Sabien M2G Pilot Scheme

Project Report

Installation of a Sabien M2G Boiler Optimisation Unit on a 700kW heating boiler at a University in Sydney

CCM ENERGY SOLUTIONS

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Project Summary

The project was a pilot scheme, involving the supply and installation of one Sabien M2G boiler optimisation unit on the main 700kW heating boiler (AIRA FTB-700) at a leisure centre at one of the major campuses of a Sydney-based university.

The Sabien M2G system operates using temperature probes on the boiler's flow and return water pipework, and a control unit which aims to minimise boiler 'dry cycling' (when the boiler fires to replace standing losses, rather than when responding to a genuine call for heat).

The principal aim of the project was to improve the overall efficiency of the boiler system by reducing boiler cycling and overall boiler run-times, with the goal of reducing fuel consumption and associated costs, as well as minimising carbon dioxide and other greenhouse gas emissions. The fuel fired on site was natural gas and the unit was installed and fully operational from 4 July 2013.

Data Analysis

A comparison of two one week periods was made, with Week 1 being the period for which the M2G was operational, and Week 2 being the 'control' period when the M2G was switched off for a week in July, following the install. The exercise aimed to see the effect of the M2G unit on the amount that the boiler cycled, and the results were positive:

1. Number of instances in one week of boiler being off for a period < 15 minutes:
   - 66 in week 1
   - 356 in week 2

➢ The M2G is preventing the boiler from starting up so frequently during periods of low load demand (i.e. when the boiler is only firing to replace standing losses, not responding to a genuine 'call for heat').

2. Average Daily Cycles (per 24 hour period over one week):
   - 31.9 in week 1
   - 68.1 in week 2

➢ Average number of times the boiler is turning on per hour (which includes pre- and post-purges) is significantly reduced when M2G is operating. Every time the boiler starts up and shuts down heat is lost from the system due to the air purges (excessive cycling also causes additional wear on all mechanical parts).

Fuel Consumption:

Data is currently available for the months of August and September, for which the M2G unit has been constantly in operation. These figures are taken from the gas meter on the main gas line to the leisure centre boiler room. A straightforward year-on-year comparison can be made, but the figures have also been adjusted to take account for differences in ambient temperature (average temperatures were warmer in August and September 2013 than in the previous year, which affects the amount of time the heating boiler will operate for).

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2012 Fuel Consumption (August & September): 1,812 GJ

2013 Fuel Consumption (August & September): 1,486 GJ

- **Nominal Year-on-Year Reduction: 18.0%**

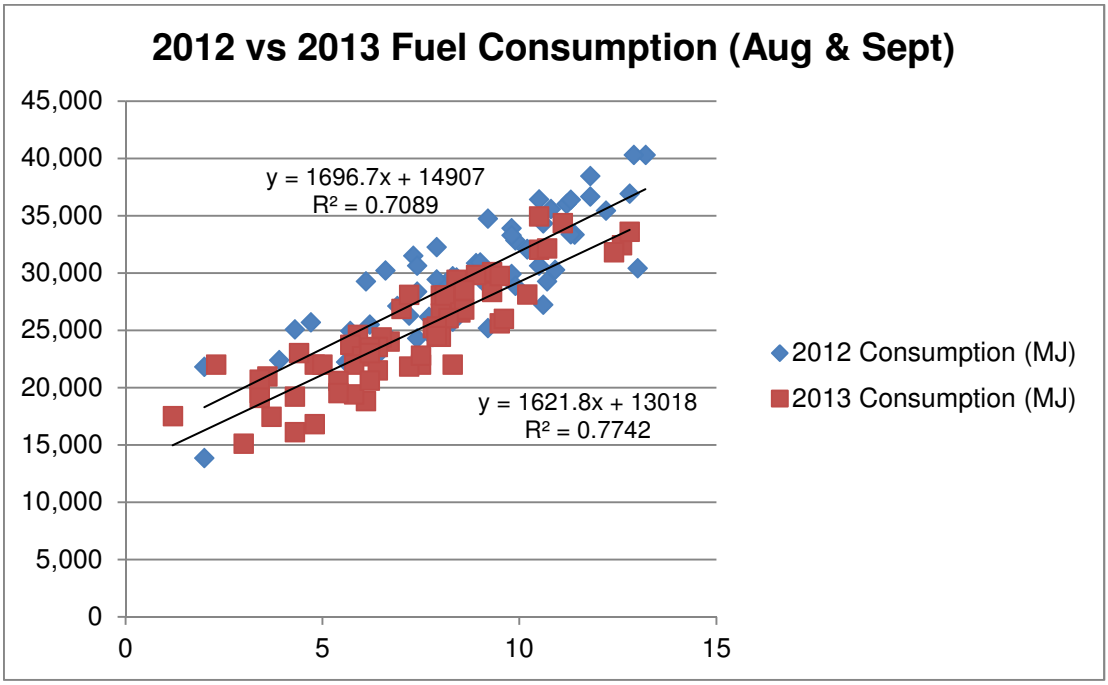
Temperature Adjusted Savings:

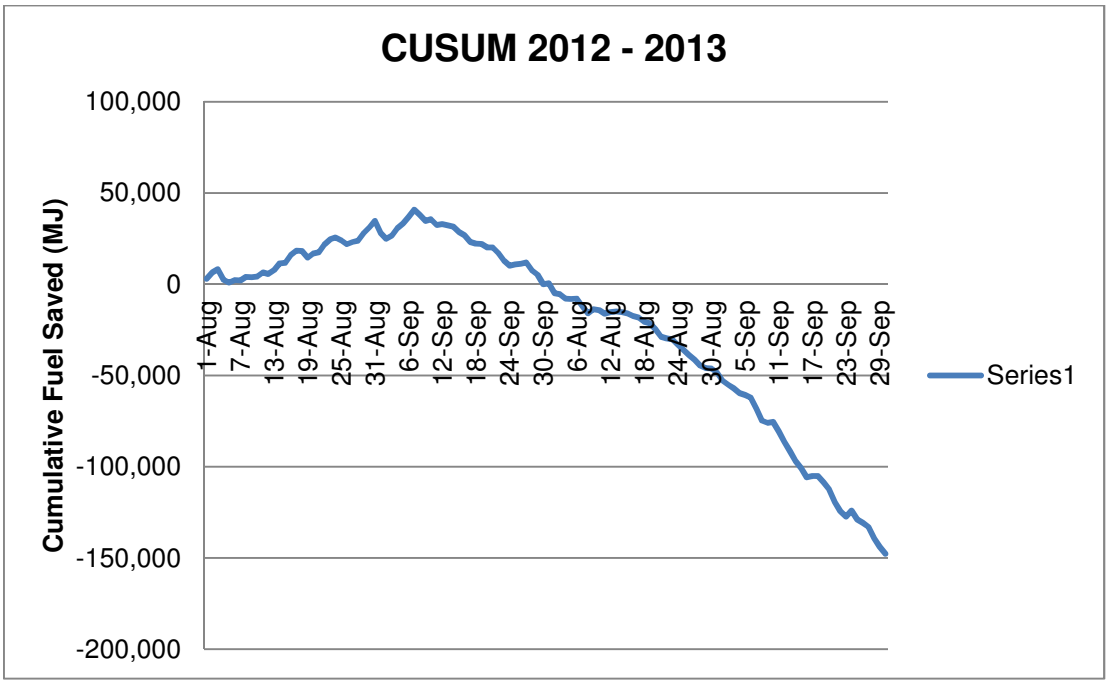
Using "heating degree-day" information for 2012, the expected fuel consumption for August and September 2013 can be estimated. This is then compared with the actual fuel consumption figures for those two months.

Expected 2013 Consumption: 1,642 GJ

Actual 2013 Consumption: 1,486 GJ

- **Temperature-adjusted Reduction: 9.5%**





Carbon Emissions:

The decrease in fuel consumption has a corresponding impact on the amount of carbon emissions from the boiler. At this stage these are estimated to be 43 tonnes per annum.