M2G Energy Analysis Report

(Using actual billing data)

Bell Helicopter

Fort Worth, Texas

Analysis Period:
October 2009 – August 2011
Location:
Fort Worth, Texas
Report Date:
October 12, 2011

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Summary

The M2G boiler optimization control unit was installed at the Bell Helicopter facility in the Alliance Airport in Fort Worth, Texas. The building is 95,000 sq. ft. and makes use of a 6 MMBtu/hr Bryan boiler. The M2G was installed on the Bryan boiler on October 28, 2010. A year-over-year analysis of the building's natural gas consumption was performed to determine the energy savings generated by the M2G using the building's actual billing data. The natural gas consumption was normalized using heating degree days (HDD) to account for weather variation in the comparison. By using a year-over-year analysis it was concluded that there was a 12.5% reduction in natural gas usage after the M2G's installation. The gas consumption, the number of heating degree days, and normalized gas consumption can be seen in the table below.

Bell Helicopter – Fort Worth, Texas				
	MCF	HDD	MCF/HDD	Energy Savings
Pre-M2G Average	2,344	2,922	0.80	12.5%
M2G	2,086	2,981	0.70	

Findings from the data collected to-date include the following:

- Building comfort levels are unaffected by the M2G device.
- An average natural gas savings of 12.5% was observed during the study period.
- The M2G has delivered significant energy and carbon savings and has also integrated into Bell Helicopter's existing building operations proving that the M2G is a commercially viable energy efficiency technology for Bell Helicopter.

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Introduction

Greffen Technology

The M2G is an advanced intelligent boiler control that optimizes the gas usage of a boiler. An M2G unit monitors and records the temperature of the water flowing in and out of the boiler every 10 seconds. The M2G also monitors additional boiler operating data, including heat transfer rates during firing and interval periods when the burner is off.

When a demand on the boiler is made, the M2G microprocessor checks the latest data it has stored and decides whether to allow the control signal to fire the boiler or open a relay which blocks the boiler from firing. Energy savings are only one of the criteria used in the M2G decision making process: (1) building comfort level and (2) protection of the boiler from thermal shock are other key criteria that are constraints used by the M2G. Also, the M2G preserves the existing system's control over the boiler and system. The M2G's built-in intelligence adjusts to changing conditions and operational settings without any requirement for operator adjustment or intervention. From an operator viewpoint all existing controls and procedures remain fully functional.

The result is energy savings while ensuring maximum capacity during heavy load periods; this is accomplished with no impact on building comfort levels. Viewed from a perspective of waste heat, the M2G minimizes the waste heat going up the boiler flue while preserving the transfer of beneficial heat into the building.

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Data Collection, Analysis and Findings

Energy Consumption

To determine the energy savings generated by the M2G a year-over-year analysis was performed. A baseline year was established to determine the building's gas consumption without the M2G. The baseline was established by using the year prior to the M2G's installation. The consumption during the first year after the M2G's installation was then compared to the baseline. The analyzed year with the M2G ranged from November 2010 to September 2011. Annual consumption was normalized using heating degree days (HDD) to eliminate weather variation effects. The final calculations show that the M2G reduced the gas consumption at the Bell Helicopter facility by 12.5%. The values used to calculate the savings are presented below.

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	MCF	HDD	MCF/HDD	Energy Savings
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Conclusions

The M2G was successful in delivering natural gas savings for the observed time period. This was accomplished by a reduction in the number of boiler firings, a reduction in waste heat going up the flue, and an increase in heat transfer to the building. The boiler met demand with less energy consumed and lower carbon emissions with no effect on the building comfort levels as confirmed with tenant reports (or lack thereof). Confirmed average annual energy savings are 12.5%. The M2Gs should also provide additional savings by lowering boiler maintenance costs due to the decrease in wear resulting from the reduction in boiler firings.

This analysis has demonstrated the M2G's delivery of significant energy and carbon savings for Bell Helicopter using the actual normalized year-over-year data. This savings was accomplished by the installation of a device that was easily integrated into Bell Helicopters building operations. The M2G is therefore a commercially viable and proven energy efficiency technology for Bell Helicopter.

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