Sierra Nevada Brewery

1MW fuel cell CHP system

Project Profile

combined heat & power in a brewery

Quick Facts

Location: Chico, California

Capacity: 1 MW (four 250-kW FuelCell Energy DFC300A molten carbonate fuel cells)

System Online: 2005

Hydrogen Production Method: Digester gas from brewing process

H_2- Production Capacity: Approximately enough to fuel one 250-kW fuel cell

System Efficiency: Estimated 50% electric efficiency, 75% using CHP

Total Project Cost: $7 million over five years

Expected Electricity Cost Savings: $400,000/year

Expected Payback Time: Approx. 6 years (with incentives and using digester gas)

Funding Sources:
Sierra Nevada Brewery
CA Public Utilities Commission

Project Overview

Sierra Nevada Brewing Co. (SNBC) in Chico, California is producing methane and electricity from byproducts of the company's beer brewing process. Founded in Chico in 1980, Sierra Nevada applies resource conservation and reusing/recycling raw materials as guiding operating principles.

The brewery has installed four 250-kW direct fuel cells that run off a combination of natural gas and methane produced from the brewery's wastewater anaerobic digester.

The treatment of SNBC's effluent water takes place on-site and uses a two-step anaerobic and aerobic digester process that produces methane. The methane is then captured and piped to the fuel cells where it is mixed with natural gas from the pipeline. The fuel cells are high-temperature molten carbonate units from FuelCell Energy Inc. They are providing a substantial portion of the facility's baseload power. The waste heat is being collected as steam and used for the brewing process as well as other heating needs onsite. The fuel cells initially ran off of natural gas alone, but in late 2006 the digester gas was integrated into the project, thus displacing 25-40% of the natural gas use with the digester gas. The fuel cell system was installed by Alliance Power, a distribution partner of FuelCell Energy. Alliance Power performed all aspects of the initial project implementation, including siting, planning, permitting, designing, constructing, financing, and operating. SNBC purchased the fuel cells from Alliance Power in December 2006. FuelCell Energy continues to provide cell monitoring and servicing.

Financial Incentives

The total project cost for the first five years is approximately $7 million, including installation costs and operation and maintenance for the hydrogen production system and the fuel cells. Some of the project costs were offset by $2.4 million in funding from Pacific Gas and Electric Co. through the California Public Utility Commission (CPUC) Self Generation Incentive Program and $1 million from the U.S. Department of Defense Climate Change Fuel Cell Program. With these subsidies, an estimated electricity cost savings of about $400,000 per year, and other cost savings associated with the operation of the system, project managers expect a payback time of about six years.

California Self Generation Incentive Program

CPUC/PG&E's Self-Generation Incentive Program provides financial incentives to help support the costs of on-site electric generating systems utilizing either solar, wind, fuel cell, micro turbine or internal combustion engine cogeneration systems. Program participants are eligible to receive incentives under this program for installing distributed generation technologies based on system type, size, fuel source and out-of-pocket costs. Only commercially available and factory new equipment is eligible for incentives. Rebuilt or refurbished equipment is not eligible to receive incentives under this program. The maximum system size is 5 MW (and the incentive payment is capped at 1 MW).

Example SGIP Incentive Levels for Advanced Technologies (as of July 1, 2006)

Level	Technology	Incentive	Eligible Size Range
Level 1	Solar photovoltaic	$2.80/Watt	30 kW – 5 MW
Level 2	Renewable fuel cells	$4.50/Watt	30 kW – 5 MW
	Renewable micro-turbines	$1.30/Watt	No min size – 5 MW
Level 3	Non-renewable fuel cells	$2.50/Watt	No min size – 5 MW
	Non-renewable microturbines	$0.80/Watt	No min size – 5 MW

Further information can be found at

Sierra Nevada Brewery: www.sierranevada.com
Alliance Power, Inc: www.alliancepower.com
FuelCell Energy, Inc: www.fuelcellenergy.com
Self-Generation Incentive program: www.pge.com/suppliers_purchasing/new_generator/incentive/index.html
PRAC: www.chpcenterpr.org

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"Like any business, Sierra Nevada was looking for stable, affordable, reliable power, and they wanted to limit the environmental impact of their operation. They found the answer in a hydrogen fuel cell that generates power on site."
Arnold Schwarzenegger Governor of California

Air quality improvement is equal to an elimination of 500 gasoline cars.

The overall energy efficiency of the installation is double compared to grid-supplied power.