

Case Study / Operational Analysis Report



EDC Technologies, Inc.
50 Executive Drive
Rohnert Park, CA 94928
949.388.2753

Date: November 9, 2010

Client: Macaroni Grill

Property: Puente Hills, CA

Purpose:

To observe, commission and tune the boiler environment for sustained energy savings. This test is for a dual water heating system plumbed in parallel. The objective of the test was to validate EDC technologies boiler control technology and methodologies in a restaurant environment with a recirculation loop and pump.

Process Summary:

Savings and optimization on this facility was performed in three phases. After each phase, the specific change in the systems operation was logged and measured to quantify the results. It should be noted that prior to EDC installations, the temperatures at this location were higher than necessary and as a result, there was excessive gas consumption. Additionally, during our test one of the heaters (the Right Water Heater) was failing. This information was communicated to the property and the system was corrected by maintenance personnel.

- Phase 1 Monitoring of Existing Temperatures and Operational Parameters
- Phase 2 Began controlling and achieving savings
- Phase 3 Stabilizing the operational temperatures to 140° during business hours and sustaining the savings long term

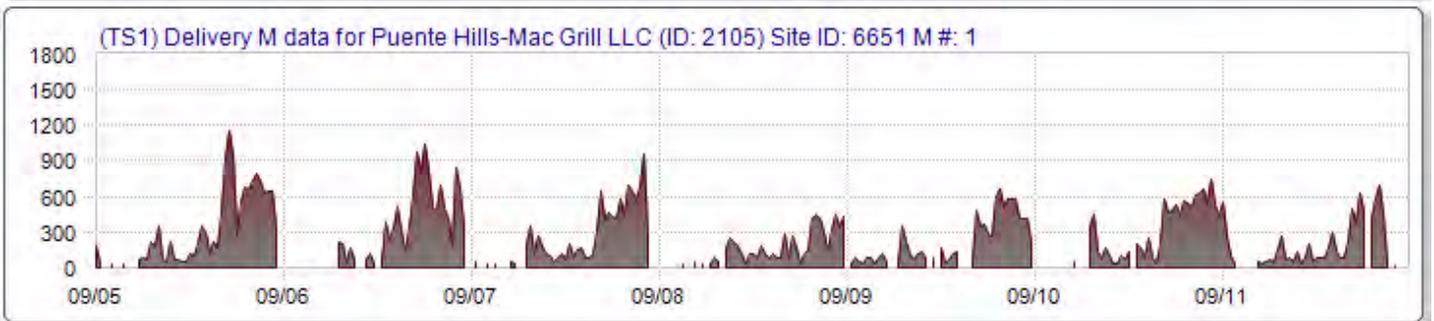
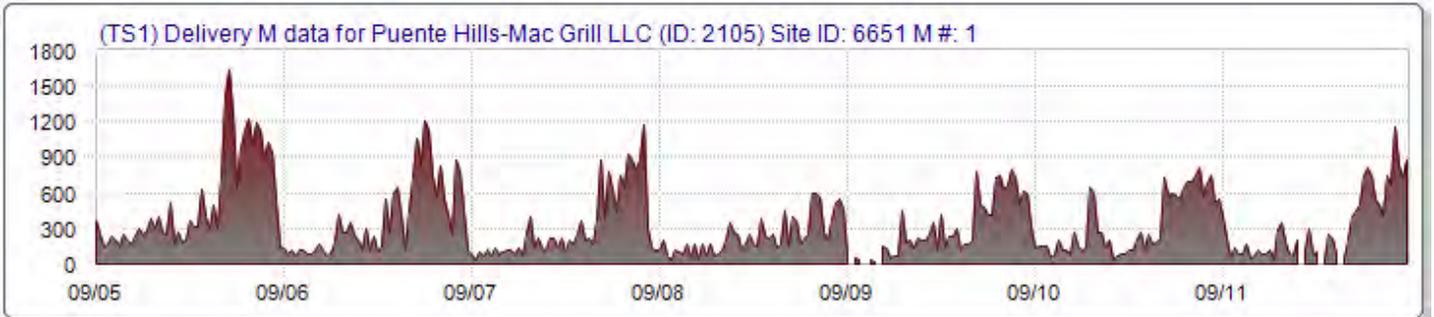
Economic and Operational Results to the facility:

- 31.7% Savings Sustained
- 207 Therms Saved per month
- 2512 Therms Saved per year
- \$1,884 Saved per year in reduced gas consumption

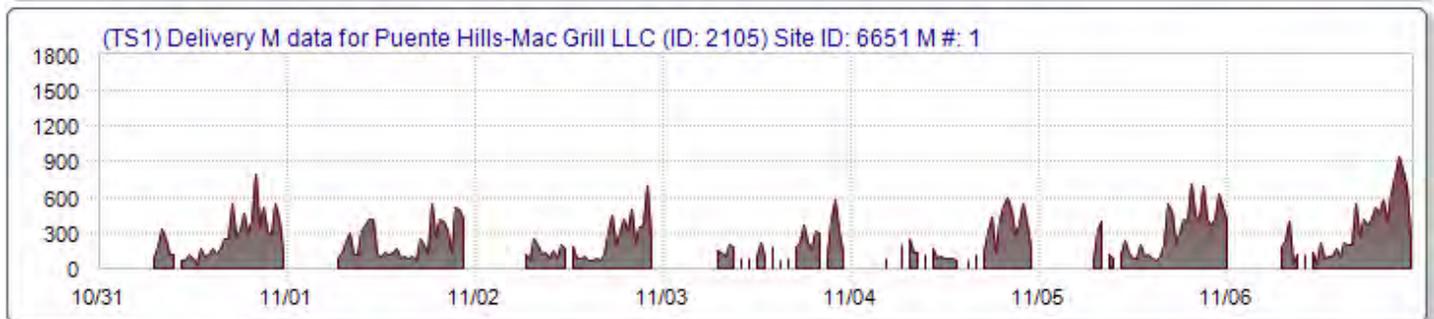
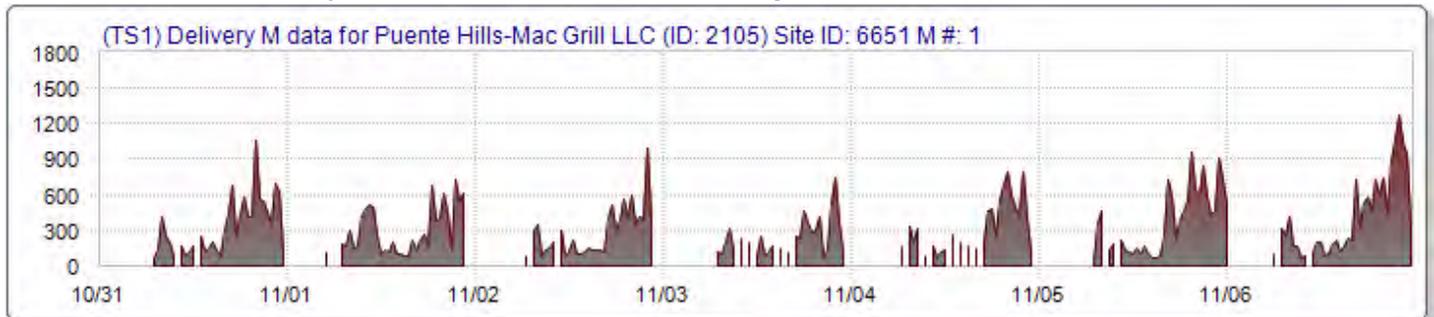
Note, during the test period the assumed cost of gas for this location is \$.75 per therm.

The following two charts compare gas consumption before EDC and after tuning has been completed and is sustained.

Gas Consumption Prior to EDC Control Top chart is Boiler (1) Bottom Chart is Boiler (2), Heaters are plumbed in Parallel



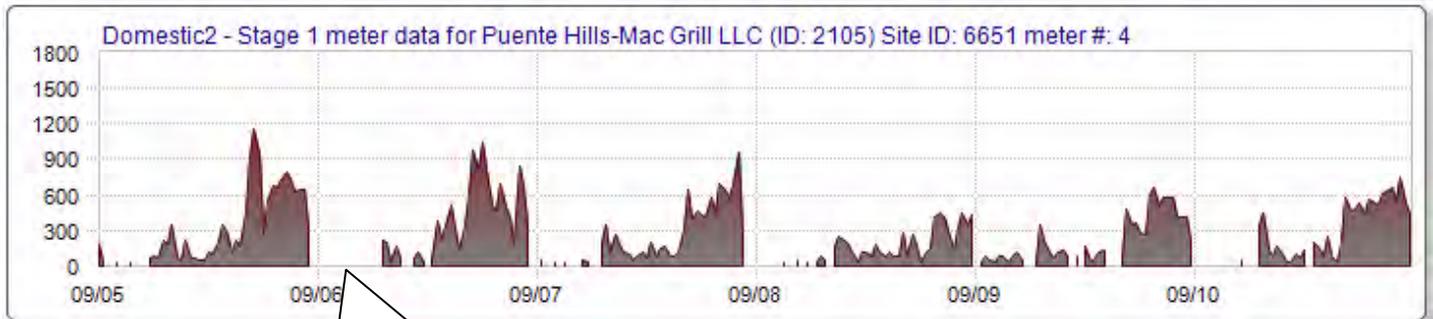
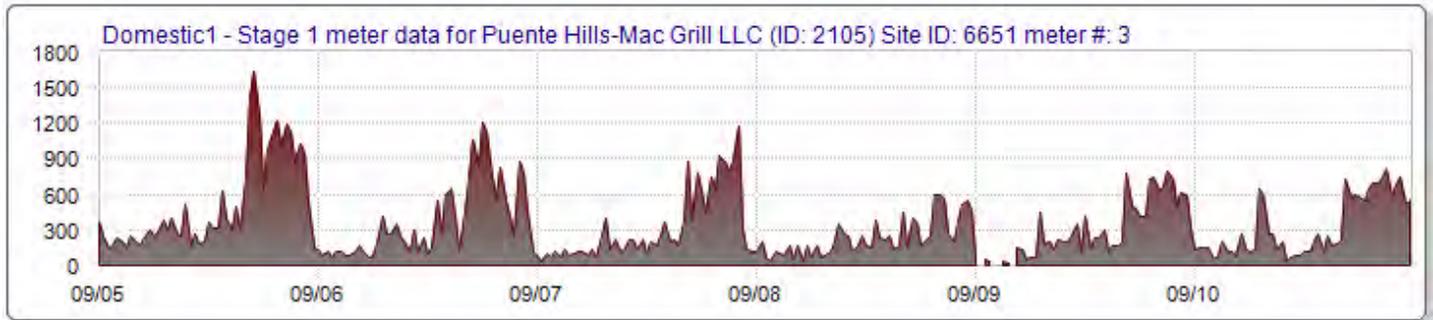
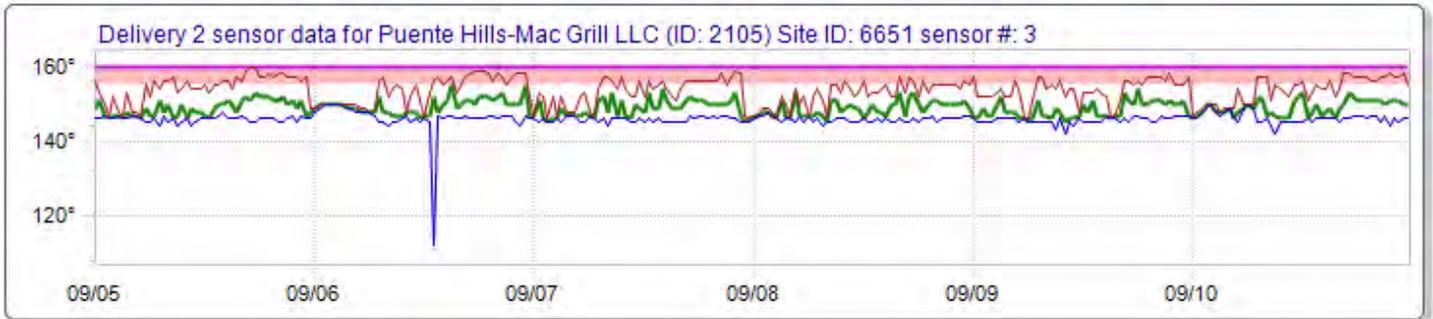
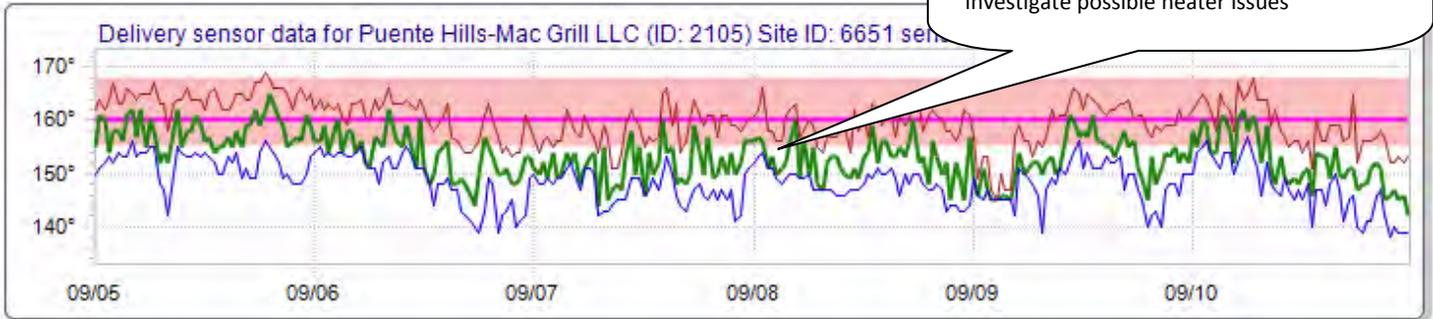
Reduced Gas Consumption Post EDC Control and now being sustained



The following pages detail each of the four phases in which EDC "Commissioned and Tuned" the boiler systems for Macaroni Grill Puente Hills. In the following charts, the **Green** line is the true average temperature that occurred during the 1/2 hour in question, **Red** is absolute high that was triggered and **Blue** was absolute low within the same period.

Phase 1 - Monitoring of Existing Temperatures and Operational Parameters

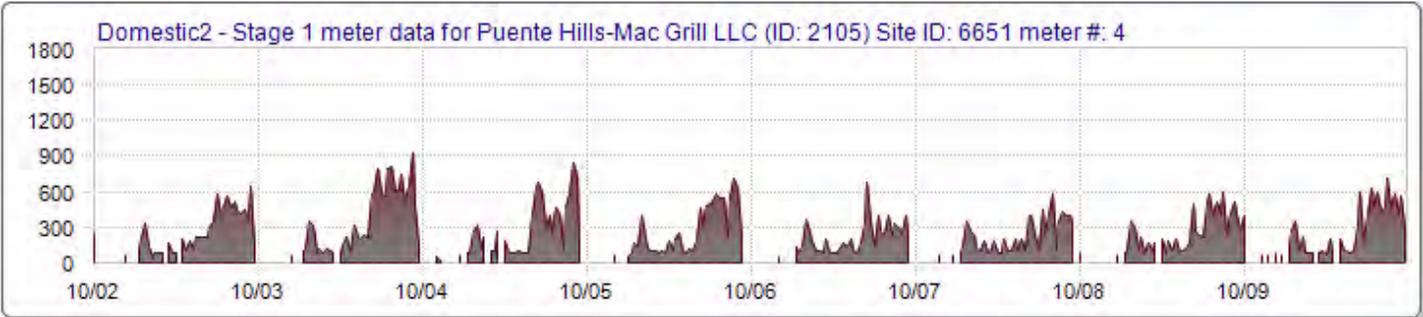
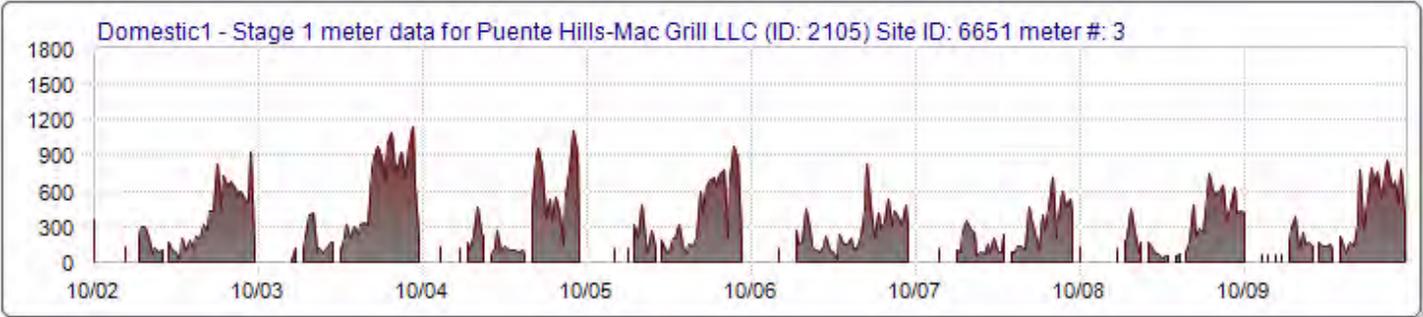
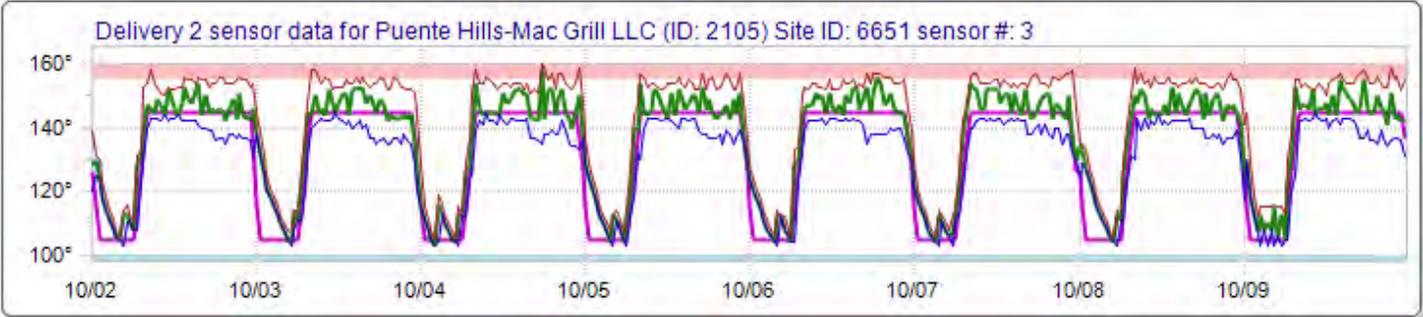
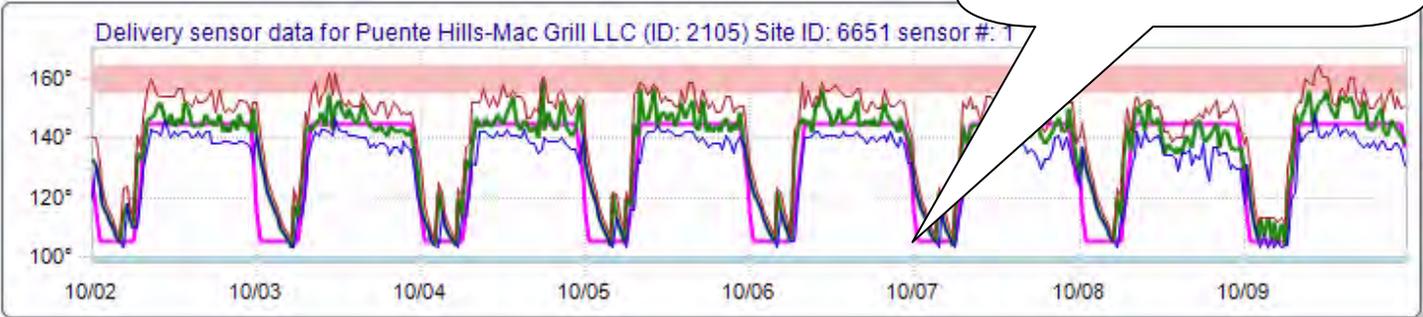
During observation, it was noted that temperatures were above MacGrill standards and very erratic, which led us to investigate possible heater issues



There is no gas burn during this operational period which further indicates that the boiler/heater is failing

Phase 2 - Applying a simple operational profile to reflect hours of operation

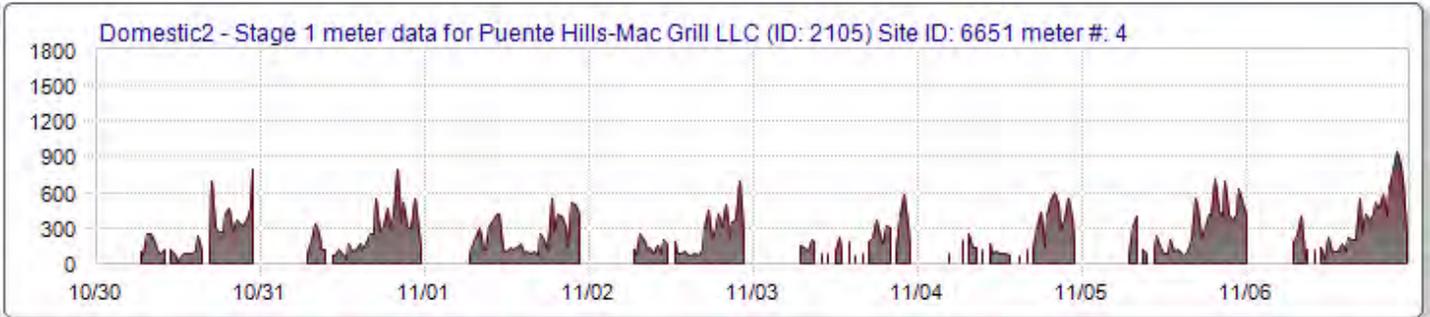
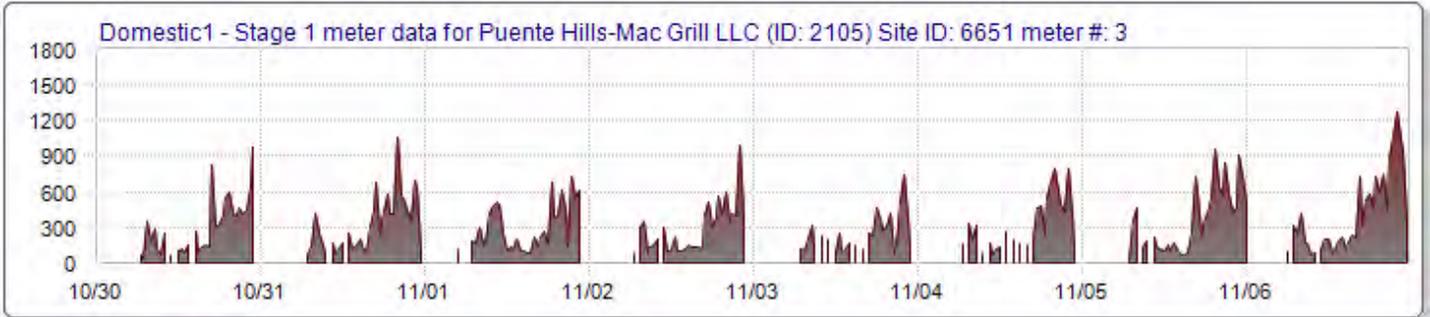
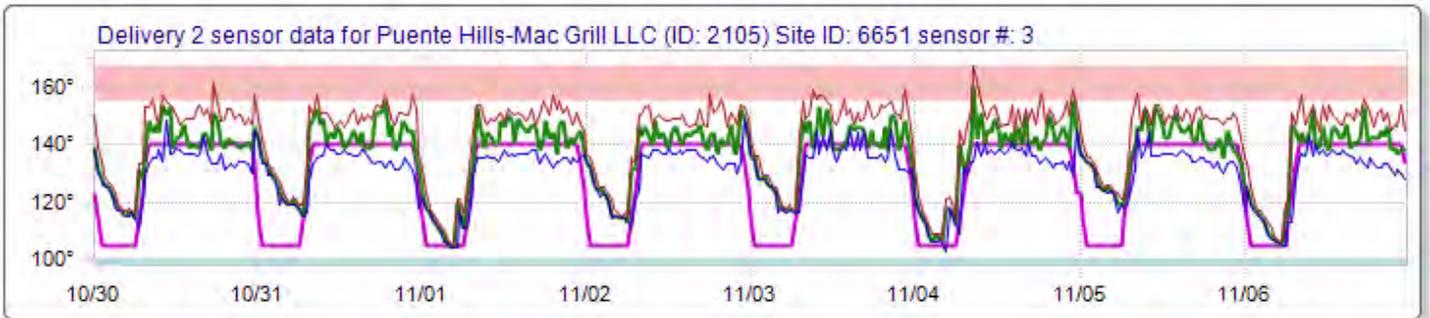
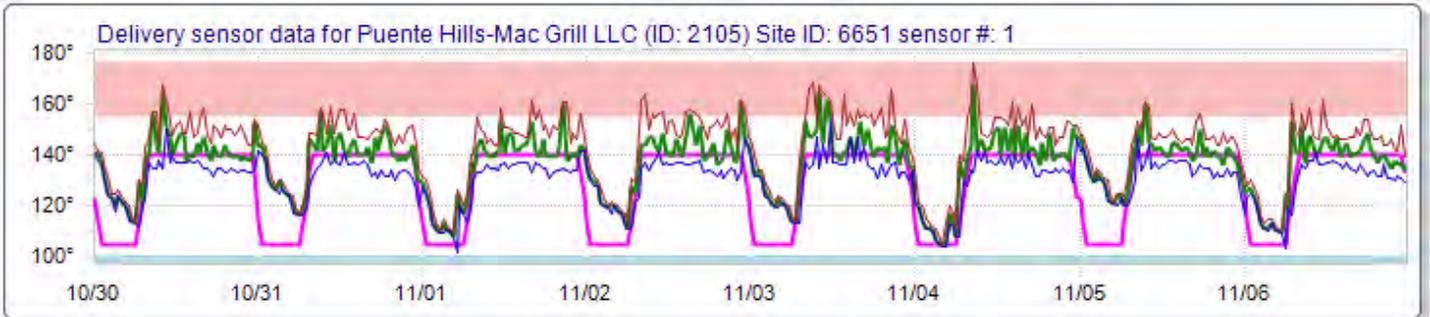
Operational Profile was applied and the temperatures were decreased and a similar operational profile was applied to the circulation pumps operation



Economics between Phase 1 and 2

Manuf	Device Name	Name Plate BTUs	Therm Per Hr	Burn Ratio	Adj Therms Per Hr	Hrs Day DS1	Hrs Day DS2	% Saved	Therms Saved Mth	Therms Saved Yr	Dollars Saved Mth	Dollars Saved Yr
Bradford White	Domestic1 - Stage 1	300000	3.00	100 %	3.00	4.46	3.19	28.4 %	114	1,388	\$85.58	\$1,041.16
Bradford White	Domestic2 - Stage 1	300000	3.00	100 %	3.00	2.77	2.61	5.9 %	15	179	\$11.03	\$134.14
					Total	7.23	5.80	19.8 %	129	1567	96.61	1,175.30

Phase 3 - With Temperatures Stable, we were able to reduce the peak temps 5 degrees to 140 and improve savings



Final economics:

Manuf	Device Name	Name Plate BTUs	Therm Per Hr	Burn Ratio	Adj Therms Per Hr	Hrs Day DS1	Hrs Day DS2	% Saved	Therms Saved Mth	Therms Saved Yr	Dollars Saved Mth	Dollars Saved Yr
Bradford White	Domestic1 - Stage 1	300000	3.00	100 %	3.00	4.46	2.77	37.8 %	152	1,848	\$113.91	\$1,385.86
Bradford White	Domestic2 - Stage 1	300000	3.00	100 %	3.00	2.77	2.17	21.9 %	55	664	\$40.93	\$498.00
					Total	7.23	4.94	31.7 %	207	2512	154.84	1,883.86