Gem Utilities

GEM | C/S 1 | 2010

▶ GEM SHOWS 17.9% REDUCTION IN GAS USE AT DCC POOL

▶ M2G DELIVERS SAVINGS WITHOUT EFFECTING COMFORT LEVELS IN HOT WATER & HEATING

Technical *focus*

ADDRESSING THE NEEDS OF SWIMMING POOLS & LEISURE CENTRES.

Subsequent to a meeting with Dublin City Council's Department of Mechanical Engineering, GEM received approval to install its breakthrough M2G boiler optimising control system in a City Centre Leisure Centre. In March 2007 M2G systems were installed at the Markievicz Leisure Centre, Townsend Street, Dublin 2. This article summarises the savings and energy benefits achieved. There have been no call-outs or maintenance associated with M2G since installation.

Helping you achieve your energy & CO2 goals

Building heating plant characteristics: Markievicz Leisure Centre is heated by 2 x cast iron sectional Buderus boilers type G605 with a combined heat out put of circa 1.2 MW heat (1,2000kW). The boilers are fired by Riello type natural gas burners Model RS 100.

The building has a Cylon type Building Energy Management System (BMS) as might be expected in any modern building. The BMS controls the heat distribution in the building by modulating the flow of hot water into the building zones from the primary heating circuits. In this way adequate heat can be delivered to the main Air Handling Units (AHU), Radiator circuits, Pool heat exchanger, and Domestic Hot Water storage facility for showering.

The BMS optimises the building environment and ensures that no under-cooling or over-heating takes place but unless there is additional boiler optimisation avoidable heat loss and Co2 emissions will occur in the boiler house. The primary cause of this wasteful heat generation is the boilers themselves which switch on and off at times when there is no demand from the building heating circuits.

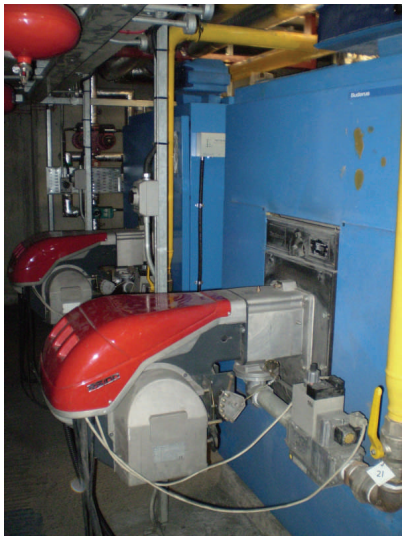
M2G is Carbon Trust Approved

M2G boiler control was designed to eliminate boiler waste.

CARBON TRUST
Making business sense of climate change

WATCH THIS SPACE

Markievicz Leisure Centre is located in the heart of Dublin City Centre. The centre comprises a 6 lane 25 M swimming pool with dedicated lane swimming at three different speeds, a fully equipped gym and sauna, large aerobics studio with fitness classes. More recently in 2008 Markievicz was awarded the prestigious White Flag Award from ILAM which is the industry standard quality mark for Leisure Centres in Ireland.



Markievicz Boiler Plant

Boiler plant looses heat up the flue (convection losses) and through the boiler casing (radiation losses). This heat loss causes boilers to fire even when there is no lost heat from the building. This happens even in buildings with the most modern Building Management Systems (BMS). This activity is particularly wasteful especially when we consider that most commercial boiler plant is oversized and that in order to re-heat, the boiler must purge each time it fires which has a significant negative impact on circulating boiler flow water temperature.

M2G boiler optimising software was designed specifically to ensure that when the boiler plant fires that there is a genuine demand for heat from the building (heating or hot water). The M2G control strategy upholds the strategic common pipe-work temperatures in the boiler house thus ensuring that there is no compromise to comfort levels whatsoever within the building.

Savings Analysis: 2# M2G boiler optimising controls were installed at the Markievicz Leisure Centre. The controls were linked to designated logging software which recorded all boiler activity down to the last 100th of a second. M2G is wired in series after the boiler control thermostat and before the burner. A connection is made on the burner connector block to signal when the gas valve opens. All gas valve activity is recorded.

An 'hour-on' (M2G control) versus an 'hour-off' (Normal boiler control) of gas valve activity gives a good indication of expectation of annual savings. Similar demand activity in terms of hot water and heating can be expected in a comparison of back-to-back hour activity. No classes or groups entered the leisure centre during this time which might have negatively affected fuel consumption. External ambient temperatures will not impact the overall savings quotient as they will be similar over the short time period. Savings are deemed to be weather dependent i.e. it can be expected that on warmer days with a similar hot water demand that savings would increase and conversely that on colder days that savings would diminish somewhat.

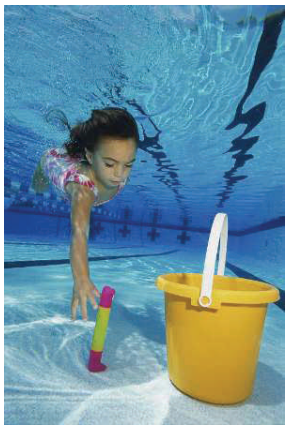
The weather dependent result from this analysis showed a 17.9% savings

M2G boiler optimisation:

By monitoring each individual boiler flow and return circulating water temperature every second M2G builds a profile of boiler performance and heat loss over time. This profile is then utilised to optimise the boiler firing pattern, eliminate wasteful boiler firing, restrict purge losses and capitalise on any boiler over-shoot.

The M2G programme can mimic current boiler performance under heavy load conditions. The software also has the ability to slow the rate of boiler response when the loading demand drops to a minimum.

Importantly, the M2G boiler optimising strategy upholds the common header pipe-work temperature set points thus ensuring that the same heat is delivered into the building on variable and constant temperature circuits.



M2G savings

DELL 35%
Milford Hospice 20%
Clarion Hotels 34%
Ulster Bank 25%
Tipperary Energy Agency 20%
Superquinn 13%
Inst Mechanical Eng 17%
O^2 27%

M2G Savings Summary

Activity	Boiler Runtime
Normal Hour	17.93
M2G Hour	14.72
Difference	3.21
% Saving	17.9%