Case Study > hot water systems

WaterTrac identifies faulty HWS plant operations

The Challenge:

Determine how much hot water is being heated by a dual gas fired community hot water system.

The Solution:

Install WaterTrac intelligent wireless water meters to measure the volume of make-up cold water entering into the hot water supply system.

The Result:

Circulating water volumes reduced, faulty system controls identified and flaws in water system design fixed.

"Not everything that counts can be measured.

Not everything that can be measured counts"

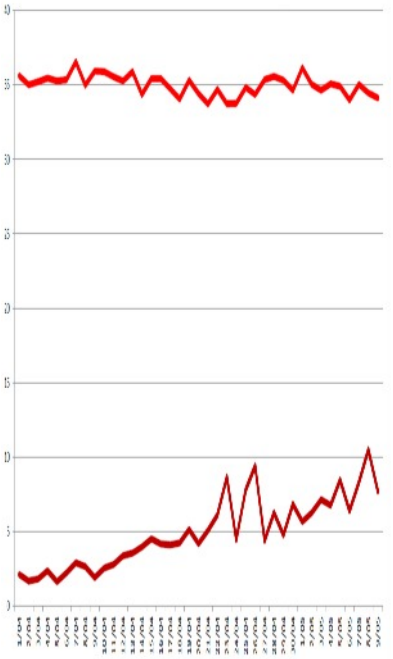
Albert Einstein

The Task:

1. Verify the correct operation of two identical gas fired community water heating and storage systems each located on top of a high rise building and providing hot water to a large number of residential apartments.
2. Turn a humble mains supply cold water meter into an intelligent measuring instrument and then use it to get information to be able to monitor the operations of the HWS plant and equipment in real time.
3. Take meter readings every 15 minutes and automatically report them to a remote computer data centre for analysis and then supply the results over the cloud to be able to be viewed on the web anywhere at any time.

The Outcomes:

New 80mm mains cold water meters and check valves were fitted on cold water input pipes feeding cold water to the gas fired HWS units in each of the buildings. The new water meters were then enabled with WaterTrac automatic reading devices and then joined by the WaterTrac secure wireless network to the 24/7 cloud-based WaterTrac sentinel monitoring service.



The volume of water being measured by each water meter was automatically recorded at a frequency of 96 times per day and consumption of cold water by each hot water service was calculated and charted remotely in real-time.

Two identical gas-fired industrial hot water heater services (HWS) had been installed in different buildings at the same time by the same manufacturer. Comparing the water flow through identical newly installed water meters on the cold water input side of each HWS showed a wide and unexplained discrepancy in cold water make up volume between the two.

After 21 days of operation we invited meter technicians and HWS engineers to inspect each of the HWS plant installations and to observe the charted measurements obtained by the WaterTrac system. None could adequately explain the difference in the volume of make-up cold water being measured by the meters at each site for exactly the same HWS plant and equipment.

A shut-down of the gas-fired water heater plants in one building was then effected. On shutdown 60% of all manually actuated valves cold not be closed without being heavily forced and several handle breakages occurred. The failure of the valves in the HWS circulating and storage systems indicated that the plant had not been properly maintained by building management.

Tracing water flow through the system disclosed a potential for heated re-circulated water to be able to re-enter on the upstream side of the cold water meter thus forcing hot water back through the cold water meter. This would affect proper operation of the water meter and would be a factor affecting the true readings of the cold water make-up volume entering each of the HWS systems as the recorded volumes in the charts indicated.

This presumption was tested by using existing valves to manually and temporarily re-configure the water flow through the HWS. It was immediately observable that back-flow of hot-water through the newly installed cold water meters was halted. The meter body temperature quickly dropped to match that of the cold water entering on the input side of the meter and the analogue mechanical meter reading system commenced proper operation.

The Outcomes:

The same trace and test procedure was used on the HWS installation in the second building which disclosed that hot water was flowing back across the newly installed cold water meter.

Both HWS designs and installations were identical in every respect, and while the back flow did increase the overall flow of water through the meter in the second building it still did not adequately explain the much higher volume of cold make-up water which was being recorded by the water meter.

Further examination of the water circulating system disclosed that plant operators had closed off a valve to restrict entry of re-circulating hot water to part of the HWS and increased the temperature set-points of the gas HWS units in order to boost overall water heating capability.

The need to boost heating was traced back to a faulty Schneider temperature valve/controller which was not able to hold water temperature at set-points. This required the gas water heaters to be operated at a higher temperature set-points in order to be able to hold hot water at the correct overall temperature in the circulating hot water system.

"Hunting" of the Schneider temperature control system resulted in difficulty in maintaining hot water temperatures, longer water heater and pump running times, higher gas consumption and shortened operating life of circulation pumps, U.V. Lamps, and inline filters systems.

About WaterTrac

Established in 2010, OzGreen Energy Pty Ltd revolutionised retrofitting of water meters into existing high-rise buildings with release of the WaterTrac system.

WaterTrac is the first cloud-based wireless water meter system tied to a predictive data engine.

For more than thirty years, the owners of OzGreen Energy have continued to revolutionise industry sectors with innovative products, services and unbeatable support for the best overall value available.

Visit www.ozgreenenergy.com.au for more information

A simple retrofit fix was designed. This consisted of the installation of a low-cost non-return valve to prevent hot water circulating to the input side of the water meter measuring the make-up cold water entering into the hot water system. The effect on installation was immediately observable:

- Housing temperature of water meters returned to normal operating temperatures (i.e input cold water temperature
- Volume of water measured by the cold water meter dropped substantially to true measured volumes

In the above cases installing WaterTrac intelligent water meters disclosed previously unknown operating and design issues in two large scale circulating hot water systems which contributed to shortened equipment life and higher operation costs.

Having the ability to remotely read and compare meter readings electronically proved to be an invaluable asset when brand new mechanical analogue meter mechanisms failed to record proper water flows because of unknown system design faults.

WaterTrac provided the only clues to be able to quickly find the faults in the hot water service that had eluded a number of plant operators for 6 years and which contributed to substantial excess operational expenditures during that time.