



10 Heat Recovery



1 Solar Power



2 Wastewater Treatment



3 Biogas Compressor



4 Hydrogen Fuel Cells



5 CO₂ Recovery



6 Materials Recycling



7 Organic Waste



8 Cattle Feed



9 Estate Hop Field



**EARTH-FRIENDLY
BREWING**

**SIERRA NEVADA
BREWING CO.**

Sierra Nevada Brewing Co., the tenth largest brewer in the United States, is dedicated to operating our brewery in the most environmentally sustaining and friendly manner possible, while producing ales and lagers of the highest quality. We are committed to finding new and innovative methods to achieve this objective. At every stage in the brewing and packaging process, we attempt to reduce waste generation. This includes recycling cardboard, plastics, metals and other materials, utilizing spent brewing grains, hops, and yeast for cattle feed, reducing water use, and operating our own water purification plant. In 2005, Sierra Nevada Brewing Co. recycled 96.6% of the brewery's production waste and by-products. Here are brief descriptions of the efforts we have taken toward achieving our goal of sustainability. For more information please visit us at www.sierranevada.com.

1 Solar

We are in the process of installing one of the largest privately owned solar arrays in the country. This 3-acre, 500kW elevated tracking solar array will provide clean emissions-free power for brewing operations and will greatly reduce our dependence on grid power. Coupled with the output of our fuel cells, this solar project will help meet our clean energy goals.

2 Wastewater Treatment

In an effort to decrease the impact on our community and environment, we installed our own wastewater treatment facility in 2001. All of the brewery's production wastewater is treated in a state-of-the-art, two-stage anaerobic/aerobic wastewater treatment digester. The anaerobic system produces biogas (a valuable fuel) as a by-product of the biological decomposition process. The aerobic system further processes the wastewater before it is discharged. We remove over 95% of the load before it is released to the local sewer system.

3 Biogas Compressor

The biogas that is produced as a by-product of our anaerobic wastewater treatment process is compressed, filtered, and then fed to our hydrogen fuel cell power plant and boilers where it is converted directly into electricity and usable steam. This provides carbon-neutral heat and clean energy to power our brewing operations.

4 1,000 kW Co-Generation Hydrogen Fuel Cells

In 2005 our brewery installed one of the largest co-generation fuel cell power plants in the United States. Our direct fuel cell technology allows us to produce electricity utilizing a highly efficient and extremely low emission process. Our co-generation boilers recover additional heat energy providing steam for our brewing operations. This combination of energy production allows us to double the overall efficiency of utility-supplied energy. This provides for most of our electrical needs as well as providing for the sale of surplus power to the energy grid.

5 CO₂ Recovery

We recently installed a carbon dioxide recovery plant that allows us to recover and reuse the carbon dioxide produced during natural fermentation often vented into the atmosphere. Our design allows us to capture, purify, and store this gas. Our state-of-the-art facility provides

for much higher purity of CO₂ than is commercially available for all of our needs throughout the brewing process. In the future, we will provide surplus CO₂ to other beverage producers.

6 Materials Recycling

As part of our dedication toward achieving a sustainable brewery, we strive to recycle or reuse materials utilized in daily operations. This includes office paper, stretch wrap, cardboard, pallets, glass, malt, yeast, hops, water, and CO₂. Whenever possible, we encourage our suppliers to use recycled products and favor those who are committed to sustainable practices.

7 Organic Waste

Most of our spent brewing materials find a beneficial secondary use in our local agricultural community. Many local dairy cows also enjoy our brews (although without the alcohol). Our spent grain, hops, and yeast are sold locally to provide a nutritional food source for the local dairy farmers to incorporate into their feed. The brewery maintains its own herd of naturally raised cattle, which are fed malt, hops, and yeast (and a little beer), to be used in our Restaurant and Taproom.

8 Cattle Feed

Sierra Nevada provides feed for dairy and beef cows through the spent grain, hops, and yeast it has collected. Spent trub produced from the wort boiling process is almost pure protein, and is added to the spent grain. The surplus spent yeast from fermentation is used as a nutritional supplement for cows, and the compost from the cow manure is used as fertilizer for Sierra Nevada's onsite 3-acre experimental hop field.

9 Estate Hop Field

The brewery maintains a 3-acre organic hop field onsite where we grow a variety of hops that are used in our pilot brewery. This field is fertilized with composted manure and brewing by-products. Our estate-grown hops are utilized in several wet-hopped ales that are served in our Restaurant and Taproom.

10 Heat Recovery

Heat exchangers are used throughout our brewing operations to recover and recycle energy. In 1997 we were one of the first American craft brewers to equip our brew kettles with vapor condensers to capture and condense steam that is typically lost during kettle boiling.