Nov 20, 2016

Location: Toronto, *Ontario, Canada*

Facility Type: *Multi-Residential Building – 465 unit building/Plus 4 Commercial Units*

Overview

This case study details the findings on the installation of the H2minusO Flow Management Device (FMD) water saving technology 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!

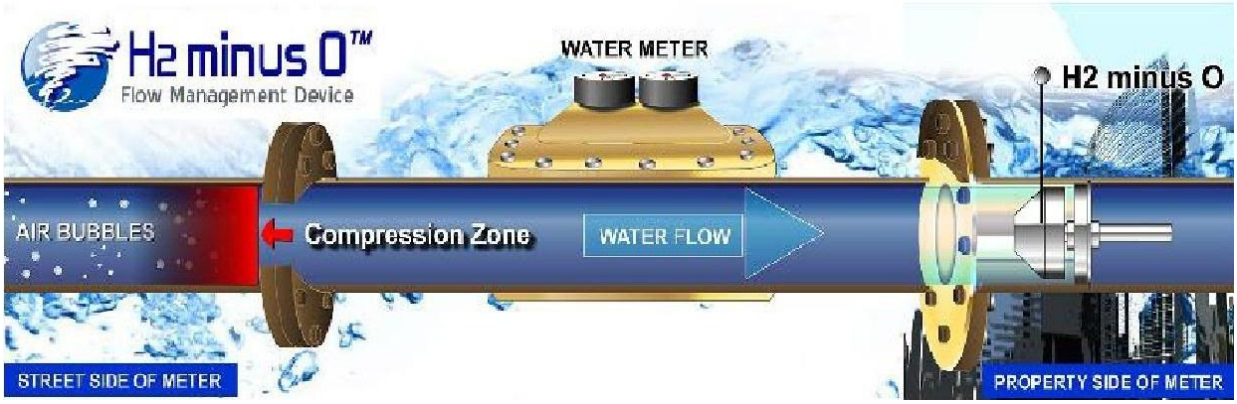
Water meters have changed little since their beginning and have a major fault in their design: air in your water lines is read as water by your meter. So for ALL end users, there is a very high probability your meter is billing you for water use, but not your actual consumption.

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 4-inch 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*

Our measurement & verification analysis is based on actual billing information as well as regular readings pre and post-installation of the H2minusO FMD. However, the historical data and initial readings for our M&V methodology were compromised. Upon completion of our post review, the measured savings were uncharacteristically high - the results were an outlier. As would be the case when the results underperform we knew further investigation would be required to better understand the effectiveness of the valve at this facility. Our initial findings indicated that consumption had decreased by over 32%, not impossible but highly unlikely. Pre-installation measurement was 195 m3/day vs 131 m3/day post installation. The pre-installation increase was measured over a period of 120 days starting in May 2016, which included the spring and summer irrigation periods. The May and June meter readings we recorded did not indicate there was anything out of the norm. In fact, the consumption was consistent with the prior year numbers. Consumption increased by 15% from 2014 to 2015 but coupled with the fact that this is a relatively new building, and 5 additional irrigation sprinkler heads were to be installed we were not alarmed by the increase in consumption and thought it was in line with the evolving requirements of the building. However, the post-installation drop to 131 m3/day indicated further analysis was required to confirm our M&V findings. Our initial finding was supported by an email we received on Nov 7, indicating that the water budgeted had already been exceeded by $6000, as of the Sept bill (which was $20,320). Upon further investigation, we were made aware of several issues that, based on their timing, definitely impacted the M&V process and we would, therefore, have to include dataset normalization in our analysis to confidently determine the effectiveness of the H2 FMD.

What we learned from our investigation:

1. There was a booster pump leak that had started in Dec 2015 and continued on and off until May. At which time it got progressively worse until it was fixed Sept 8, 2016
2. The "reflection pool" water feature was opened on July 29th and closed on Oct 26th. Although the pool water is recycled, there is some water loss that needs to be topped up. However, the impact on the building's overall water consumption from this pool, based on other such water features, we believe is negligible.
3. The new water bills from Feb 2016 - Sept 2016 confirmed a number of things (see figure 1)
    a. Although there was a leak that got progressively worse from May 2016 until it was fixed on Sept 8, it did not impact water consumption in a way that would indicate there were serious issues.
    b. Daily water consumption from Dec 2016-May 2016 was completely consistent with seasonal expectations -126 m3/day
    c. Daily water consumption from May 2016-Sept 21, 2016 was completely consistent with seasonal expectations and evolving requirements for this new building - 189 m3/day. In particular, irrigation would have a significant impact on water consumption, if on a regular watering program. Therefore the increase in water consumption would appear to be consistent with seasonal expectations. Furthermore, increased irrigation was something addressed during our presentation to the board as it related to frequency as well as adding additional sprinkler heads.
    d. Based on averages for condo facilities, per unit consumption ranges between .35-.40 m3/day/unit. So this would translate into 162.75 m3/day -186 m3/day. When we factor in the other variables the water consumption usage in this facility is consistent with industry averages.

Chart 1: Average Daily Consumption

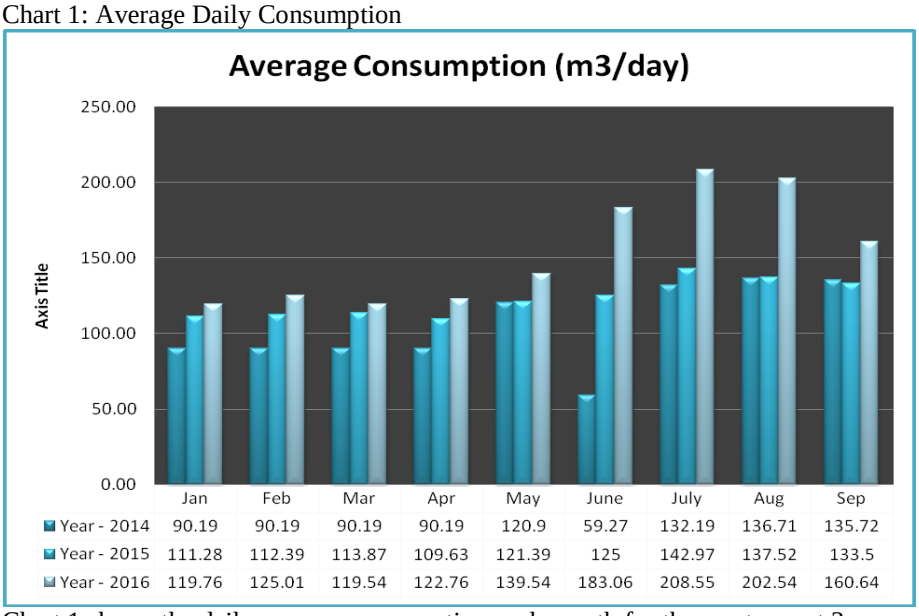


Chart 1 shows the daily average consumption each month for the most recent 3 years. Given this is a relatively new building the increasing consumption pattern is consistent with the building's evolving expectation.

So with the findings identified in the preceding section "What we learned from our investigation", we revisited our M&V datasets and analysis process. In such situations where the variable(s) are introduced after we have established a baseline and are well into the M&V process, we seek to isolate measurement periods that are stable and are least impacted by the introduction of the new variables. We also include dataset normalization to further eliminate/minimize the impact of the new variables.

Normalization Process:

1. Based on the new datasets the most stable pre-installation period that can be used to establish the M&V baseline would be the day the booster pump leak was fixed and the day of the H2minusO FMD installation. The booster pump fix occurred on Sept 8 and the FMD installation took place on Sept 21.
2. So at a minimum, we can establish the pre-installation baseline with data over this 13 day period.
3. However, our supporting data readings were from Sept 1 - Sept 21
4. So there were 7 days of consumption with the leaking booster pump that needed to be removed from the analysis in order to normalize the 13 day period we had to use to establish the pre-installation consumption baseline.
5. The average daily consumption in Aug was 202.54m3/day
6. We can then estimate the total consumption from Sept 1 to Sept 8 to be 1417.78 m3. (7 days *202.54 m3/day).
7. The total consumption from Sept 1 - Sept 21 was 3505.28 m3/day and therefore the net normalized consumption from Sept 8 to Sept 21 can be estimated to be 2087.5 m3/day or 160.56 m3/day (3505.28 m3/day - 1417.78 m3/day)
8. Furthermore, we know that based on the actual Sept bill (30-day billing cycle), that consumption averaged 160.69 m3/day, but this average also included 7 days of the H2minusO FMD being operational at the building.
9. So, for even greater clarity on the performance of the H2minusO FMD, we used Oct 1 as the install date for the FMD, which meant that we used 7 days of post installation consumption as part of the pre-installation averages (consumption from Sept 8 - Oct 1 is normalized with the data calculated in step 6 above) - Sept consumption for 30 days was 4,819.28 m3 - 1417.78 m3/day = 3401.47 m3/day.
10. Therefore the average daily consumption from Sept 8 - Sept 30 drops to 147.89 m3/day (Sept normalized consumption in step 9/23 days - 3401.47 m3/23 days)
11. So the worst case scenario is that the pre-installation baseline is confidently established at 147.89 m3/day
12. The "reflection pool" was closed on Oct 26th and our analysis was concluded on the 26th as well. For the purposes of this analysis, we assumed that the reflection pool did not have a significant impact on water consumption.

Findings:

The key M&V findings are detailed in table 1. Based on our analysis this building's normalized daily consumption was averaging between 147.89 m3/day to 160.56 m3/day - see table 1 row 1 & 2 column 4. Consumption decreased by 16.19% when measured against the normalized pre-installation average inclusive of 7 days of readings with the H2 FMD - see table 1 row 3 column 6. When we compare the post installation average to the normalized pre-installation average exclusive of the 7 days with the H2 FMD, consumption decreases by 22.80%. Based on these results, the H2 FMD has demonstrated that it has improved the meter reading efficiency in this facility.

Table 1: Period Analysis – Consumption for 352 Front Street

	Measurement Period - Start	Measurement Period - End	Average Consumption (m3/day)	Average Consumption (m3/day/unit)	Change in Water Consumption Reading (Period to Period)	Reduction in Water Consumption (all Periods) vs Post H2 Install
Consumption for 13 days pre-installation	8-Sep-16	21-Sep-16	160.56	0.345	0.00%	-22.80%
Consumption for 23 days pre-installation (includes 7 days of H2 FMD)	8-Sep-16	1-Oct-16	147.89	0.318	-7.89%	-16.19%
Consumption for - 25 days post installation	1-Oct-16	26-Oct-16	123.95	0.267	-16.19%	0.00%

Chart 2:

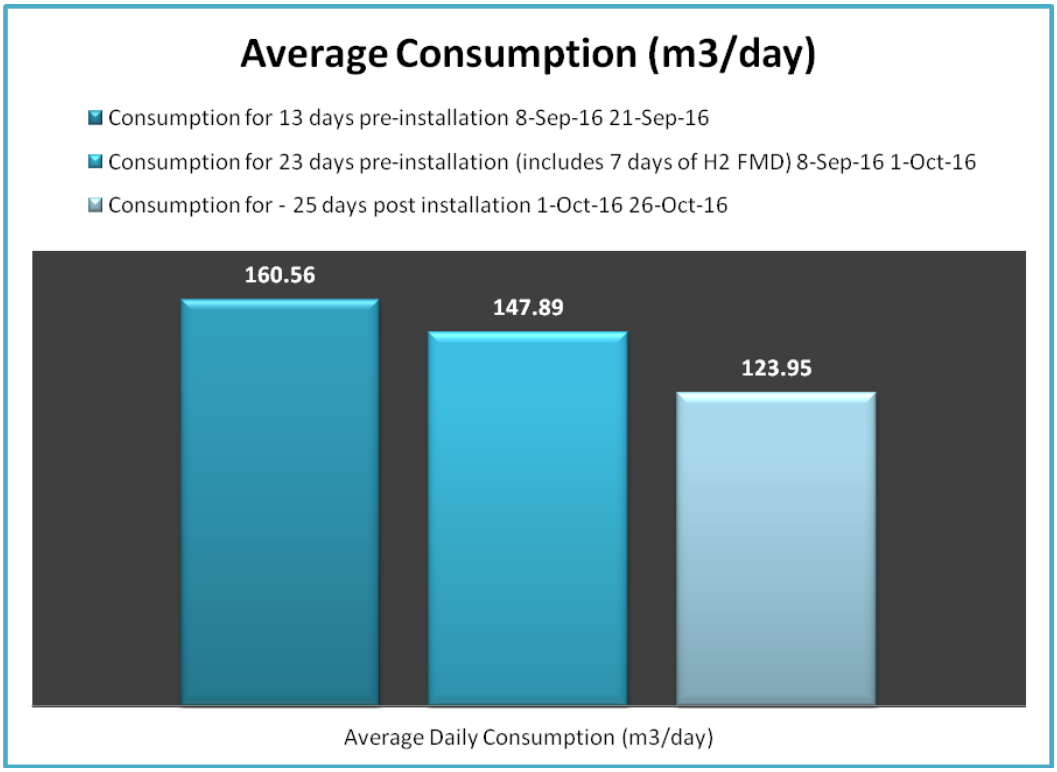


Chart 2 shows the average daily water consumption based on normalizing the meter reading datasets.

397 Freeman Crescent Oakville Ontario, Canada suite # 2
Tel: 416 526 7582 Fax: 905 472 5396

Chart 3:

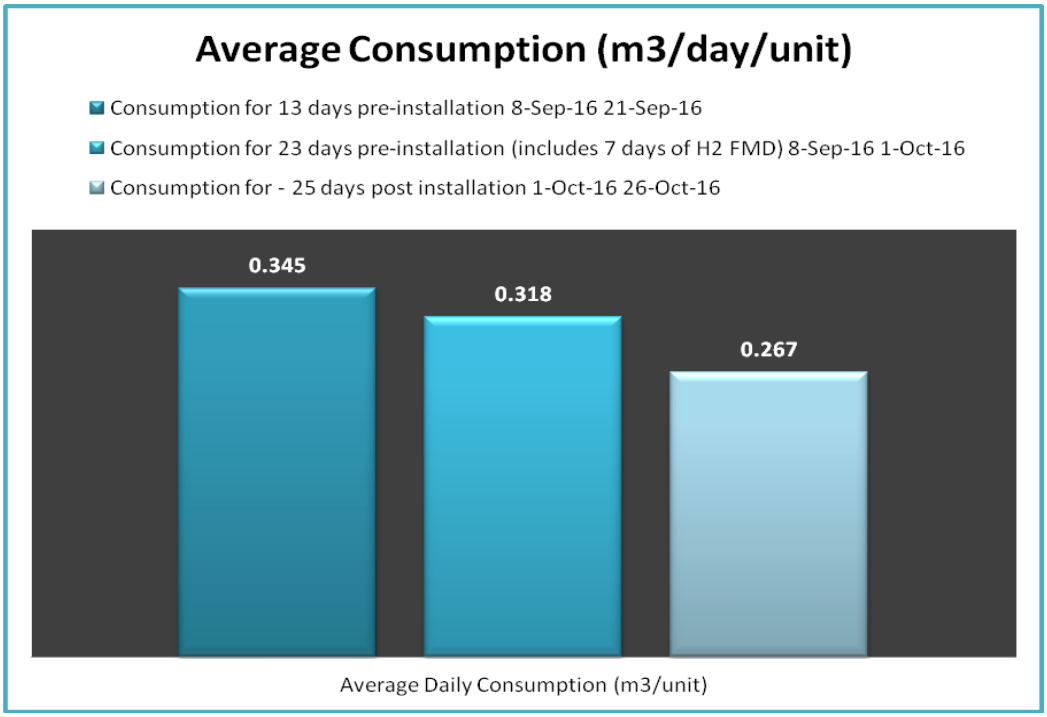


Chart 3 shows the average daily/unit water consumption based on normalizing the meter reading datasets.

Chart 4

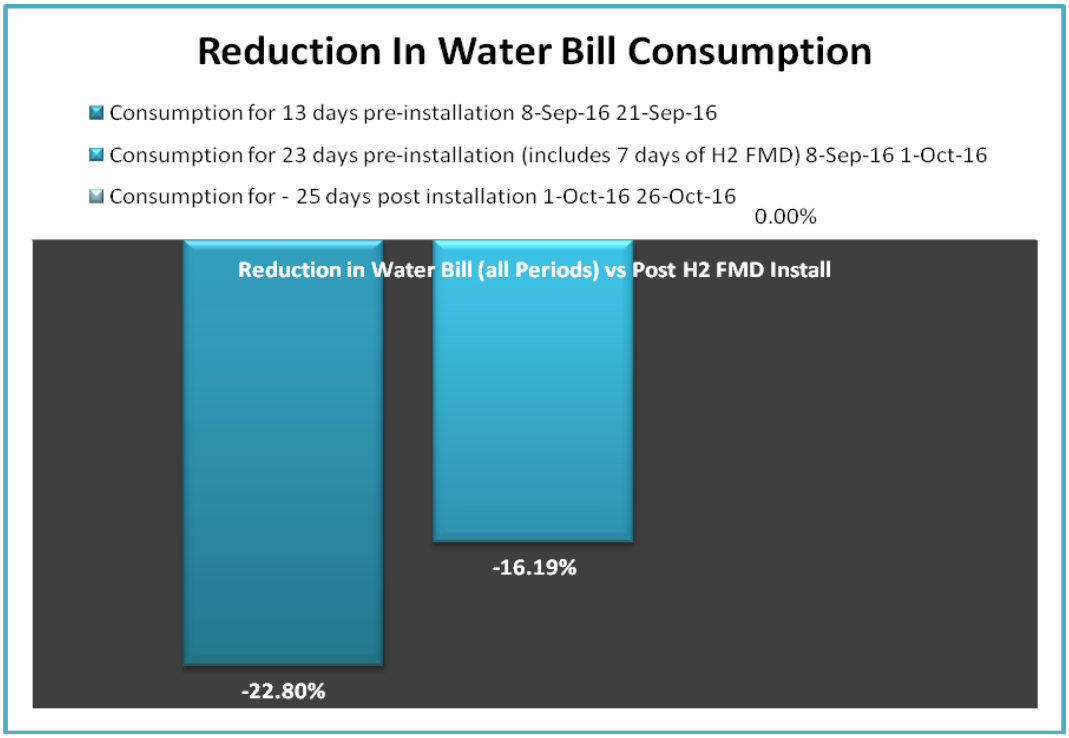


Chart 4 shows the impact on consumption post-H2minusO installation.

397 Freeman Crescent Oakville Ontario, Canada suite # 2
Tel: 416 526 7582 Fax: 905 472 5396

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

Based on the initial audit of the facilities and factoring in the average 2014 and 2015 water rates; and projected reduction in consumption billing, this building had an expected payback of 1.62 years as shown in Table 2. The post installation results and analysis indicate the projected savings will yield a payback in .50 years. Annual consumption was projected to be 53,972 m3 but with the H2 FMD consumption is projected to be 45,317 m3.

Table 2: Estimated vs measured results

	Projected Payback (yrs)	Measured Payback (yrs)	Difference (yrs)
Projected Payback – 352 Front Street	**1.62**	**.47**	**1.15**

Summary

The installation of the 4-inch 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, your facility will continue to experience average savings of 16.19% on your water consumption readings. Furthermore, the financial metrics and ROI are based on the blended water rate for 2015/2016. So the actual dollar savings on future consumption will increase provided water rates continue to increase.