

2003 CLIMATE CHANGE FUEL CELL BUY-DOWN PROGRAM

FINAL TECHNICAL REPORT

Reporting Period: November 2005 through November 2006

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THE COLLEGE OF NEW JERSEY

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ABSTRACT

The Student Apartments Fuel Cell Island Project consists of three (3) 200 kW phosphoric acid fuel cells located in conjunction with three (3) student apartment buildings, each housing 200 students.

The Final Report contains limited data because the fuel cells were started up November 2005 and shutdown March 2006. The price of natural gas, which is the primary fuel for the fuel cells, escalated by 200% following hurricane Katrina in August 2005. This escalation in natural gas price made operation of the fuel cells economically unviable, i.e., the cost to produce electricity with the fuel cells far exceeded the cost to purchase electricity from the utility.

The College intends to restart the fuel cells once the cost of natural gas stabilizes. The natural gas futures market is currently overpriced even though fundamentally the physical inventory is a five year high. We believe the natural gas market will eventually correct to the fundamentals and drive the cost down. Once this occurs we will restart the fuel cells.

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EXECUTIVE SUMMARY

The Student Apartments Fuel Cell Island Project consists of three (3) 200 kW phosphoric acid fuel cells located in conjunction with three (3) student apartment buildings, each housing 200 students.

Both the student apartments and the fuel cell island are at a remote location on The College of New Jersey (TCNJ) campus in an area not served by the campus central steam and chilled water utilities. Conventionally, buildings not served by central steam and chilled water must utilize package boilers (gas or oil fired) for heat and direct expansion cooling (electrically powered). Our application of fuel cell technology is unique in that it negates the need to utilize conventional package heating and cooling; the fuel cell island serves as a distributed generation asset at the remote building location, and also integrates within the overall campus electric transmission and distribution system. In addition, the fuel cell island is a combined heat and power (CHP) function, providing heat to the co-sited student apartments.

The Final Report contains limited data because the fuel cells were started up November 2005 and shutdown March 2006. Actual full-load operations were limited to December 2005 through February 2006—startup and shutdown activities encompassed December 2005 and March 2006, respectively. The price of natural gas, which is the primary fuel for the fuel cells, escalated by 200% following hurricane Katrina in August 2005. This escalation in natural gas price made operation of the fuel cells economically unviable, i.e., the cost to produce electricity with the fuel cells greatly exceeded the cost to purchase electricity from the utility.

The College intends to restart the fuel cells once the cost of natural gas stabilizes. The natural gas futures market is currently overpriced even though fundamentally the physical inventory is a five year high. We believe the natural gas market will eventually correct to the fundamentals and drive the cost down. Once this occurs, we will operate the fuel cells and subsequently supply the DOE with a “follow up” Final Report with one year of operating data.

EXPERIMENTAL

Because the fuel cells were simply commissioned at full load and then subsequently shut down, no experimental data was collected or is included in this report.

The price of natural gas, which is the primary fuel for the fuel cells, escalated by 200% following hurricane Katrina in August 2005. This escalation in natural gas price made operation of the fuel cells economically unviable, i.e., the cost to produce electricity with the fuel cells greatly exceeded the cost to purchase electricity from the utility.

RESULTS AND DISCUSSION

Because the fuel cells were simply commissioned at full load for 60 days and then subsequently shut down, no operational data was collected and analyzed. Thus, there are no relevant Results and Discussion included in this report.

The price of natural gas, which is the primary fuel for the fuel cells, escalated by 200% following hurricane Katrina in August 2005. This escalation in natural gas price made operation of the fuel cells economically unviable, i.e., the cost to produce electricity with the fuel cells far exceeded the cost to purchase electricity from the utility.

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CONCLUSION

Because the fuel cells were simply commissioned at full load for 60 days and then subsequently shut down, no operational data was collected and analyzed. Thus, there are no relevant Conclusions included in this report.

The price of natural gas, which is the primary fuel for the fuel cells, escalated by 200% following hurricane Katrina in August 2005. This escalation in natural gas price made operation of the fuel cells economically unviable, i.e., the cost to produce electricity with the fuel cells greatly exceeded the cost to purchase electricity from the utility.

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APPENDICES

I. Fuel Cell Operational Data

Fuel Cell Operation Data
The College of New Jersey

Fuel Cells (FC)	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06
GAS (GSG)												
Original Therms FY2006 Projection	38,294	38,294	38,294	15,768	FC Startup	15,768	15,768	15,768	FC Shutdown	15,768	15,768	15,768
Actual & Revised Therms Projection FY2006	-	-	-	-	10,000	23,088	23,088	23,088	5,000	-	-	-
Original \$\$/Therm FY2006 Projection	\$0.89	\$0.90	\$0.89	\$0.89	\$0.93	\$0.96	\$0.99	\$0.98	\$0.96	\$0.87	\$0.85	\$0.85
Actual & Revised \$\$/Therm Projection FY2006	\$0.00	\$0.00	\$0.00	\$1.8388	\$1.6500	\$1.6500	\$1.6500	\$1.6500	\$1.6500	\$1.23	\$1.22	\$0.90
NG Demand Chrg. (Nov. - Mar.)					\$ 4,480	\$ 4,834	\$ 2,000	\$ 4,500	\$ 1,826			
Original FC NG Cost FY2006 Projection	\$34,243	\$34,319	\$34,185	\$14,108	\$4,480	\$20,006	\$17,535	\$19,995	\$17,014	\$13,643	\$13,430	\$13,446
Actual & Revised FC NG Cost Projection FY2006	\$0	\$0	\$0	\$0	\$16,500	\$38,095	\$38,095	\$38,095	\$10,076	\$0	\$0	\$0
KWH Generated	0	0	0	0	216,000	432,000	432,000	432,000	108,000	0	0	0