



March 27, 2015

Location: Toronto, Ontario, Canada

Facility Type: Hotel & Multi-Residential Building – 754 units

Overview

This case study details the findings on the installation of the H2minusO Flow Management Device (FMD) water saving technology at a Hotel & Multi-residential site located in Toronto, Ontario. The facility had 514 rooms in the hotel and 240 apartments in the multi-residential building. The positive results demonstrate the value-add our device continues to have 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 this facility was for a 4-inch Valve that took approximately 4 hours. A typical install will usually take between 2-4 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*

OVERVIEW: THE APPROACH

This measurement & verification analysis is based on actual billing information as well as daily readings pre and post installation of the H2minusO valve. Encompass was provided billing details for 24 months up to the Oct 2013 billing period. Additional billing details were provided for Dec 2013 – March 2014 and Dec 2014 – Feb 2015.

The analysis for this install had to factor in some very unique conditions because the hotel and multi-residential building both shared the same water meter. And given the transient nature of hotel accommodations, compared to residential buildings, our analysis required establishing a unit of measure that combined consumption of both facilities in order to ensure the highest degree of accuracy in our analysis. This permitted us to make a relative comparison across any period in order to gauge the effectiveness of the H2minusO FMD. So for this facility, we developed two such measures. Both measures required converting the entire facility (hotel and Multi-residential building) to a “Room Sold” unit of measure that would allow us to perform the follow comparative analysis.

1. Consumption (m3) per room sold
2. Consumption (m3) per percentage room sold.

The Room Sold measure converted the 514 units of the hotel and the 240 units of the multi-residential building into the maximum number of rooms that could be “potentially” sold each day. The percentage of actual rooms sold was calculated by dividing the actual rooms sold for the hotel (provided to Encompass) and multi-residential building (we assumed 100% of all rooms were sold for the analysis period *e.g. Total rooms sold = number of units in the building*).

CONSUMPTION (M3) PER ROOM SOLD

For the “Consumption Per Room Sold” Measurement & Verification (M&V) approach, we looked at what the average consumption was on a per room/day basis over comparable periods before and after the installation of the H2minusO FMD. As discussed earlier, the entire facility was converted to the average maximum available rooms each day which was 754 units. Table 1 column 7 shows the consumption (period to period) based on the average daily consumption divided into the average daily rooms sold. Columns 8 and 9 of the table show the percentage reduction in water consumption. Column 8 shows the reduction based on the period-to-period comparison. In this comparison we see, after the installation of the H2minusO valve, the facility experienced a substantial reduction in consumption 20.69%. Furthermore, during the post-installation period, average rooms sold was higher than in 2 of the 3 prior comparable periods. This fact may potentially support even higher levels of savings than what was recorded, during our analysis period, because there is a strong correlation between occupancy levels and consumption. Note that in Row 4 column 5 and 6 that the average room sold/day and average consumption/day is higher than the post-installation period, but the actual average consumption/room is equal to the prior comparable period even though the consumption numbers were lower. In other words, we have two comparable periods (row 3 and 4) in which the average consumption/room is the same, but the average rooms sold and average daily consumption is different. This is also one of the key reasons for introducing the second analysis measure “Consumption Per Percentage Room Sold” as a comparison to the “Consumption Per Room Sold” measure.

Column 9 shows the reduction based on comparing the post H2 install against each of the prior periods. Row one of the Table shows that the H2minusO valve saved the facility 25.81% when compared to the Jan 11, 2012 – Mar 9, 2012, period. So when comparing the consumption of post-H2minusO install to the comparable 3 prior periods, savings range between 20.69% - 25.81%.

Table 1: Consumption – Room Sold

Measurement Type	Measurement Period - Start	Measurement Period - End	Available Rooms For Sale (per day)	Average Rooms Sold (per day)	Average Consumption (m3/day)	Consumption Based on Room Sold (m3)	Reduction in Water Bill (period/period)	Reduction in Water Bill (all Periods) vs Post H2 Install
Consumption for Comparable Period (58 days)	24-Jan-12	22-Mar-12	754	462.34	287.16	0.62	0.00%	25.81%
Consumption for Comparable Period (57 days)	19-Jan-13	17-Mar-13	754	521.91	301.53	0.58	6.45%	20.69%
Consumption for Comparable Period (59 days)	20-Jan-14	20-Mar-14	754	567.69	327.57	0.58	0.00%	20.69%
Consumption for Comparable Period - Post Install (28 days)	1-Feb-15	1-Mar-15	754	557.43	253.75	0.46	20.69%	0.00%

Chart 1:

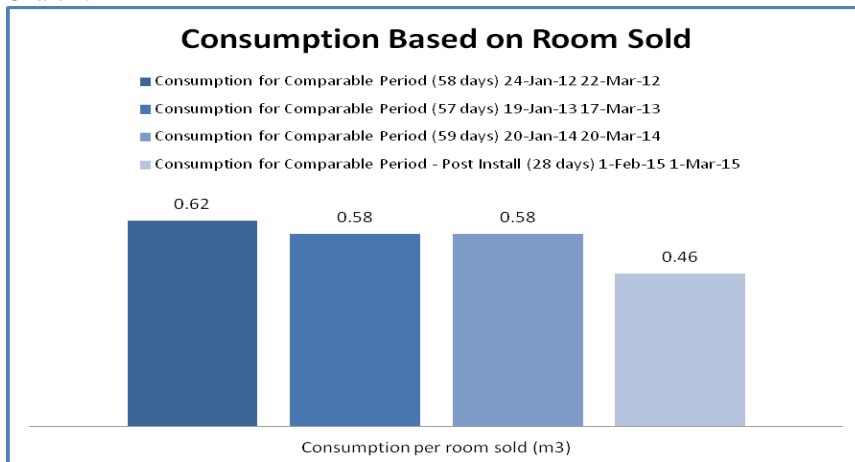


Chart 1 shows the daily average consumption per room sold.

Chart 2:

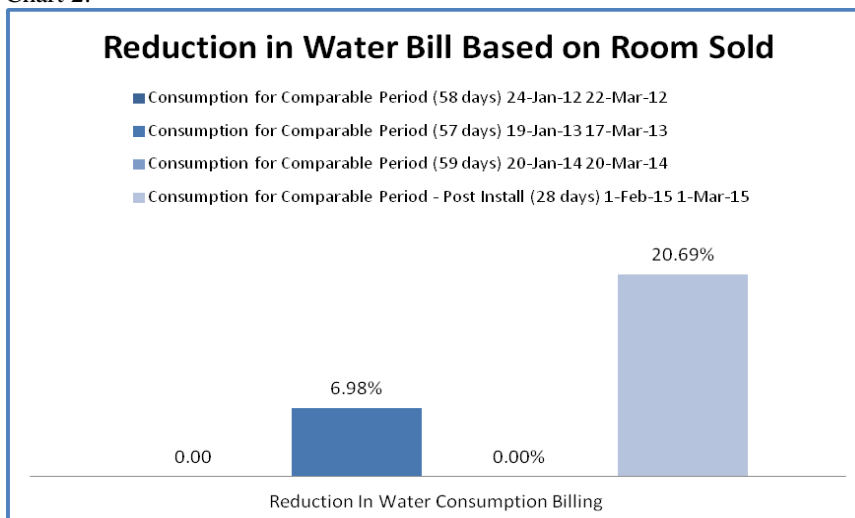


Chart 2 shows the percentage reduction in consumption based on room sold.

CONSUMPTION (M3) PER PERCENTAGE ROOM SOLD

For the “Consumption Per Percentage Room Sold” M&V approach, we looked at what the average daily consumption was based on 1% occupancy. This allowed us to factor in situations whereby the consumption dropped in spite of increased rooms sold. It also provided us a mechanism to consider and factor in noticeable changes in consumption patterns from period to period, especially considering the transient nature of the hotel industry. And although this facility exhibited reasonably consistent consumption patterns period to period and season to season, there still remained situations whereby consumption patterns were clearly the result of changes in occupancy.

Table 2 column 6 shows the average daily consumption based on 1% rooms sold. Columns 7 and 8 of the table show the percentage reduction in water consumption. Column 8 shows the reduction based on the period-to-period comparison. In this comparison we see, after the installation of the H2minusO valve, the facility experienced a substantial reduction in consumption 21.11%. Also note that although row 3 had higher percentage rooms sold than the prior period, the average daily consumption/room was virtually the same. So although the savings are relatively similar between the two analysis approaches (“percentage” vs. “room sold”), the higher savings recorded using the “percentage” approach supports our view that the correlation between occupancy and consumption may be more accurately measured using the percentage approach.

Column 8 shows the reduction based on comparing the post H2 install against each of the prior periods. Row 1 of the Table shows that the H2minusO valve saved the facility 26.71% when compared to the Jan 24, 2012 – Mar 22, 2012, period. Although this approach may be slightly more accurate, the 26.71% reduction in consumption between period 1 and post H2minusO installation is even more compelling given that rooms sold were over 12% higher during H2minusO period. So when comparing the consumption of post-H2minusO install to the comparable 3 prior periods, savings range between 21.11% - 26.71%.

Table 2: Consumption – Percentage Room Sold

Measurement Type	Measurement Period - Start	Measurement Period - End	Average Rooms Sold (%/day)	Average Consumption (m3/day)	Consumption Based on 1% Room Sold (m3)	Reduction in Water Bill (period/period)	Reduction in Water Bill (all Periods) vs Post H2 Install
Consumption for Comparable Period (58 days)	24-Jan-12	22-Mar-12	61.32%	287.16	4.68	0.00%	26.71%
Consumption for Comparable Period (57 days)	19-Jan-13	17-Mar-13	69.22%	301.53	4.36	6.98%	21.21%
Consumption for Comparable Period (59 days)	20-Jan-14	20-Mar-14	75.29%	327.57	4.35	0.12%	21.11%
Consumption for Comparable Period - Post Install (28 days)	1-Feb-15	1-Mar-15	73.93%	253.75	3.43	21.11%	0.00%

Chart 3:

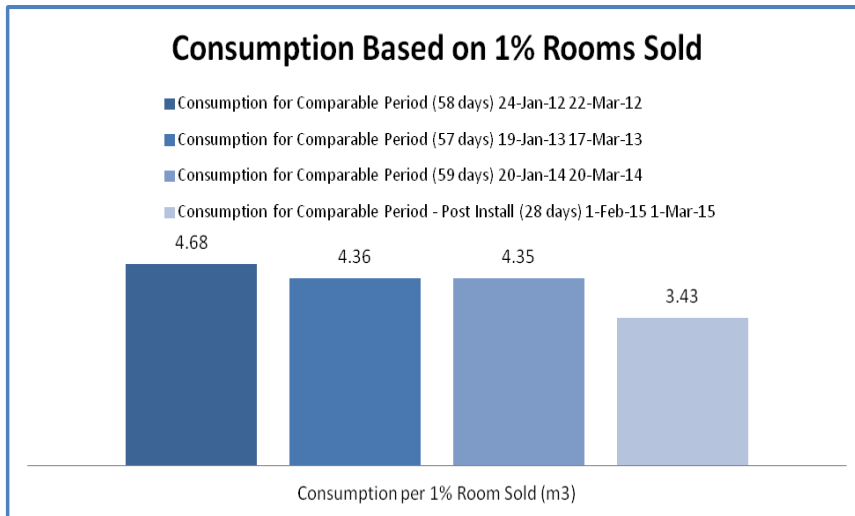


Chart 3 shows the daily average consumption based on 1% rooms sold

Chart 4:

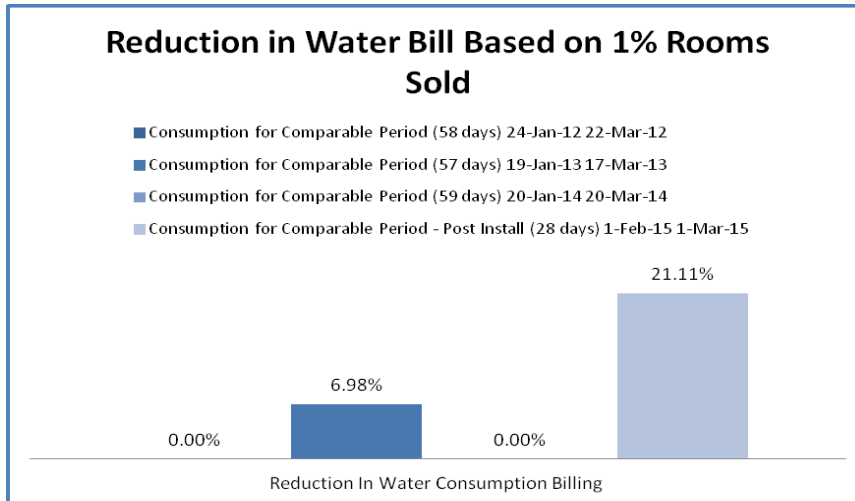


Chart 4 shows the percentage reduction in consumption based on 1% rooms sold.

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

Based on the initial audit of the facility and analysis of 31 months of water bills and factoring in the average 2012 and 2013 water rates, this building had an expected payback at .56 years. Using the lowest recorded savings, from the two M&V approaches used, the post-installation results indicate the projected savings will generate a minimum payback in .18 years

Table 3: Estimated vs measured results

	Estimated Payback (yrs)	Measured Payback (yrs)	Difference (yrs)
Projected Payback	.56	.18	.38



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, this facility will continue to experience savings on their water consumption readings. Furthermore, the financial metrics and ROI are based on the average of 2012 and 2013 water rates, so the actual dollar savings on future consumption will increase provided water rates continue to increase.