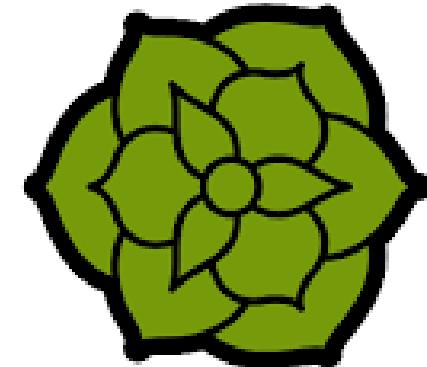




**EARTH
FIRST.
BEER
SECOND.**



Going Green

Roger Worthington, Owner, Worthy Brewing & President, Worthy Garden Club
May 17, 2019 | OSU Cascade's Fermentation Education

Going Green

Alternative & Sustainable Energy



Worthy invested in solar power from the beginning.

- 117 rooftop PV solar panels; 48 PV above the Star Bar.
Total Co2 spared = 57,000 lbs
- Total energy generated = 55K kWhs, providing a yearly average of 10% of Worthy's power. In the summer months, this percentage increases to 30-50%.
- Solar Thermal Panels (56 total = 42k CO2 saved)

What does this mean?

Worthy spares the atmosphere 100,000 pounds of CO2 emissions annually. Or ~2,400 trees planted (~8 acres) per year.

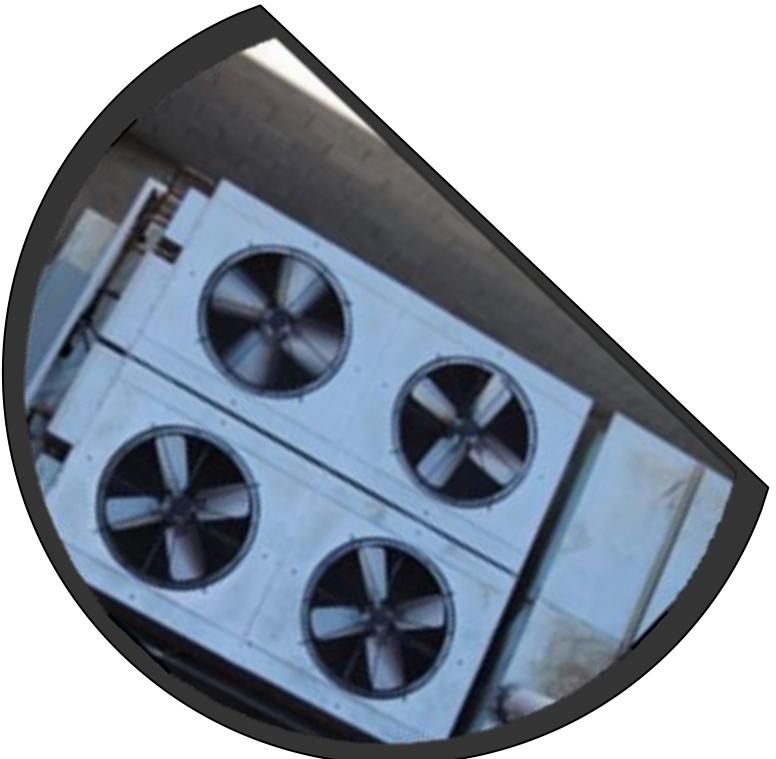
Sources: Arbor Environmental Alliance & Tufts University

Going Green

Brewing Process Efficiencies



Worthy Brewing uses technical methods to improve our brewhouse yields. This means we use less raw materials [malt, water, hops] yet get more out of them. **Do more with less.**



Example shown is Worthy's **'Smart Chiller'**

"Variable-frequency drive" brain center, meaning it only consumes electricity when needed.

Energy efficient waste heat capture boiler



Going Green

Local Sourcing

>80%

of Worthy's hops are sourced from the Willamette Valley

- Source malt [barley] from Great Western Malting, Vancouver, WA.
- Heart & Soul beers often use malt from Mecca Grade Estate Malt in Madras, OR.
- Every Worthy beer uses hops that are certified Salmon Safe, meaning they are cultivated under practices that protect water quality, maintain watershed health, and restore habitat for native salmon.



Going Green

Brewery Recycling



Worthy Brewing is implementing a new recycling program with The Broomsmen, which is focused on recycling or repurposing more of the brewing operations by-products including:

- Mylar malt bags
- Plastic pallet wraps
- Aluminum cans
- Tasting cups (polystyrene) & Styrofoam
- Cardboard
- PakTech can carriers [to date: we've recycled more than 5 bins' worth!]

This dramatically reduces the items going to Knott Landfill.

Staff & community education is a significant part of this initiative; ensuring employees know what types of plastics are able to be recycled significantly impacts Worthy's success both inside & outside of the brewery.



Going Green

Waste Reduction & Repurposing



Worthy partners with local farmers & ranchers to repurpose its waste stream.

- Greene Bros Ranch picks up Worthy's spent grain 3-4 times a week for cattle feed.
- When possible & for special events, Worthy purchases beef from Greene Bros to feature in select dishes.
- Boundless Farmstead picks up Worthy's spent hops, yeast, and trub [spinoff from the whirlpool] for compost.
- Worthy's restaurants purchase Boundless Farmstead produce through local food distributor, Agricultural Connections when possible; more frequently during the summer months.

Going Green: WHAT'S NEXT

Brewery Waste Water (BWW): There's ENERGY and \$\$\$ in that wastewater!

The Challenge: All Bend breweries send their wastewater to the city treatment plant; this "high strength waste stream is processed aerobically, consuming large amounts of electricity and chemicals...and generating greenhouse gases.

*Bend's 6 largest breweries generate 50M Gals of waste per year, 10% hi-strength, 400 x more than homes.

*40M gals hi + med strength WW down drain

*Passing the buck to taxpayers? Does X-strength surcharge solve problem? Still huge carbon add.



Going Green: WHAT'S NEXT

Brewery Waste Water (BWW): There's ENERGY and \$\$\$ in that wastewater!

The Idea: bring the Bend brewing community together to create a community Resource Recovery Center (bio-digester) for brewery wastewater and high strength byproducts. This will:

- o Keep treatment fees flat or reduced for participating brewers
- o Generate renewable energy (biogas, electricity and thermal energy)
- o Reduce Carbon and Methane (2X times worse than CO₂) emissions
- o Produce cleaner effluent and natural fertilizer



Going Green

Worthy Garden Club, 501c3



- 30,000+ sq ft of pollinator-friendly garden areas, including raised herb & edible flower beds, two display gardens, drainage swale/rain garden, and half acre of native plantings.
- Top bar beehive: educate community about pollinators & their struggle with climate change; use their honey in select pub dishes and specialty Heart & Soul beers.
- Estate hop yard: serves as a satellite lab for OSU; many on-site varieties that were developed by the USDA-ARS Hop Breeding program under OSU's Dr. Al Haunold. Each year, Worthy brewers brew an estate hop IPA.

Going Green

Tenmile Creek & Restoration Strategy



WORTHY
GARDEN CLUB



Going Green

Tenmile Creek & Restoration Strategy

10 Point Restoration Plan for Biodiversity & Natural Climate Solutions

- Clean up process [remove the old homestead, junk left on property]
- Restoration begins [target: 2020; a few examples below]
 - Planting willow, maple & cedar trees next to the stream
 - Create pollinator habitat by doing understory planting
 - Create fenced elk enclosures in the uplands & riparian areas



Figure 1. Road decommission along Cape Creek removes a barrier to floodplain recovery.



What will this do?

Long-term increases in carbon storage & biodiversity. These benefits are just now starting to be recognized in the field of Natural Climate Solutions.