Saving Money and More with Solar

by
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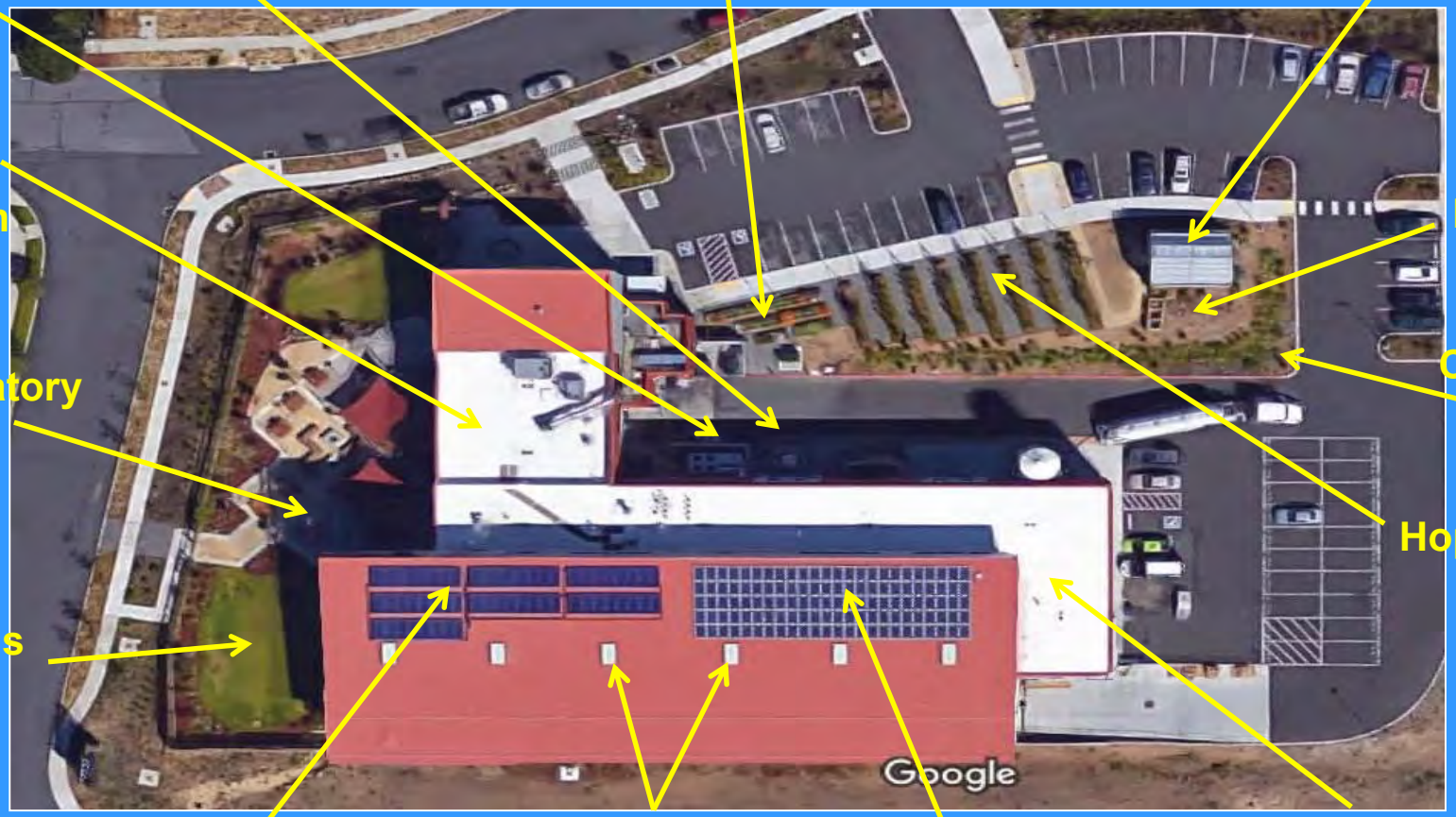
Worthy Brewing
The Power Hour: An Environmental Center Event
August 9, 2018

Worthy Brewery: Green From the *GIT GO*



Beertopia

Solar Hot Water System

- 56 SunMaxx Solar Hot Water Collectors (Panels) covering 1,450 sq ft
- 2,000 gallon solar hot water storage tank aka “Hot Tub” Preheats water for use in Brewery and Restaurant . 170-180F.
- Est. annual savings in therms: 3,937 (equiv. to 115,000 kWhs of electric power.
- Est. annual saving : $5,000
- Est. equivalency of pounds of CO_2 saved per year: 42,000

Solar (PV) Powered Beer

- 27.5 kW rooftop, 117 Solar Panels, PV system (2013).
- 12.24 kW, 48 Solar Panel Solar Awning (2016)
- Total PV System: 40 kW
- Estimated PV Production: 50,000 kWhs
- Actual PV Production: 55,000 kWhs (10% overproduction)
- Electric savings annually about $5,000

WORTHY
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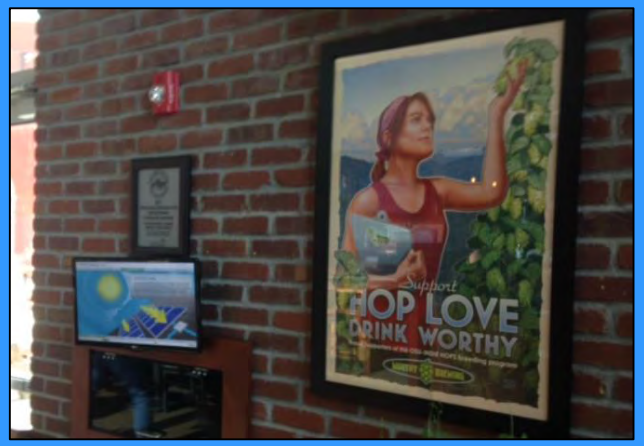
Customer Engagement



- Educational Kiosk at entry educates customers on how solar works and displays real-time and historical PV Production. Green Culture signage throughout "Beertopia": "Earth First, Beer Second," "Cultivate Your Garden," "No Place like Home"
- Hosts solar workshops and educational events (Solar Oregon, Community Solar, Environmental Center, etc.)
- Dual function cool awning roof and power producer.

The Push: Financial Incentives

Commercial

Cash Incentives

- **Energy Trust of Oregon Rebate:** The Energy Trust of Oregon (ETO) cash incentive reduces a solar installation's upfront cost. ETO incentives are available to Pacific Power and PGE customers only. The incentive rates for solar are based on system size and availability, and are not available for all solar installation.

Tax Credits

- **Federal Tax Credit (30% of Customer Price):** The Federal Investment Tax Credit (ITC) is claimed in the fiscal year that the solar installation is placed in service. The federal tax credit is worth 30% of the customer price (after utility rebate), and is currently set to scale down to 10% by 2022.
- **MACRS – Federal Depreciation Benefits:** Accelerated Depreciation benefits may be available for businesses depending on their tax situation. Bonus Depreciation 100% (First Year) Under New Tax Code.
- Please consult your tax preparer.

Worthy's Solar Investment

Solar System Cost

$294,705.00	Total Project Cost
	* 2012 PV, 2012 Solar Hot Water, 2016 Solar Awning expansion
$46,500.00	Energy Trust Rebates
$248,205.00	Customer Price for all three systems

Tax Credit Incentives

$66,528.02	Estimated MACRS Depreciation
	* Dependent on the tax situation of the individual
$74,461.50	Federal Investment Tax Credit - 30% of Customer Price
$107,215.48	Net Cost

Investment

10%	Internal Rate of Return (25-year)
9	Simple Payback in Years
$434,324.00	25-year Energy Savings

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SUNLIGHT SOLAR energy inc.

ROI? Does Solar Pencil Out?

Year	Customer Price	Depreciation Benefits	30% Federal Tax Credit	Estimated Energy Savings	Annual Savings	Total Savings
0	$ (248,205)	$ -	$ -	$ -	$ (248,205)	$ (248,205)
1		$ 7,385	$ 74,462	$ 10,098	$ 91,945	$ (156,260)
2		$ 23,633		$ 10,526	$ 34,159	$ (122,101)
3		$ 14,180		$ 10,972	$ 25,152	$ (96,948)
4		$ 8,538		$ 11,437	$ 19,975	$ (76,974)
5		$ 8,538		$ 11,922	$ 20,460	$ (56,514)
6		$ 4,254		$ 12,427	$ 16,681	$ (39,832)
7				$ 12,954	$ 12,954	$ (26,878)
8				$ 13,503	$ 13,503	$ (13,375)
9				$ 14,076	$ 14,076	$ 701
10				$ 14,672	$ 14,672	$ 15,373

Yes.

WORTHY BEND, OREGON

SUNLIGHT SOLAR energy inc.

Commercial Solar in the U.S.

- If it didn't pencil, they wouldn't do it.
- SEIA-Solar Energy Industries of America

Environmental Benefits of the two Solar Electric (PV) systems combined

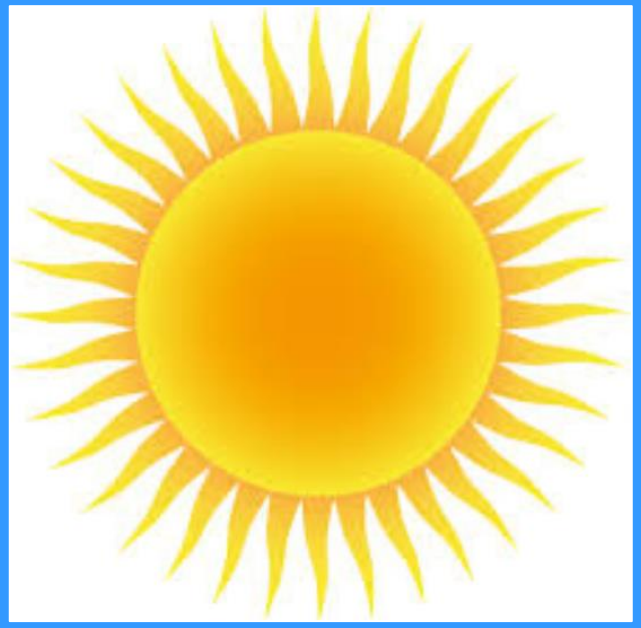
57.069	Estimated pounds of CO_2 saved (year 1)
60.3	Estimated pounds of SO_2 saved (year 1)
83.6	Estimated pounds of NOX saved (year 1)
68,462	Equivalent miles of reduced driving (year 1)
4.4	Equivalent acres of trees planted (year 1)
!!!	*All systems combined, Worthy Brewing energy efforts equivalent to 100,000 pounds of CO_2 and 8 acres of trees planted per year.*

60% of Pacific Power electricity generated by coal burning power plants.

Leave the World Better than you found it.

Source: Energy Trust of Oregon

Why Go Solar?



- ROI! Simply Pays Off.
- Financial incentives, rebates, and savings
- Public Relations – Local, Green, Sustainable
- Environmental Stewardship and Leadership
- Supports Local Economy and Jobs

Other Worthy Initiatives

- Kitchen Scraps-Compost-Veggies
- Kitchen Scraps-Hogs-Pork
- Food Waste-Compost
- Plastics Reduction & Recycling
- Bee Hive for Flower Pollination & more
- Spent Grain-Cattle-Steaks
- Beer Sludge - Farm Fertilizer
- Beer Sludge to BioGas Pilot Study
- Filter, Anaerobic Digester, methane CNG

Beer-Cake to Fertilizer

Hops, Yeast, Trub and CIP waste stream filtered and converted to energy rich sludge cake.

Delivered to Boundless Farms and used for fertilizer.

Avoid sending to landfill, saving money.

Worthy Grain Makes Happy Cattle

Brewery Generates as much as 10,000 lbs/day of spent grain. Loaded with sugars and proteins. Why send to a landfill?

Picked up daily by Greene Brothers Ranch.

Returns to Worthy Restaurant as Rib Eye.

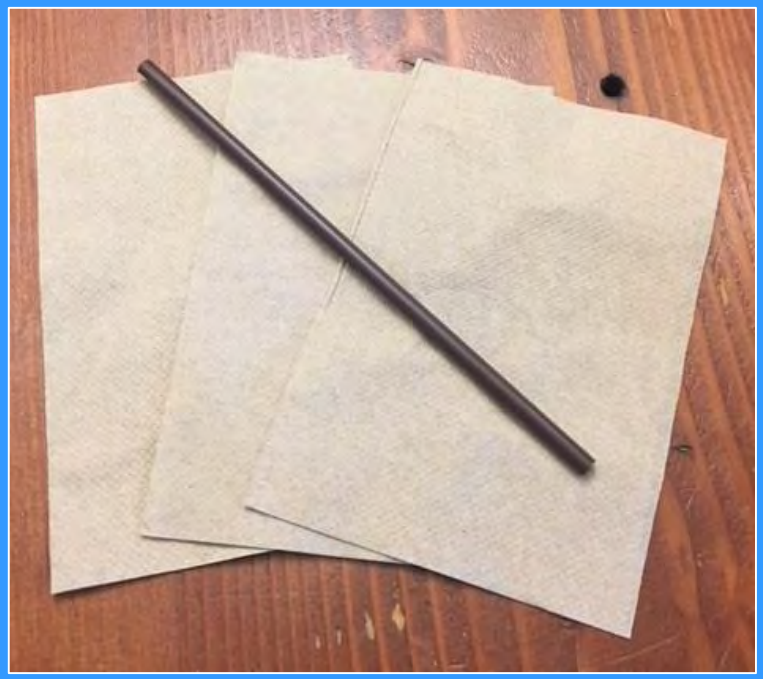
Kitchen Scraps to Compost to Veggies

Prep cooks segregate clean veggie/fruit scraps.

Picked up by farms for conversion to compost.

Returns to Worthy in salads and more.

Plastic/Paper Reduction/Reuse



- Menus Recycled paper.
- To go order boxes 99% sugar cane/1% bamboo. 14% $ savings.
- Metal ramekins re-usable. Plastic costs $350/mo. Ramekins $.50 per.
- Re-usable hard plastic kiddies cups (plant fiber lid).
- Straws only on request, 100% compostable. Paper straws at TnT.
- 9 recycling bins vs one dumpster.

Pro-Pollinators

- Pollinate herb and veg gardens
- Educate on importance of biodiversity
- Viewing window peaks curiosity
- Honey Bee 101 pamphlet — the looming crisis
- Honey Beer!

Beer to Bio Gas Proposal

- Bend's six largest breweries generate 50 million gallons of waste per year, 7 million of which is Extra High Strength Waste, 400 times greater than residential.
- High Strength Waste – hops, yeast, trub, grain, CIP etc. 3-6x Trtmnt surcharge.
- Extra high strength waste separated and used for fertilizer. About 40M gals of high and medium strength wastewater is sent down the drain to the municipal treatment system.
- Municipal waste treatment has a high carbon footprint.
- GHGs : carbon dioxide and methane flared directly into the atmosphere, even "spent grains" fed to cattle ultimately converted to GHGs via digestion and released directly to the atmosphere.

Beer to Bio Gas, Part 2.

- Brewery wastewater a very good food source for microbes which use oxygen to convert waste into bio-gas, specifically methane.
- Methane worse GHG than carbon dioxide because of how effectively it absorbs heat. In the first two decades after its release, methane is 84 times more potent than carbon dioxide. Neither captured.
- Proposal- sidestream BWW and divert it to a patented Anaerobic Digestion (AD) system (similar process to the gut of a cow!) which filters water and creates renewable energy.
- AD Process removes 99% of organic load and generates bio gas, which can be used to produce carbon neutral fleet fuel, heat, or electricity. Reduce carbon footprint and avoid burning fossil fuels.

Beer to Bio Gas Carbon Neutral

- The carbon in beer biogas comes from plant matter that fixed this carbon from atmospheric CO2. Thus, biogas production is carbon-neutral and does not add to greenhouse gas emissions.

- When this renewable biogas is burned to make heat, power, or to fuel CNG vehicles, it releases CO2 and water, but this is carbon neutral as the "fuel" comes from crops such as barley, yeast, and hops.

- In addition, since the biogas energy is produced on a 24/7/365 basis, it is considered more valuable (per kWh) than intermittent renewable sources like solar and wind.

- AD treatment of the 50 million gallons of BWW will reduce power and chemical consumption and labor at the Bend municipal wastewater treatment plant, saving thousands for the city's residents.

- And AD will will spare the atmosphere tons of Co2.

- Breweries avoid surcharges, filter WW, generate biogas income