

CASE STUDY



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Sierra Nevada Brewing Co.

Integrated Case Study • Energy Efficiency, Demand Response, Solar, and the ClimateSmart™ Program

Sierra Nevada Energy Usage Savings with PG&E (includes brewery, restaurant and concert venue*)

2006** Electrical Usage: ~19 kWh/Barrel

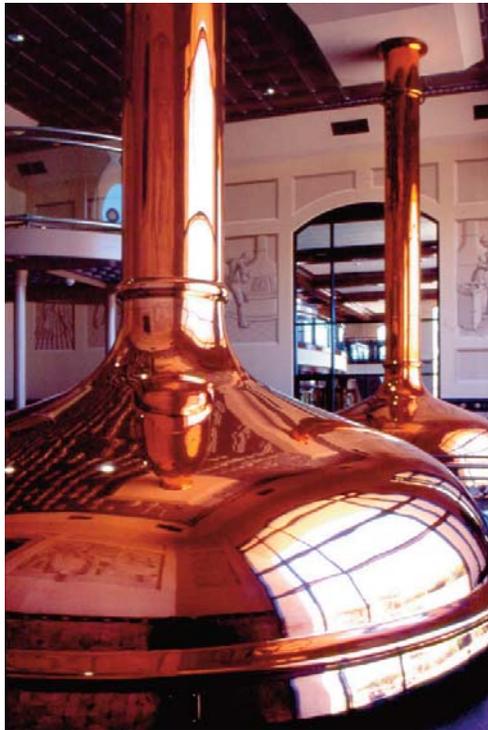
2008 Electrical Usage: ~18 kWh/Barrel

2006** Gas Usage: 1.5 Therms/Barrel

2008 Gas Usage: 1.3 Therms/Barrel

* company has no breakout figures for brewery alone

**company has no per-barrel usage statistics prior to 2006



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A RESOURCE-CONSCIOUS COMPANY

From the day in 1980 that Sierra Nevada Brewing Co. turned out its first batch of beer in a warehouse in Chico — using recycled dairy and soda equipment — resource sustainability has been a core value of the company. Co-founder and CEO Ken Grossman, a passionate environmentalist, emphasizes sustainability as both a philosophy and a sound operating principle.

Now the second largest craft brewery in America, Sierra Nevada is firmly established as a corporate visionary in recycling, sustainability and environmental awareness. The brewery recycled an amazing 99.5% of its materials — everything from industrial plastic to packaging — and diverted over 33,000 tons of waste from landfill in 2008. The company is a member of the California Climate Action Registry, tracking and reporting its emissions. Additionally, the brewery's "Green Machine" program encourages employees to reduce their own emissions by biking to work instead of driving.

Sierra Nevada emphasizes sound environmental stewardship, supporting local community conservation initiatives. CEO Grossman is a member of the Chico Sustainability Task Force, working with the city, local businesses and CSU, Chico to promote the same energy efficiency measures that Sierra Nevada has adopted.

REBATE-POWERED ENERGY EFFICIENCY

Virtually from the outset, Pacific Gas and Electric Company (PG&E) actively worked with Sierra Nevada on energy conservation solutions. With support from PG&E rebate programs, the company has:

- Retrofitted lighting systems as new energy-efficient solutions have become available, including the installation of ambient lighting sensors, motion sensors and timers.

- Replaced outdated motors with variable frequency drives.
- Upgraded and insulated boilers to increase energy efficiency.
- Upgraded compression systems to improve efficiency.
- Installed a new software system to control and monitor energy consumption from computers and monitors.
- Updated appliances and fixtures.

PG&E's Savings by Design program enabled Sierra Nevada to maximize energy efficiency in a major facility expansion project. "Without the PG&E rebates, we wouldn't have been able to install as many variable frequency drives or upgraded as much of our lighting as we did, and it would have taken longer because of capital concerns," said Cheri Chastain, Sustainability Coordinator for Sierra Nevada.

REDUCING DEMAND WHEN IT COUNTS

With PG&E's guidance, Sierra Nevada has become a valued customer in Demand Response, a program PG&E implements during periods when demand for electric power is at its highest. PG&E offers a variety of incentives for major customers to reduce their energy consumption during peak periods and ease the stress on the grid.

Sierra Nevada participates in the Base Interruptible Program (BIP), which means the brewery will respond within 30 minutes of a PG&E request to lower its consumption. Sierra Nevada's participation in BIP, along with other PG&E Demand Response customers, goes a long way in helping to protect California's energy reserves to ensure power is available when it's needed.



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“PG&E incentives provided considerable impetus for our self-generation initiatives. Our fuel cell and solar projects could not have been launched when they were if PG&E rebates had not been available.”

Cheri Chastain,
Sustainability Coordinator,
Sierra Nevada Brewing Co.



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ENERGY SELF-SUFFICIENCY: FUEL CELLS AND HEAT RECOVERY

Sierra Nevada is committed to energy self-reliance, largely because the special demands of its business make reliable power a crucial issue. Weather and other events inevitably cause interruptions in PG&E’s service, and if such an interruption were to occur during certain phases of the brewing process, an entire batch of product could be lost. The company therefore has a strong economic incentive to rely on its own constant power supply.

In pursuit of that goal, the brewery consulted and received technical assistance from PG&E on the installation of four onsite co-generation fuel cells that run on a blend of natural gas and recovered methane. With upgrades, the four units now generate 300 kilowatts each for a total of 1.2 megawatts of uninterruptible electricity. Both the original installation of the fuel cells and the subsequent upgrades were supported by PG&E rebates.

PG&E has provided significant support to Sierra Nevada for various heat recovery projects that have increased energy efficiency in the brewing process. The company has installed several systems that capture and recycle heat from boilers, kettles and fuel cells, with PG&E providing rebates for vapor condensers and heat exchangers. One project, a retrofit involving process boiler heat recovery, generated a PG&E rebate of nearly \$64,000.

ENERGY SELF-SUFFICIENCY: SOLAR POWER

In 2007, Sierra Nevada, with assistance from PG&E, launched its most significant self-generation initiative, the installation of solar panels. The initial project was a 500-kilowatt, sun tracking system situated atop a covered parking lot — a project financed largely with rebates from the PG&E Self-Generation Initiative and the California Solar Initiative, plus federal tax credits. Stage 2 was the phased installation of a fixed rooftop solar system atop the majority of the Sierra Nevada facility. The system, which generates 1.4 megawatts, was partly covered by Self-Generation Initiative rebates as well.

The result is that Sierra Nevada is approaching complete energy self-sufficiency:

- Solar power generation: 1.9 MW
- Fuel cell power generation: 1.2 MW
- Total onsite power generation: 3.1 MW
- Percentage of company’s annual requirements: 80% (estimated)

During peak times in summer, additional solar output enables the brewery to self-generate more than 100% of its needs. The company is therefore not contemplating further self-generation projects, but hopes instead to approach total self-sufficiency by reducing energy consumption across its operations by another 20%.

THE CLIMATESMART PROGRAM AND BIOGAS RECOVERY

Sierra Nevada is one of the original corporate members of the ClimateSmart program, which allows businesses to easily balance out the greenhouse gas emissions from their energy use by investing in projects that capture or reduce greenhouse gases.

In 2006, before the program was even announced, PG&E approached Sierra Nevada's Sustainability Coordinator, Cheri Chastain, about joining the launch of the program. CEO Grossman delivered his approval within 24 hours. Since joining the ClimateSmart program, Sierra Nevada's contribution has achieved a carbon offset of 16,743 tons of CO₂ emissions that is equal to 2,329 passenger vehicles being removed from the road.

The brewery has instituted a biogas recovery project at its onsite wastewater treatment plant, where an anaerobic digester breaks down solids and organic materials in the brewery's process wastewater to recover biogas, about 75% of which is methane. The plant captures roughly 80,000 cubic feet of methane per day, which is then blended with natural gas and piped into the brewery's fuel cells and boilers. Sierra Nevada is not only generating energy from recovered biogas; it's preventing the release of methane, a greenhouse gas 23 times more potent than carbon dioxide.

Speaking of carbon dioxide, Sierra Nevada recovers that, too. One-hundred percent of the CO₂ the brewery uses for pressurizing and moving beer through pipes, sanitizing lines and tanks, and bottling is captured and recycled for the same purpose. The plant releases no CO₂ and no longer has to purchase any.

NEW INITIATIVES AND BEYOND

PG&E continues to work closely with Sierra Nevada on rebate-worthy energy conservation projects, including a more efficient bubble diffuser at the treatment plant and an initiative to irrigate an on-site nine-acre hops field with treated, recycled wastewater — which will conserve not only lots of water but the electricity now required to pump Chico city water out of the ground. Chastain credits her company's close working relationship with PG&E for much of its conservation success, and she would advise other interested companies to cultivate the same.

"I would tell them to form a close working relationship with their PG&E account reps," said Chastain, "because these reps have a tremendous body of knowledge about the programs available to help companies save on energy costs."

HOW CAN PG&E HELP?

To learn how PG&E can help businesses reduce costs and energy consumption, contact your local PG&E representative or call our **Business Customer Service Center** at **1-800-468-4743**. More information is available at www.pge.com/mybusiness.



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