

## NAVY FUEL CELL DEMONSTRATION SITES

SITE: China Lake Naval Air Station  
 LOCATION: China Lake, CA  
 BUILDING APPLICATION: Pool Building



### Site Description

China Lake, CA was a chosen site for one Plug Power GenSys™ 5CS- 5kW PEM fuel cell. The unit is located at the bases swimming pool area at China Lake Naval Air Station. It provided supplemental heat to heating the swimming pool as well as clean electrical generation to the nearby loads.

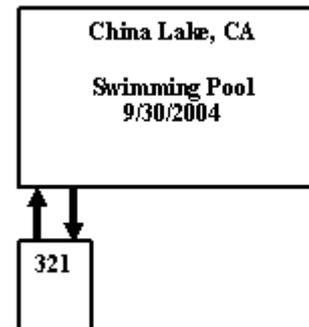
This fuel cell reforms natural gas into a hydrogen fuel source, CO<sub>2</sub> and water vapor. The GenSys 5kW fuel cell offers uninterruptible power to a critical load in the event of grid disturbance. They are connected to the electric utility grid and set to allow 2.5kW output from the fuel cell.

These fuel cell installations also capitalize on a combined heat and power (CHP) utilizing the fuel cells waste heat to be recovered to supplement an existing hot water system. This site was chosen based on thermal energy requirements at the facility and the ability of the fuel cell units to provide combined heat and power in this application.

Fuel Cell Performance			
Cumulative Operating Hrs	<b>6536.8 Hours</b>	Capacity Factor	<b>49.79%</b>
Total Electric Output	<b>16311.2 kWh</b>	Availability	<b>99.77%</b>
Total Input Fuel	<b>207.7MMBTU</b>	Electrical Efficiency	<b>26.80%</b>

### Period Summary Statistics:

		Total	Unit # 321
Start Date		--	<b>9/30/2004</b>
Thru Date		--	<b>8/31/2005</b>
Hours of Operation	Hours	<b>7967.6</b>	<b>7967.6</b>
kWh Output	kWh	<b>19798.9</b>	<b>19798.9</b>
Input Fuel	MMBTU	<b>255.1</b>	<b>255.1</b>
Electric Efficiency	%	<b>26.55%</b>	<b>26.55%</b>
Availability	%	<b>99.1%</b>	<b>99.1%</b>
Capacity Factor	%	<b>49.25%</b>	<b>49.25%</b>



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### Unit#1 (System Number#SU01B00000321)

Date	Oper. Hours	Total kWh	Avg. kW	Capacity Factor	Availability	Input Fuel (MMBTU)	Electric Eff.
08/04	0.0	0.0	0.00	0.00%	0%	0.00	0.00%
09/04	0.0	0.0	0.00	0.00%	0%	0.00	0.00%
10/04	744	1806.6	2.48	48.56%	98%	22.56	27.33%
11/04	720	1743.9	2.42	48.44%	100%	21.59	27.57%
12/04	744	1871.0	2.51	50.30%	100%	23.66	26.99%
01/05	744	1867.9	2.51	50.21%	100%	23.91	26.66%
02/05	672	1678.5	2.50	49.96%	100%	21.6	26.53%
03/05	744	1856.2	2.50	49.90%	100%	23.8	26.62%
04/05	719	1792.7	2.49	49.80%	99.9%	22.9	26.76%
05/05	743	1848.7	2.49	49.70%	99.9%	23.8	26.56%
06/05	684	1689.5	2.47	46.93%	95.06%	22.0	26.24%
07/05	743	1806.1	2.43	48.55%	99.93%	24.4	25.23%
08/05	722	1788.5	2.47	48.08%	97.16%	23.4	26.10%

**Average kW** = kWh ÷ Operating Hours

**Availability** = Operating Hours ÷ Hours in Period

**Capacity Factor** = Total kW Hours ÷ [Total Period Hours \* Fuel Cell Rated kW]

**Electrical Efficiency** = [kWh x 3413 Btu/kWh] ÷ [Input Fuel MMBTU x 1 million Btu/MMBTU]