

This presentation premiered at WaterSmart Innovations

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W-1702

1:00 pm - 1:30 pm

Sonoma C

Submetering and Leak
Detection Advancements
Cut Water Usage in Half

Presenter: Don Millstein, President
H2O Degree



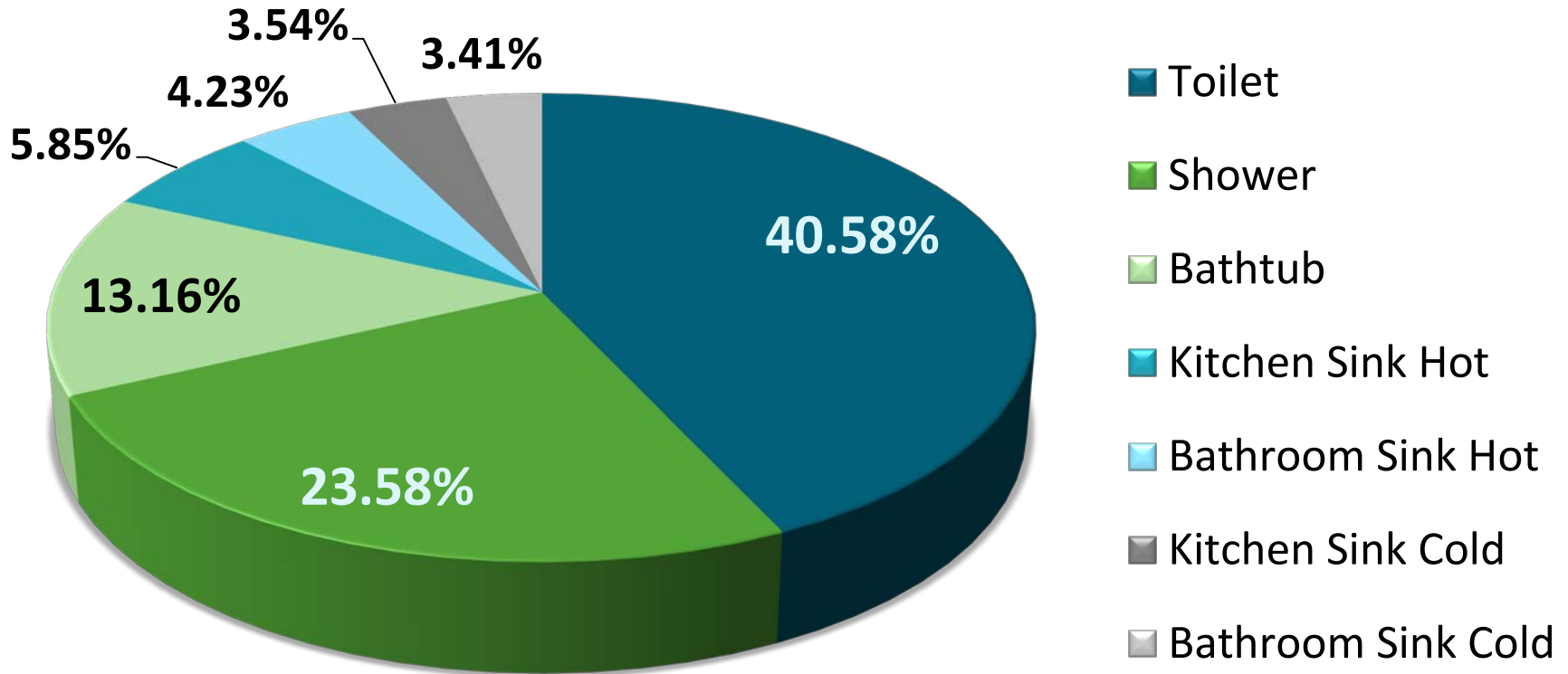
Goal of water submetering & leak detection

- Achieve maximum water efficiency
- Reduce operating expenses
- Create tenant behavioral change
- Drive owner/maintenance behavioral change
- Increase the facilities Net Operating Income
- Improve the property valuation



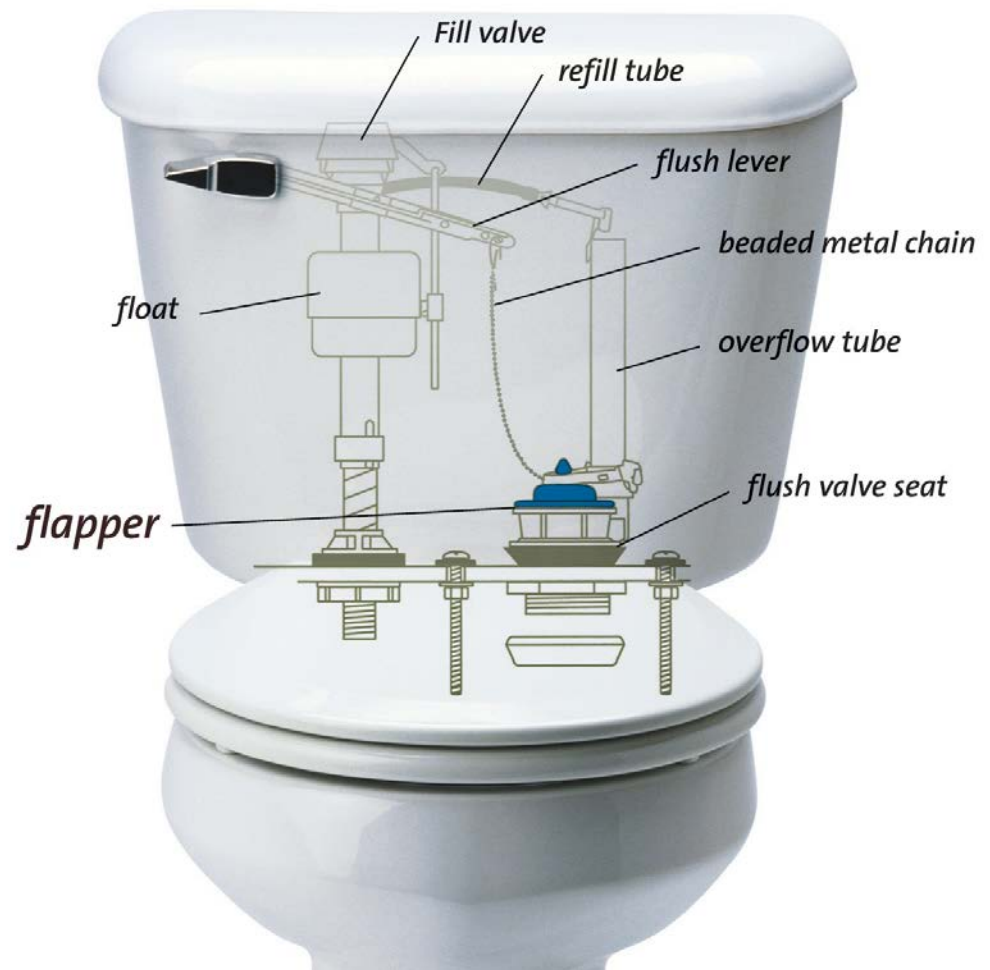
Every DROP Counts

Typical One Bedroom Point of Use Consumption



Every DROP Counts

Components of a Standard Toilet Tank



Toilets – 40% of the consumption
70% of the leaks

Consumption by Fixture – Leaks - Behavior



		Consumption	Leaks	Billing Behavior
TOILET	Cold	40%	70%	Low
TUB SHOWER	Hot	25%	8%	High
	Cold	8%	5%	Low
KITCHEN SINK	Hot	15%	8%	High
	Cold	2%	3%	Medium
BATH SINK	Hot	8%	4%	Medium
	Cold	2%	2%	Low

What is Submetering?

- Metering of water consumption “Sub” of the utility water meter
- Building has one Master Meter from the utility, how does it allocate the water bill?
 - Just include water in as part of rent
 - Allocate water bill based on some estimate (sq. footage, units, bedrooms, etc)
 - Rubs – Ratio Utility Billing System
- Install individual meters to bill tenants for their actual usage
 - Equitable way to bill tenants
 - Creates an incentive for conservation
 - Provides property owner with ability to recover cost



Utility Master Meter



Utility Apartment Meter

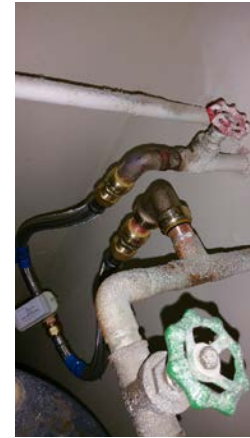


Point of Use Water Meter

Type of Submetering System	Number of Meters per Apartment Unit	Type of Plumbing Design
Single Point of Entry	1	Single cold water branch feeds each apartment. Typically, it enters the apartment at one point in the utility closet and supplies the heater and continues on to supply cold water for the fixtures. Meter installed right before plumbing branches and after isolation valve.
Dual Point of Entry	2	Building produces central domestic hot water. Both hot and cold water typically enter the apartment at one centralized location in a hallway access panel or washer closet. Meter installed right before plumbing branches and after isolation valve.
Point of Use	3 (Average)	Individual hot and cold risers feed the toilets, hot shower, cold water for shower, kitchen, sink, etc. Meters are installed at each fixture supply valve to capture water consumption.

Point of Entry Water Submetering

- Apartments where plumbing is configured where water enters each apartment at one single point
 - Each apartment has its own shut-off valve
 - Typically water enters each apartment in the utility closet, right before the hot-water heater
 - Cold water to each apartment, One meter required to meter the water before it branches off to the hot water heater and then to cold appliances
 - Hot & Cold to each apartment, two meters required, one for hot and one for cold.



Traditional Point of Entry Meters with Pulse Output



Master Meter
Cold Only
1 Pulse per Gallon



Norgas
Cold & Hot
1 Pulse per 10 Gallons



Neptune
Cold & Hot
 $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, 2 inch
1 Pulse per 10 Gallons



Wireless
2 Channel Pulse Counter

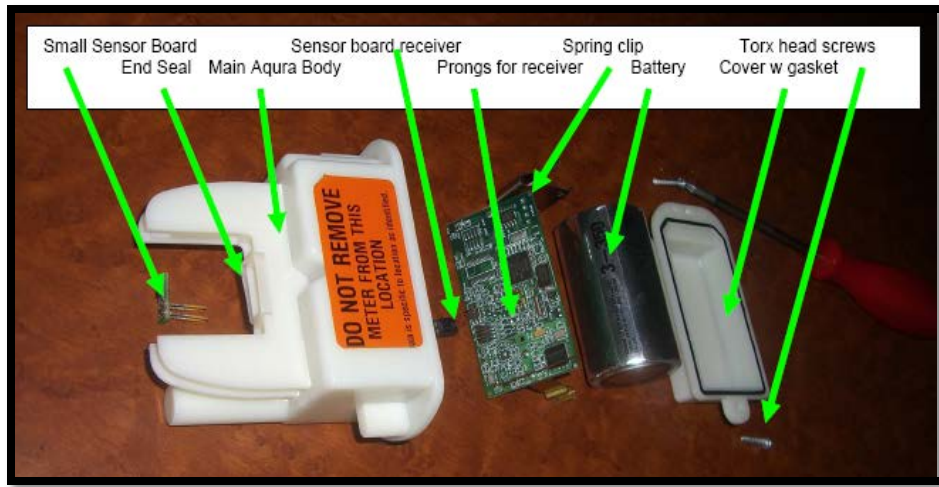
Pulse Output Meters can be challenging to get granular leak detection

Point of Use Submetering

- Apartments where plumbing is a Riser Pipe configuration
 - One water pipe runs either up the building or through the ceiling tapping off to multiple points
 - Toilet
 - Shower/Tub
 - Bathroom Sink
 - Kitchen Sink
 - Washing Machine
- To gather total water consumption, must meter each “Point of Use”
 - Toilets get you 40%, Shower & Tub 40%
 - In some cases, the customer may allocate the remainder of water rather than meter



H₂O° Flow Sensor - Wireless Water Consumption Monitor



Gallons

Temperature

Time

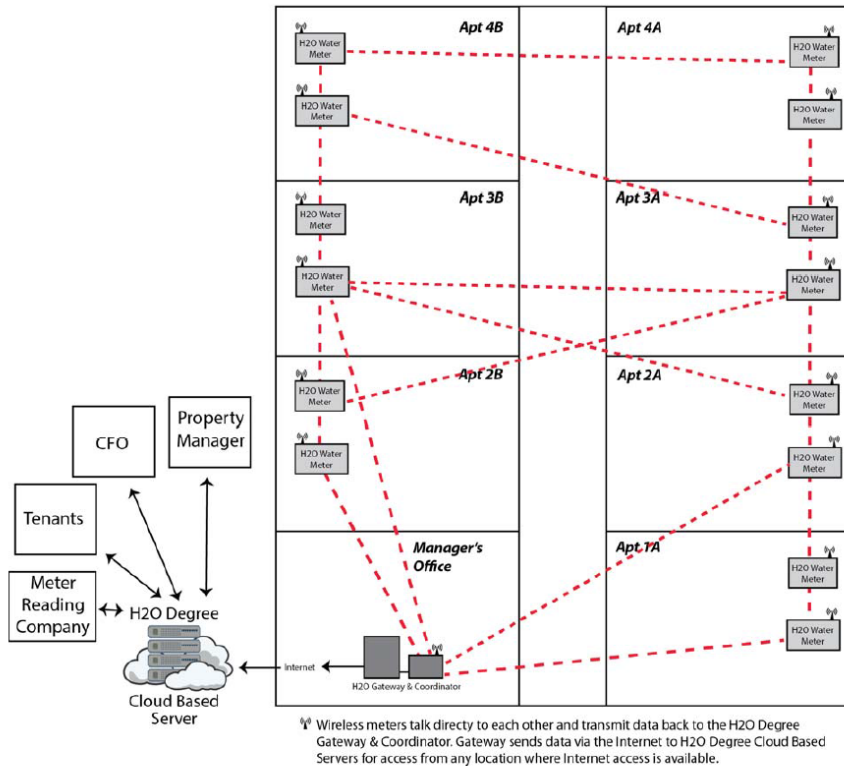
Event

Physical Installation



Unique aspects of Wireless Submetering Solution

Line Powered Water Meter
Building Configuration Diagram



Unique features of Wireless Solution

- 2 way wireless mesh
- No repeater options
 - Line powered water meters
 - Thermostats work as repeaters
 - Behind the wall repeaters
- Gateways compact and requires no set-up
- Internet and cellular based Gateways
- No pre-programming or pre-assignment needed for commissioning
- Immediate communication connectivity feedback at time of installation
- 2 & 4 channel pulse counters for 3rd-Party Meters. Built in display options
- Supports Modbus integration to Building Automation Systems

Average Daily Consumption (ADC)

How to calculate ADC

Step 1: Divide Water Bill by the number of Days in the Billing Cycle

Step 2: Divide answer by the number of Apartment Units

Step 3: Compare to the national average for 1 Bedroom of 70 Gallons per day



Analytics based on Comparison

- Under 70 Gallons ADC
 - Efficient Tenant
 - Elderly Tenant
- Over 130 Gallons ADC
 - Leaky toilets, showers, sinks
 - Wasteful tenants
- Over 200 Gallons ADC
 - Abusive waste of water
 - Extensive Leaky appliance
 - Underground leaks
 - Pin Hole Leaks in the walls
 - Over occupancy

Target ADC 70 Gallons for One Bedroom



Average Daily Toilet Events

- 10 Events, normal day
- 20 Events, bad burrito the night before
- 100 Events with little usage each time, broken flapper valve
- 2 events with constant water flow, broken flow valve



Leak Detection for Master Meters

- Get instant alerts when a leak occurs
- Measures water flow in real time by sensing the pulse of the meter
- Dashboard that shows property data by hour, day or month



PROPERTY NAME	STATE	ZIP CODE	SQ FT	ALERTS	AVG GAL DAY	GAL IRRIG/DAY	EST COST/YR	EST COST PER SQ FT PER YEAR	
BUILDING 1	GA	30096	707,000	1	72,828	9,106	\$341,640	\$0.48	■
BUILDING 2	TX	75062	315,900	1	17,480	1,684	\$76,656	\$0.24	■
BUILDING 3	FL	33647	256,100	2	22,360	5,077	\$98,544	\$0.385	■

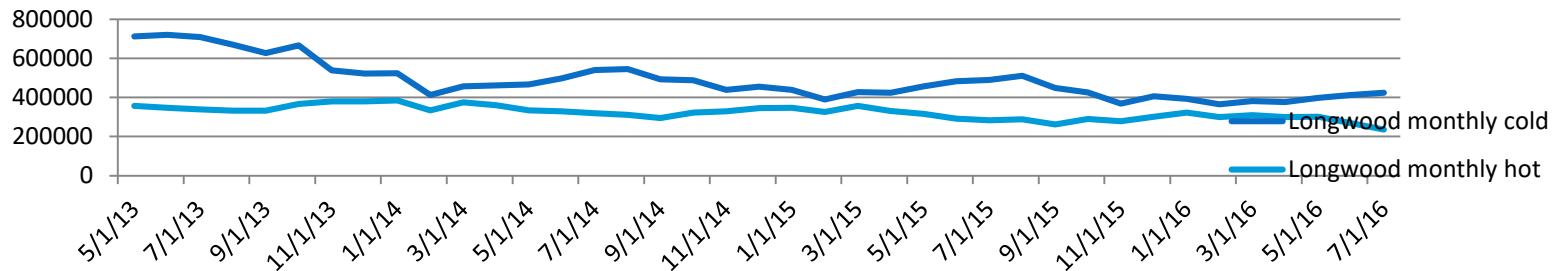
Instantaneous Leak Report Option



- Instantaneous Leak Reports
- Sent via E-Mail (Text in future)
- High Gallon Report
 - Criteria – More than X gallons per hour for N hours
 - Report available with both H2O Degree's M54120 meter and any pulse output water meters connected to H2O Degree Pulse Counter
- Constant Flow Report
 - Criteria – 60 Minutes of flow in an hour. This report is available only with the H2O Degree M54120 meter for both point of entry and point of use

Daily Leak Detection Reports

- Daily leak detection reports
- E-mailed to various stakeholders
 - Property Manager
 - Maintenance
 - CFO
- Web-portal view
- Highlights issues and if they have been rectified



Every DROP Counts

Our **DAILY** leak reports allow you to keep your finger on the pulse of your property. Furthermore, these reports ensure your team reacts **QUICKLY** to leaks.

Leak reports are sorted by:

1. Serial number
2. Property
3. Building
4. Apartment
5. Point
6. Leak size



Low Technology Tools



Cheverly Crossing, Hyattsville, MD

- **60 Units, Garden Style retrofit**

- Developer – Novo Properties
- Water, Electric & Thermostats

- 238 Wireless Water meters – Point of Use
 - Meter toilet, shower, sink, etc.
 - Submetering for tenant billing
 - Daily leak detection reports sent to property
- Average Daily Consumption (ADC) reduced from 200 gallons to 80 gallons the first year.



- **56% Utility Savings – 1.2 Year Payback**

360 State Street – New Haven, Ct

- **500 Units, 32 Story – New Construction**

- Developer – Becker & Becker
- Water, Electric & Thermostats
- Platinum LEED Building
- Mainly Yale Graduate Students

- 1,000 Wireless Water meters - dual point of entry
 - One hot and one cold water meter
 - Submetering for tenant billing
 - Daily leak detection reports sent to property

- Average Daily Consumption (ADC) 45 – 55 Gallons per unit, compared to industry average 70 Gallons



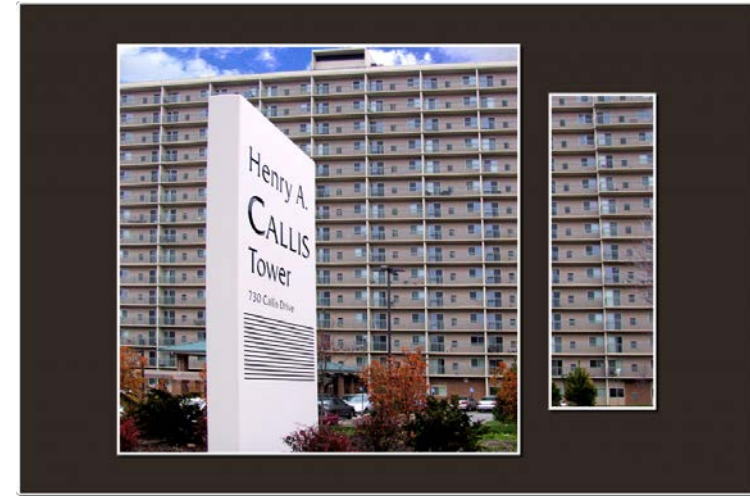
- **Saved 2.9 Million Gallons per year**

Callis Tower, Akron, OH

- **280 Unit Senior Housing**
- Developer – Alpha Phi Alpha
- LIHTC - Low Income Housing Tax Credit
- Water leak detection

- 560 Wireless Water meters - dual point of entry
One hot and one cold water meter
 - Submetering for tenant billing
 - Daily leak detection reports sent to property

- Saved over 15% or \$23,000 the first year



- ROI 45% with a Payback of 2.2 Years

460 16th – San Diego, CA

- **359 Units – Under Construction**
- H2O Degree Water Submetering system
- installed for tenant billing of water
- Developer - Lennar Multifamily Communities

- 718 Wireless Water meters - dual point of entry
 - one hot and one cold water meter
 - Submetering for tenant billing
 - Daily leak detection reports sent to property

- California Senate Bill 7 requires all new Multi-family properties to be submetered starting 1/1/18



New California law requires all new construction to be submetered

The Atlantic – Atlanta, GA

- **403 Units – Mix-use Condos & Apartments**
- Mgt. Company – Condominium Concepts
- H2O Degree Thermostat control system for billing run-time for central HVAC plant to each unit
 - Tenants have access to mobile app and web portal to control thermostats
- Water Submetering system installed for tenant billing of water



University Terrace – Blacksburg, VA

- **132 Units – Condos**
- **Installed 9/2014**
- H2O Degree Water Submetering system installed for tenant billing of water
- HOA – President



Wireless Water Meter





Thank you for your time

Don Millstein – President

H2O Degree

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