its own clean, renewable power from 117 solar electric panels mounted on the roof. And 52 solar thermal panels preheat all the hot water used in the brewhouse and restaurant.

These and other energy improvements, such as efficient tankless water heaters, are saving Worthy an estimated \$15,900 in annual energy costs, proving that sustainability pays off for the pocket book as well as the planet.



**Manufacturing beer uses a lot of energy, so we look for ways to reduce our energy load and costs. Energy Trust has been an excellent partner.**

**Chad Kennedy, brewmaster  
Worthy Brewing**



**A solar electric system is an excellent way to lower your brewery's energy costs and is a viable technology option throughout Oregon. Energy Trust offers cash incentives that you can combine with federal tax credits, as well as accelerated depreciation, to make solar more affordable.**



## NINKASI BREWING FUELS ITS EXPANSION WITH HIGH-EFFICIENCY BOILERS

When it was time to build a new brewhouse, Ninkasi Brewing wanted to install high-efficiency boilers that could keep pace with the brewery's growing product demand for the lowest energy cost. So the Eugene brewer turned to Energy Trust's industrial energy experts, who helped them opt for two high-efficiency, natural gas-fired steam boilers with built-in stack economizers and digital controls.

The new boilers supply enough steam for 10 to 12 brews per day—tripling the capacity of Ninkasi's original brewhouse, which still operates across the street. Even better, the boilers are trimming an estimated \$72,200 from Ninkasi's annual energy costs. And a \$35,900 cash incentive from Energy Trust helped the brewery offset the added cost of investing in high-efficiency boilers.

"An economical feature about these boilers is that they are two-stage, allowing us to match energy use to our varying load," said Paul Cook, vice president of production, Ninkasi Brewing. "We often run the boilers at low-fire, which is about 75 to 85 percent of capacity. When we increase production, we run them at 100 percent."

In addition to energy savings, Ninkasi expects to save on maintenance costs because the digital controls make maintenance processes such as water treatment much easier. And with a more stable steam output, Ninkasi should enjoy even higher product quality.

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Energy Trust expedited the energy-savings analysis on our new boilers so there was no question we'd meet our fast-track brewhouse construction schedule.

Paul Cook, vice president of production  
Ninkasi Brewing

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### ENERGY-SAVING IMPROVEMENTS

- High-efficiency steam boilers

### ESTIMATED SAVINGS

- 85,400 annual therms
- 500 annual tons of carbon dioxide

### FINANCIAL ANALYSIS

- \$72,200 estimated annual energy cost savings
- \$71,800 project cost
- \$35,900 in Energy Trust cash incentives



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This was our first experience with Energy Trust, and it was very positive. We're considering other projects such as energy-efficient lighting or solar electric.

Lee Radtke, partner  
Gilgamesh Brewing

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#### ENERGY-SAVING IMPROVEMENTS

- High-efficiency brewing system

#### ESTIMATED SAVINGS

- 1,500 annual kilowatt hours
- 3,900 annual therms
- 24 annual tons of carbon dioxide
- Up to 35 percent water savings

#### FINANCIAL ANALYSIS

- \$3,300 estimated annual energy cost savings
- \$162,700 project costs
- \$60,400 annual savings from using raw grain
- \$9,800 in Energy Trust cash incentives

## GILGAMESH REAPS THE BENEFITS OF A HIGH-EFFICIENCY BREW SYSTEM

In 2012, the Radtke family moved their brewing operation out of their home-based furniture shop and into a former South Salem grass seed warehouse, transforming it into a full-scale brewery and restaurant adorned with custom woodwork and metal fabrication. Gilgamesh Brewing took that same customized approach in the brewhouse, choosing to brew a bit differently by installing a High Efficiency Brewing System, HEBS, which takes advantage of technology previously available only to macro breweries.

The cornerstone to the HEBS' efficiency is a multiple-frame mash filter that replaces the lauter tun. This filter efficiently extracts 98 percent of the wort from the spent brewer's grain, which slashes water use as well as energy needed to heat and pump that water. The steam system that heats the kettle is 98 percent efficient, and the kettle has two inches of insulation. The mash tun has an efficient variable frequency drive.

With these features, the HEBS reduces energy use by up to 15 percent, water consumption by up to 35 percent, grain input by up to 20 percent and effluent by up to 40 percent. The 17-barrel system also brews twice as fast as a conventional system—completing a typical brew in only two hours, which cuts labor time by up to 50 percent.

Lee Radtke, a partner at Gilgamesh, learned about the HEBS from a vendor and was immediately intrigued. So he approached Energy Trust about the technology. "I'd heard about Energy Trust on TV and I figured they might be able to help," said Radtke. "Energy Trust's industrial energy experts examined the system's efficiency, performed some calculations and determined that the HEBS was indeed an energy and money saver. Because of the HEBS' efficiency, Gilgamesh qualified for \$9,800 in Energy Trust cash incentives.

HEBS' mash filter is also able to process raw grain through enzymes that convert starches and complex sugars into simple sugars. By replacing much of the malted grain, the HEBS can deliver up to \$60,400 in additional annual savings for Gilgamesh.



Are you ready to get more from your energy? Visit [www.energytrust.org](http://www.energytrust.org) or call **1.866.368.7878**.