



contract report



Customer:
Royal Darwin Hospital

Location:
Tiwi, NT, Australia

Boiler Type:
John Thompson

Burner Model:
LCNO36

Fuels:
No.2 Oil & LPG

Fuel Savings:
12.1%

Project Summary

As part of a larger infrastructure upgrade project at Royal Darwin Hospital, CCM Energy Solutions were elected by the primary contractor (O'Donnell Griffin) to supply two new Limpsfield high-efficiency burners for the two main John Thompson boilers which provide steam to the hospital. In addition, new Autoflame Mk7 combustion control systems were incorporated into the design, along with in-situ Autoflame exhaust gas analysis units for real time combustion analysis and combustion 'trim', and a data transfer unit to allow communication between the burner control systems and the hospital's building management system (BMS). Variable speed drives (VSD) were also to be supplied for the control of the forced draft fan blower motors. This aspect of the project was expected to deliver a payback period within two years following completion – this figure was based on calculations made during the pre-tender scoping process by AECOM, the consultant contracted to perform the work by the Northern Territory Government.

Equipment Supplied:

The principal new components supplied were the following:

- o Limpsfield LCN036 high-efficiency, dual-fuel burner - Including Autoflame fuel and air control servomotors, flame scanners, gas and oil valves etc
- o Autoflame Mk7 'Evolution' combustion control system
- o Autoflame Exhaust Gas Analyser unit
- o Autoflame Data Transfer Interface unit
- o Danfoss VLT series Variable Speed Drive

Year on Year Weekly Diesel Consumption

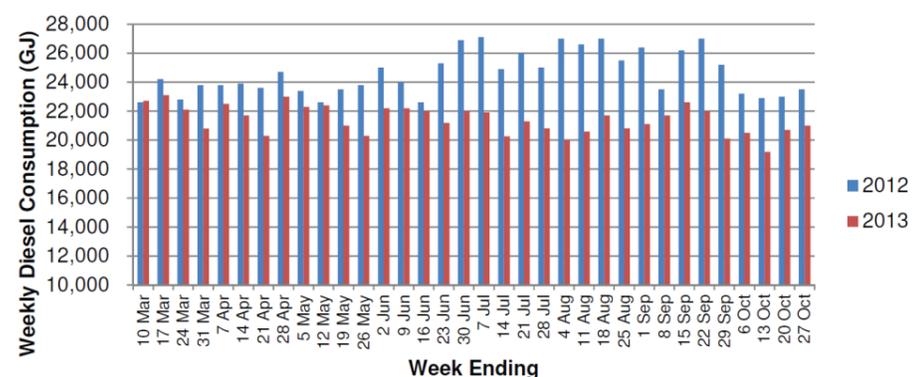


Figure 1 shows how the average fuel consumption in the boiler room has decreased significantly since the installation of the new systems – it is a graphical representation of the weekly fuel usage from one year to the next, i.e. before and after the installation of the new burners. The shorter red bars show the decrease in fuel consumption post-installation.

Installation & Commissioning

The old burners and associated mechanical controls were removed in full, along with the redundant control systems from the existing control panels. All mechanical and electrical work during this phase of the project was carried out by the boiler service company on site at the hospital (AirDucter), with oversight from O'Donnell Griffin and Royal Darwin Hospital. The first burner was successfully installed and fully commissioned by 8 March 2013, with the second burner being completed by 19 April 2013. All mechanical and electrical work was completed by the local regular boiler service company (who are based on-site at the hospital). Once this had been completed, CCM Energy Solutions attended site and undertook full field testing and then oversaw the commissioning process. The burners were then commissioned (firing on diesel) with the following combustion characteristics throughout the firing range (low to high fire):

- O₂ levels in the range of 2.5-3.5%
- CO levels at sub-10 ppm and
- CO₂ levels in the range of 13-15%
- Efficiency levels between 86-89%

For more information on the Limpsfield burner range, please do not hesitate to contact us.



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Data Analysis Diesel Consumption

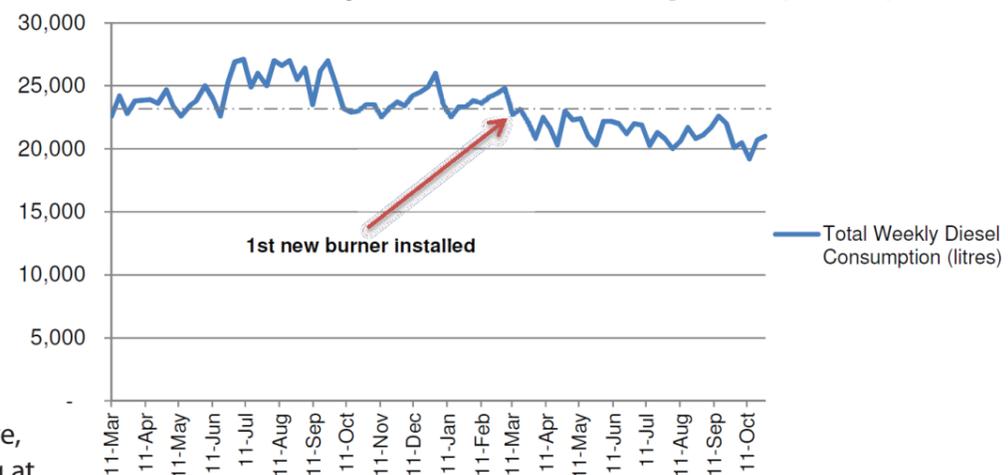
The daily diesel consumption in the boiler room is monitored and recorded on a daily basis by AirDucter personnel as part of their daily routine and safety checks on the boilers. These figures were then analysed for a period before and after the installation of the new burners, to monitor any beneficial impact that the new technology had on fuel consumption. The average daily diesel consumption in the boiler room decreased significantly postinstallation of the new burners and control systems. Below is a comparison of figures since the installation of the first new burner, compared to the preceding 12 months (11 March 2012 – 4 March 2013):

Average Diesel Consumption	
Since Burner Upgrade	3,059 litres / day
Preceding 12 Months	3,479 litres / day
Percentage Reduction	12.1%

Based on the figures above, assuming a conservative reduction in diesel usage of 350 litres per day, this equates to an **annual saving of over 125,000 litres of diesel.**

The horizontal dotted line in the chart on the right represents the average weekly consumption in the boiler room over the preceding twelve months, before the installation of the new systems.

Total Weekly Diesel Consumption (litres)



Electrical Savings

Since the installation of the first new burner and control system, including the new variable speed drive, the blower motor has been observed to be operating at an average output of 3.31 kW. The previous motors were both rated at 11 kW. Assuming that one boiler is running for an average of 18 hours per day, this works out at an estimated reduction of 50,500 kWh per annum. Using an indicative pricing level of \$0.18 / kWh, this equates to a saving of over **\$9,000 per annum** through the use of VSDs.

Carbon Emissions

Based on the reduced fuel consumption on site, we have also estimated that greenhouse gas emission reductions will be as follows:
 Total reduction in harmful emissions: 20.56%
 Annual CO2 reduction: 460 tonnes

"Fuel savings of 12.1%, with an annual diesel saving of 125,000 Litres"



BEFORE



AFTER

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