



March 14, 2016

Location: Toronto, Ontario, Canada

Facility Type: Multi-Residential Building - 163 unit building

Overview

This case study details the findings on the installation of the H2minusO Flow Management Device (FMD) water saving technology at a facility located in Toronto, Ontario. The positive results demonstrate the value-add our device had on this facility and will continue to have. Virtually any facility that consumes water can benefit from our technology.

Background

Good water management requires accurate water measurement!

Water meters have changed little since their beginning and have a major fault in their design: air in your water lines is read as water by your meter. So for ALL end users, there is a very high probability your meter is billing you for water use, but not your actual consumption.

In a variety of ways, air can enter the water supplied by your water utility. Our H2minusO Flow Management Device (FMD) valve acts to minimize the air that would otherwise travel through your water meter and inflate the volume of water you ultimately pay for. All water pipes intermittently carry air along with water. As water travels from the water company to a home or business, air builds up in the water pipelines via internal and external processes. Since all water meters measure total volume, including both air and water, the blades in the meter turn faster than they would with just water alone. As a result, if you don't have our H2minusO valve, you pay more than necessary for your water.

What are the benefits for your business/organization/facility?

- Lower water bills
- Rapid return on investment
- Increased net operating income

The Technology: H2minusO - Water Flow Management Device





The Installation

The installation at these facilities was for a 3" Valve that took approximately 4 hours. A typical install will usually take about 4 hours and in most cases, if there is a by-pass, water services will still be available to the facility. Once the installation is complete the water savings will start immediately.

The Project Analysis: *Pre and Post Water Consumption Analysis*

This measurement & verification analysis is based on actual billing information as well as daily readings pre and post installation of the H2minusO FMD. Encompass was provided billing details for 19 consecutive months (ideally 24 months required). However, this did not prevent us from establishing key metrics and measurements in order to determine the performance of the FMD relative to historical consumption benchmarks. We also took readings for 48 days prior to the install and then for an additional 24 days after the installation. The post installation data collected permitted us to apply our Measurement & Verification (M&V) analysis methodology. The analysis explored such things as consumption patterns, abnormal or suspicious periods of consumption, comparison of same period consumption year to year, consumption trending and impact of variables contributing to increased consumption. For this facility, we observed no extraordinary fluctuation in consumption based on the data collected from all sources.

Our analysis showed this facility exhibited consistent seasonal water consumption patterns during the original 19 months of billing data we were provided and then the period prior to and post H2minusO FMD installation. So the installation of the H2minusO valve quickly demonstrated its impact by showing a deviation from this consistent consumption pattern.

As shown in Table 1 row 1, consumption for a 1 year period was 94.62.56 m³/day and .581 m³/day/unit. This high-level baseline is used to monitor savings as the post-installation period progresses throughout the year. We also established additional baselines that were more closely centered on the actual installation period so that we could minimize the impact on our M&V process due to seasonal consumption or other consumption events such as leaks caused by any number of mechanical equipment failure – e.g booster pumps. This can be observed in Table 1 Row 2, 3 and 4.

Row 2 established a baseline in the prior year during a similar period relative to the current year, but before the FMD is installed. This baseline showed that in a 60 day period in the prior year, consumption was 93.46 m³/day and .573 m³/day/unit, which was 1.237% lower than the average for the year.

Row 3 established a baseline in the prior year during a similar period relative to the current year but after the FMD is installed. This baseline showed that in a 61 day period in the prior year, consumption was 88.97 m³/day and .546 m³/day/unit, which was 4.81% lower than the annual average (note: the FMD was installed on Feb 16, 2016, so when considering similar periods in the prior year both before and after the FMD installations, there is an overlap in the data sets recorded in rows 2 & 3). In the absence of daily readings, it is not possible to break out the exact consumption for each period before and after the actual install date in 2015. The data sets during this period (row 2 and 3) indicated there was minimal deviation from the averages and thus the overlapping periods did not significantly impact our analysis.

Row 4 established the consumption pattern of 90.71 m³/day and .557 m³/day/unit for the period immediately before the FMD was installed. These numbers were also in line with the data sets in rows 1,2 and 3.

Row 5 established the consumption pattern of 79.46 m³/day and .487 m³/day/unit for the period immediately after the FMD was installed. When the post installation data sets were compared to the data sets in rows 1, 2, 3 and 4, it showed that the H2minusO FMD had a positive impact on water consumption readings. Observe column 7 - the post install consumption compared to the annual average is lower by 16.03%; when compared to the prior year averages before and after the install period of the current year we see savings of 14.98% and 10.69% respectively; when compared to the 48 day period immediately before the installation a savings of 12.41% is realized.

Using the most conservative results, of the analysis, this facility showed a reduction in the average daily water consumption of 10.69% as shown in row 3 column 7, clearly pointing to improved meter reading efficiency.

Table 1: Period Analysis – Consumption for 50 Burnhill

| | Measurement Period - Start | Measurement Period - End | Average Daily Consumption (m3) | Average Daily Consumption Per Unit (m3) | Change in Water Consumption Reading (Period to Period) | Reduction in Water Consumption (all Periods) vs Post H2 Install |
|-----------------------------------------------------------------|----------------------------|--------------------------|--------------------------------|-----------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------|
| Consumption for - 365 days (pre H2) | 1-Aug-14 | 1-Aug-15 | 94.62 | 0.581 | 0.00% | 16.03% |
| Consumption for Comparable Period- 60 days (pre H2 prior year) | 1-Feb-15 | 1-Apr-15 | 93.46 | 0.573 | 1.23% | 14.98% |
| Consumption for Comparable Period- 61 days (post H2 prior year) | 1-Mar-15 | 1-May-15 | 88.97 | 0.546 | 4.81% | 10.69% |
| Consumption for - 48 days (pre H2 current year) | 30-Dec-15 | 16-Feb-16 | 90.71 | 0.557 | 2.94% | 12.41% |
| Consumption for - 24 days (post H2minusO retrofit) | 16-Feb-16 | 11-Mar-16 | 79.46 | 0.487 | 12.41% | |

Chart 1:

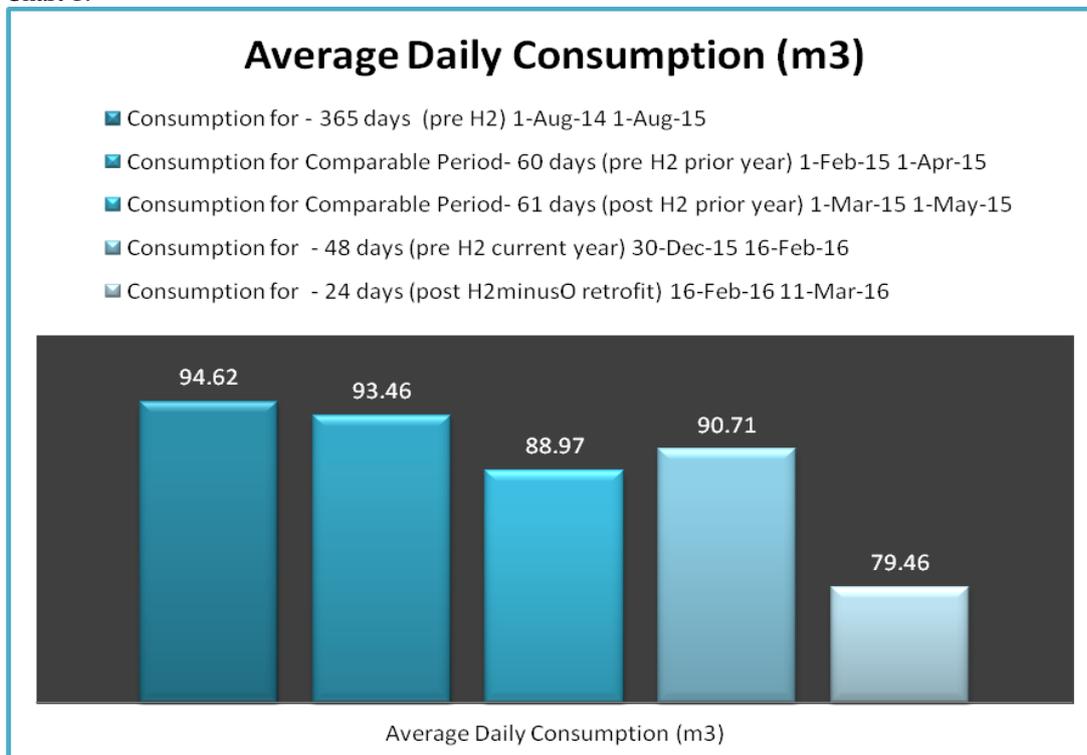


Chart 1 shows the daily water consumption recorded period over period based on water bills and actual meter readings.

Chart 2

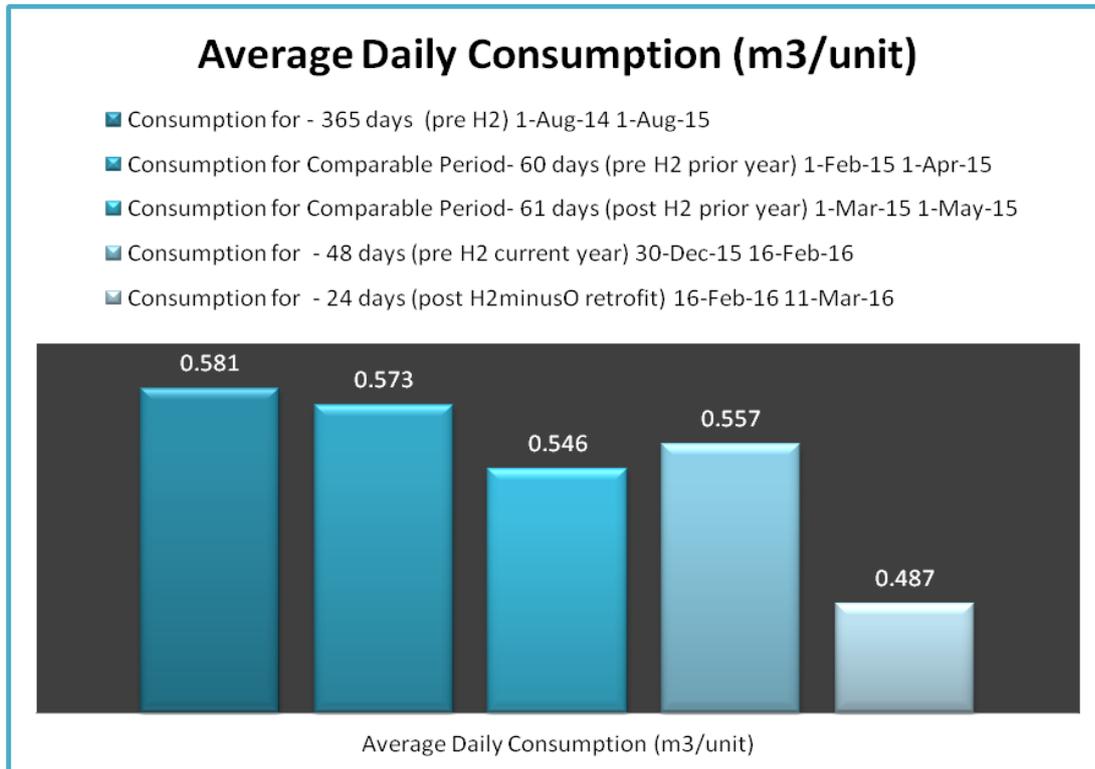


Chart 2 shows the daily water consumption per unit period over period based on water bills and meter readings.

Chart 3

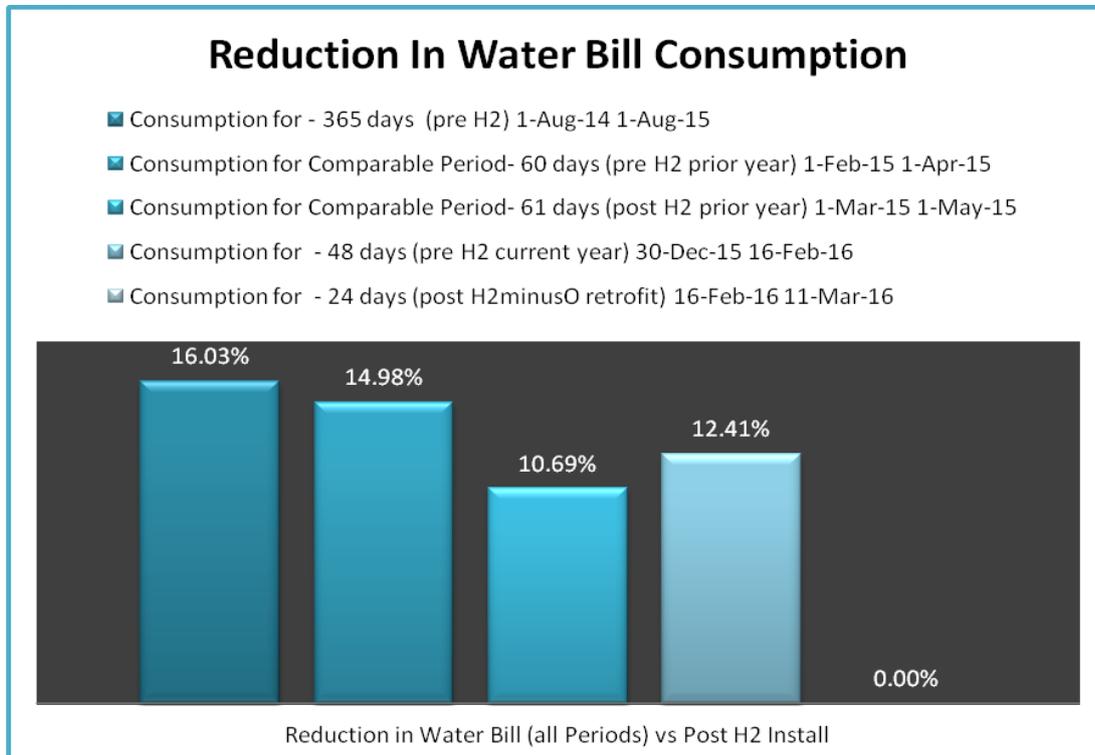


Chart 3 shows the impact on consumption post-H2minusO installation relative to all other periods.



The Project Analysis: *Estimated vs Measured Water Consumption and ROI Analysis*

Based on the initial audit of the facilities, analysis of 19 months of water bills; and factoring in the average 2014 and 2015 water rates; and projected reduction in consumption billing, this building had an expected payback of 1.98 years as shown in Table 2. The post installation results and analysis indicate the projected savings will yield a payback in .84 years.

Table 2: Estimated vs measured results

| | Estimated Payback (yrs) | Measured Payback (yrs) | Difference (yrs) |
|---------------------------------|-------------------------|------------------------|------------------|
| Projected Payback – 50 Burnhill | 1.98 | .84 | 1.14 |

Summary

The installation of the 3” H2minusO FMD will generate a reduction in water consumption readings based on the current existing conditions. Because the device treats the entire volume of water entering the facility, regardless of changes in the buildings consumption patterns and history, this facility will continue to experience savings of 10.69% on their water consumption readings. Furthermore, the financial metrics and ROI are based on the average of 2014 and 2015 water rates, so the actual dollar savings on future consumption will increase provided water rates continue to increase.