



# METERING TECHNOLOGY LEGACY PRODUCTS UNTIL TODAY AMI VS AMR

Mike Phillips-Master Meter

Jeff Garrett-Ferguson MAG Group



# VOLUMETRIC VS VELOCITY

Positive Displacement VS Multijet



# POSITIVE DISPLACEMENT



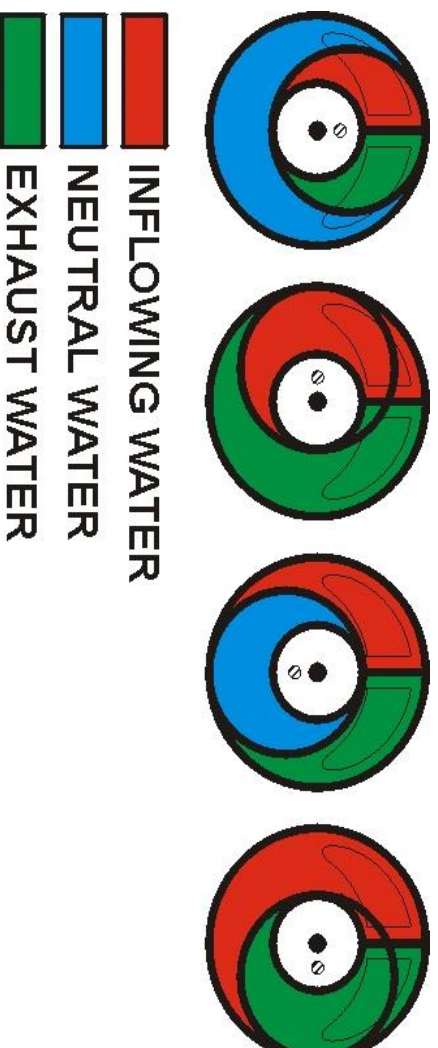


# PISTON VS DISC PD

- Piston
  - Used by two major manufacturers in the US and Canada. Common through out the world
  - Low flow requirements normally met with piston or multi jet meters
- Disk
  - Used by three manufacturers & used primarily in the US and Canada only
  - May be more susceptible to dirt than piston meters \*

# OPERATING PRINCIPLES AS A PD METER

- Water flows in most chambers from below and above piston / disk & out through the side
- Inflowing water separated from outflowing water by division plate and surfaces of piston / disk against chamber and piston walls
- Each revolution equals a known volume



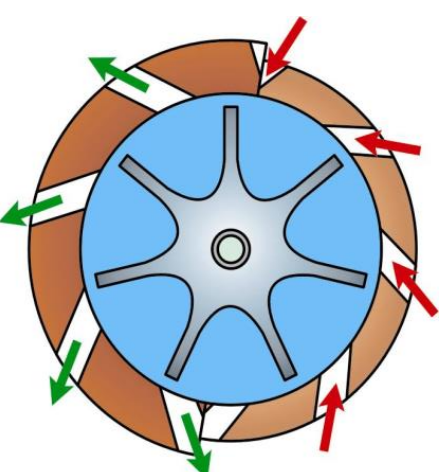


# MULTIJET WATER METERS



## OPERATING PRINCIPLE OF MJ

- Somewhat easier to manufacture than volumetric meters
- The rotor cage separates the measuring element from the body
- More tolerant to solids in the water

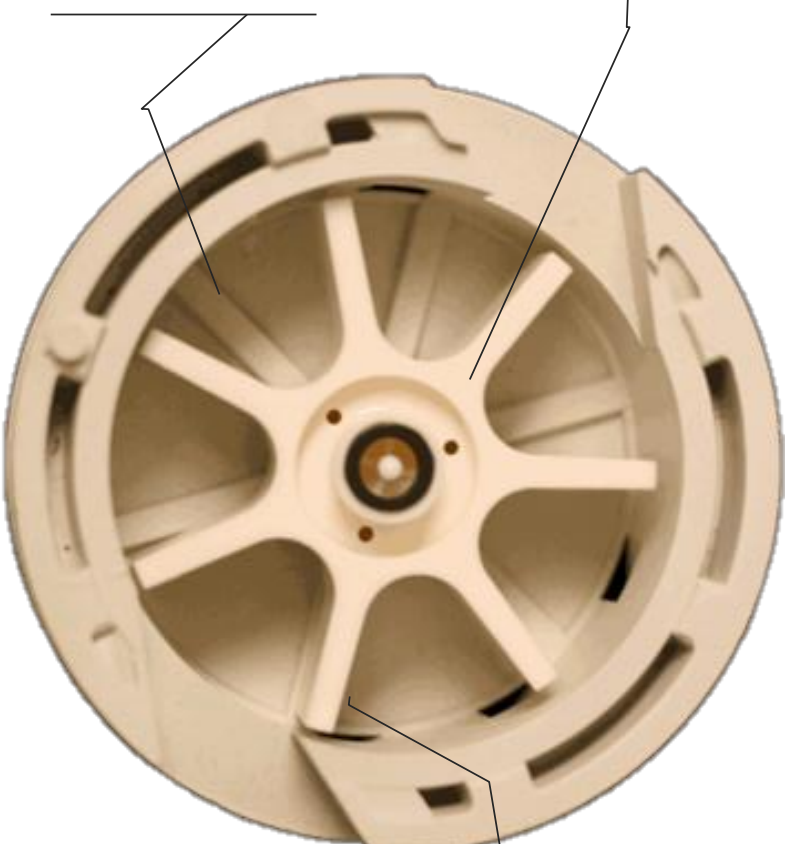




# PRECISE CHAMBER DESIGN

A single moving part; a floating hydro-dynamically balanced impeller

Water uniformly flows through multiple inlet ports and across a precisely balanced impeller



Quiet, efficient, very low pressure drop. Rate payers prefer this meter.





# COMMERCIAL METERING

Legacy products Vs Ultrasonic



# LEGACY PRODUCTS





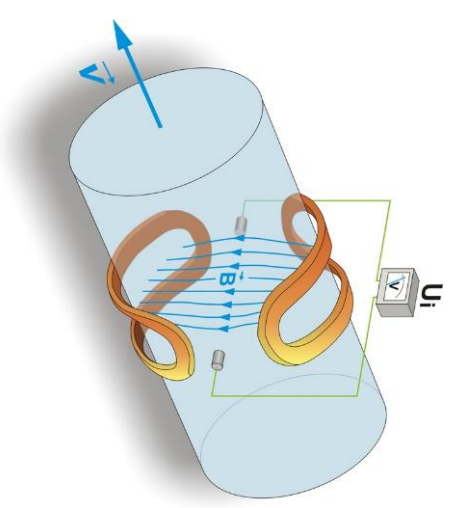
# ULTRASONIC VS MAGNETIC FLOW



# MAGNETIC FLOW METER

# MAGNETIC FLOW METERS

- A magnetic field is created by running current through a coil surrounding the flow tube.
- The electrodes sense and measure the voltage created as the liquid passes through the tube. The greater the velocity the higher the voltage, thus creating the proportional signal that is eventually converted to volumetric flow.
  - Pros
    - No moving parts
    - Can measure solids
    - Highly accurate in max flow applications
    - Operates on pipe diameters from 1/2" to 200" (may require 2 or 3 different sets of transducer depending on pipe size and range transducers cover)
  - Cons
    - Power needed for most types of mag meters
    - Not as accurate for lower flows





# WHAT IS ULTRASONIC?

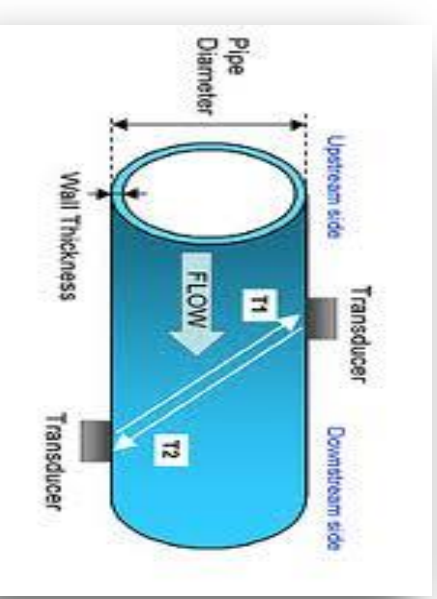
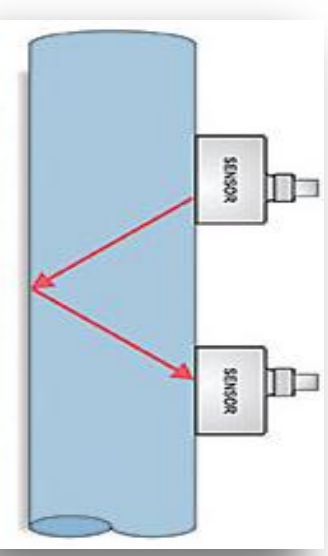


# ULTRASONIC METERS



# HOW ULTRASONIC WORKS

- Basic Operating Principle is Sound
- Two types:
  - Transit Time
    - Best suited for clean water.
    - Sound waves are generated by a transmitter and are either reflected to, or sent across the pipe to a receiver.
  - This same process happens in the opposite direction. (one with flow, one against flow).
  - Upstream and downstream times are compared. The difference in time equates to the water velocity.
    - No time difference = no flow







# HOW ULTRASONIC WORKS



- Dual Beam
- Ultrasonic Transit Time
- Sing Around

Flow •  
Direction



# BENEFITS OF ULTRASONIC

- No moving parts
- Sustained meter accuracy
- No strainer required
- Low flows similar to compounds and high flows similar to turbines
- One meter for all applications (if the meter has FM or UL approval)
- Reduced headloss
- Light-weight design
- No cross-over drop in accuracy





# ULTRASONIC VS TURBINES

## 3" TURBINE

3 GPM Average Low Flow @ -5% - +1%.  
5 GPM Normal Range @ +1.5%



- 0.5 - 0.7 GPM Average Flow



- Toilets ('92): Up to 1.6 USG per flush
- Urinals ('92): Up to 0.5 USG per flush

The 80/20  
Rule



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# Why it is important?

- Unmetered consumption
- Inaccurate meters
- Damaged meters
- Frequent repairs

***All lead to lost revenue***



Keep It Simple



## ELIMINATE:

- Installing the wrong meter type installed
- Excessive maintenance costs
- Gradual decrease in accuracy
- High overhead & inventory costs
- Decrease installation costs

## Simple Installation



**VS.**



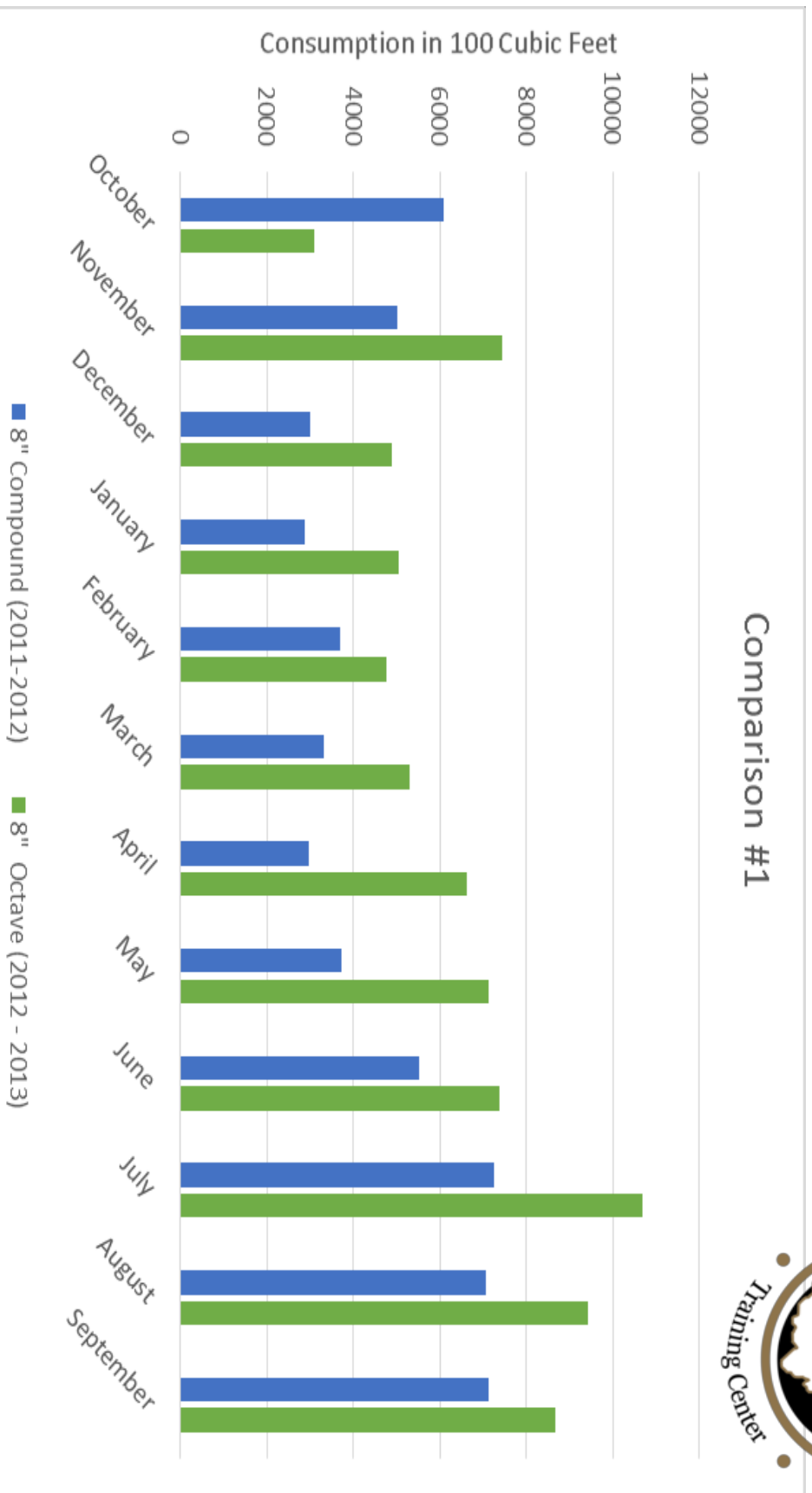
- Turbines up to 80% heavier
- Compounds up to 300% heavier
- Fire Assemblies up to 1800% heavier



# Real World ROI



Comparison #1



💧 **\$52,315.80 | Annual Increase in Revenue**

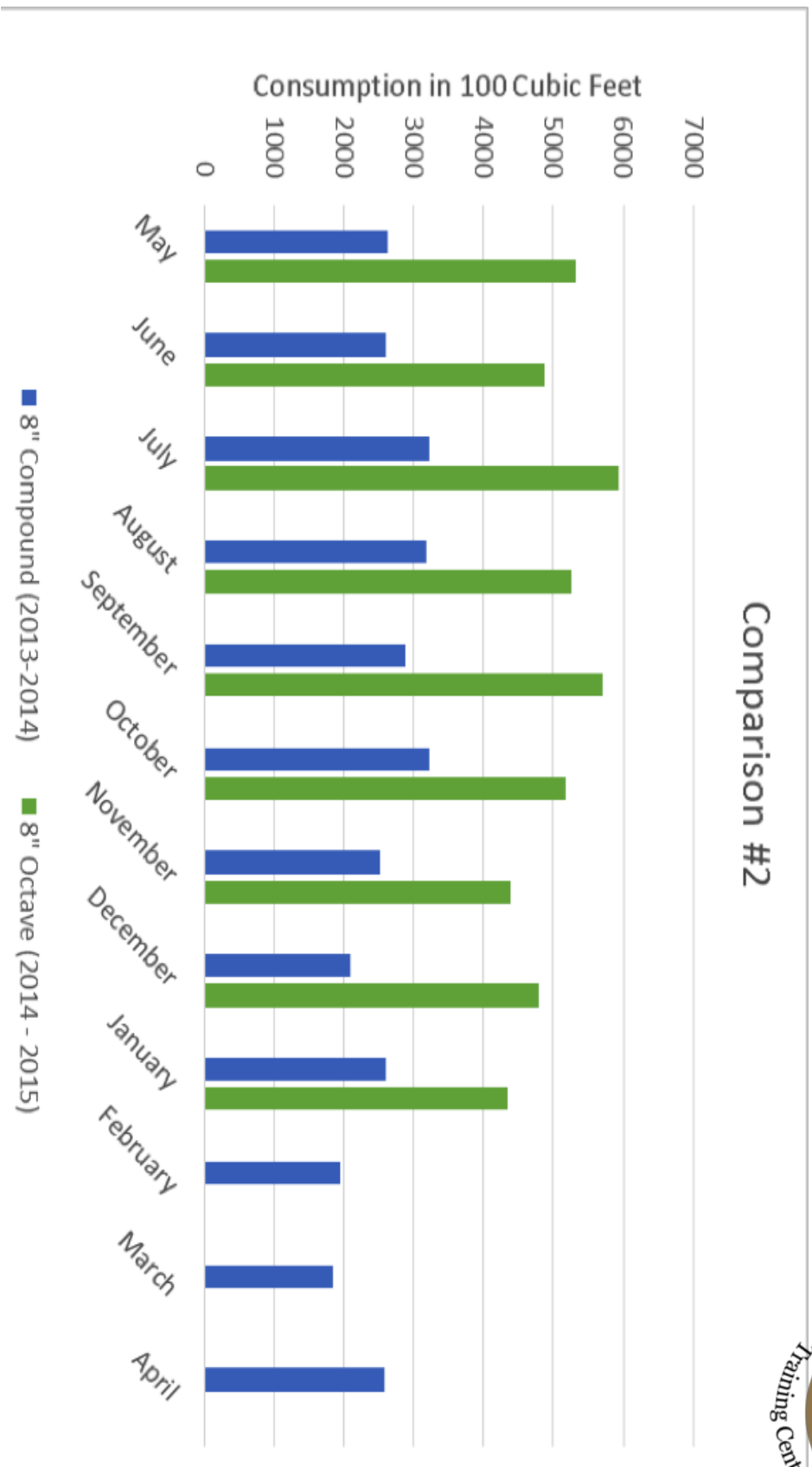
💧 **39.38% | Increased % of Consumption**



# Real World ROI



Comparison #2

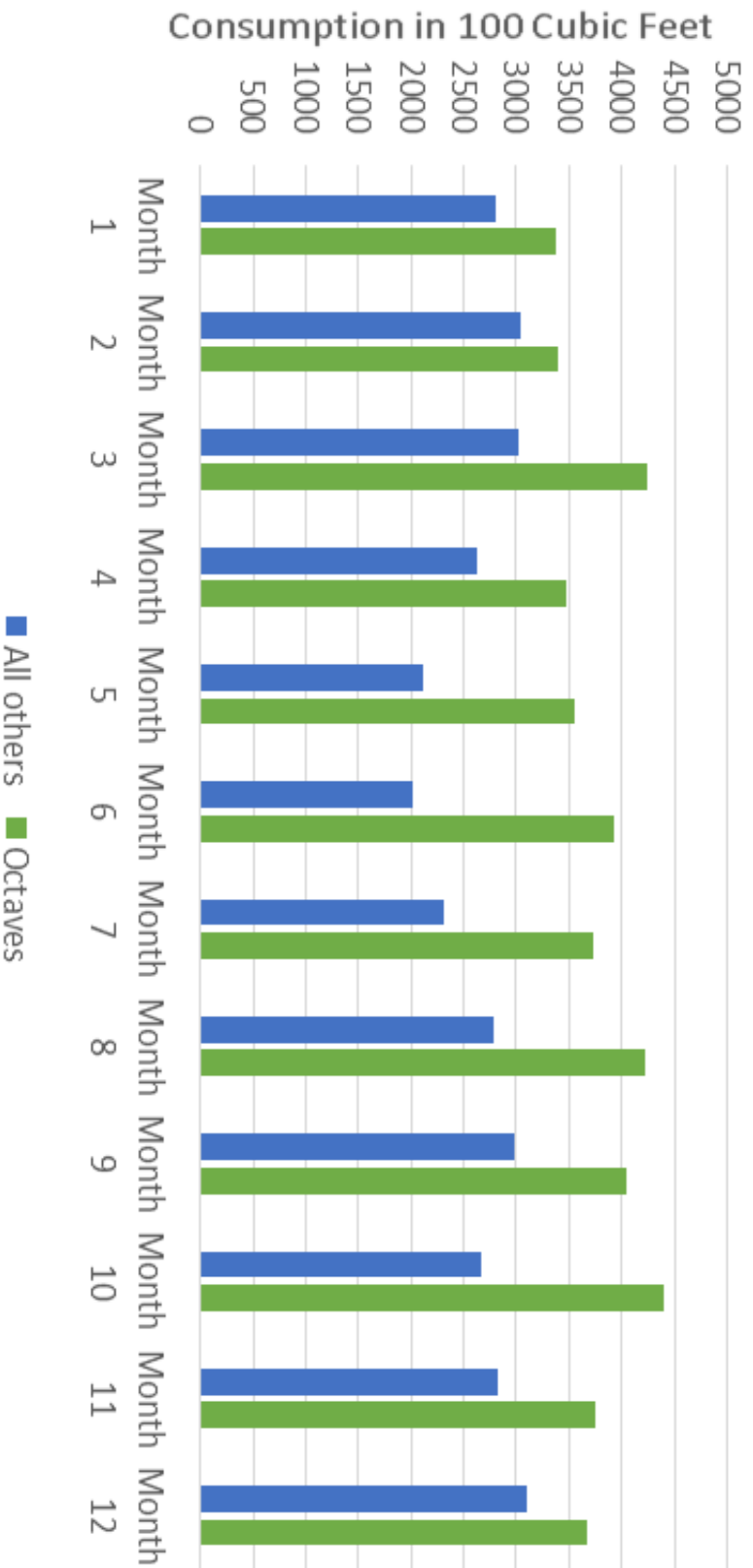


- 💧 **\$48,028.60** | Annual Increase in Revenue
- 💧 **46.47%** | Increased % of Consumption

# Real World ROI



Comparison #3



💧 **\$31,001.70 | Annual Increase in Revenue**

💧 **41.73% | Increased % of Consumption**

# Real World ROI



- ▶ **Hazleton, PA** | One meter increased revenue from \$6,000 per month to \$50,000 a month.
- ▶ **Bradford, PA** | After replacing a meter with the Octave Ultrasonic, the utility found a leak that amounted to 6,000 gallons a day.
- ▶ **Big Flats, NY** | Replace compound and increased revenue in by 900,000 gallons in one month. Projected to bring \$17,000 in revenue annually.
- ▶ **Peru, IN** | Replaced compound and increased consumption by 33%.



# WHAT IS AMI AND WHY IS IT IMPORTANT?

# TODAY'S DEMAND FOR WATER



## **BEEF**

**1 LB | 1,799 USG**

## **DAIRY**

**1 LB | 700 USG**

## **WHEAT**

**1 LB | 172 USG**

## **COFFEE**

**1 CUP | 39 USG**



# GLOBAL WATER STATS

- On average, 925 gallons of water are used to produce a person's daily food and water consumption.
- 1 Million miles of pipe (\$1 Trillion) are nearing End of Life.
- 41,415 Billion gallons of water were consumed in 2014.
- 1.2 Billion people live in areas of physical water scarcity.
- 66% of countries source water from outside their own borders.





# WHAT CAN WE DO?

# AMI IS THE SOLUTION!



A system that remotely and continuously monitors and diagnoses problems, pre-emptively prioritizes and manages maintenance issues, and remotely controls and optimizes all aspects of the water distribution system using data-driven insights.

In addition, it provides customers with the information and tools they need to make informed choices about their behaviors and water usage patterns.







# AMR VS AMI



## AMR

- A technology which automatically collects metering data and transfers that data to a central database for analysis and billing purposes, generally called “smart meters”.
- Technology includes:
  - Touch read
  - Drive By

## AMI

- Advanced metering infrastructure starts with smart meters and adds two-way communication between the meter and utility, and between the meter and consumer. This means that in addition to providing readings, the meter can also receive (and often act on) instructions sent from the utility or consumer



# Different types of AMI

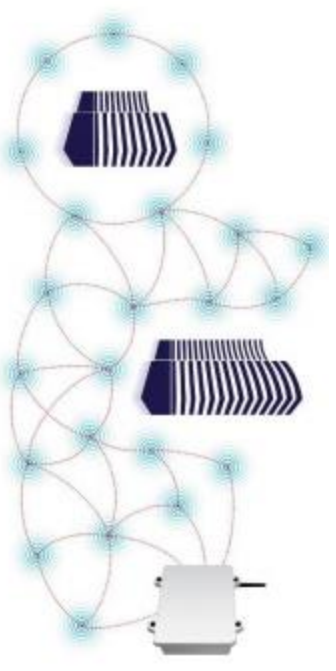
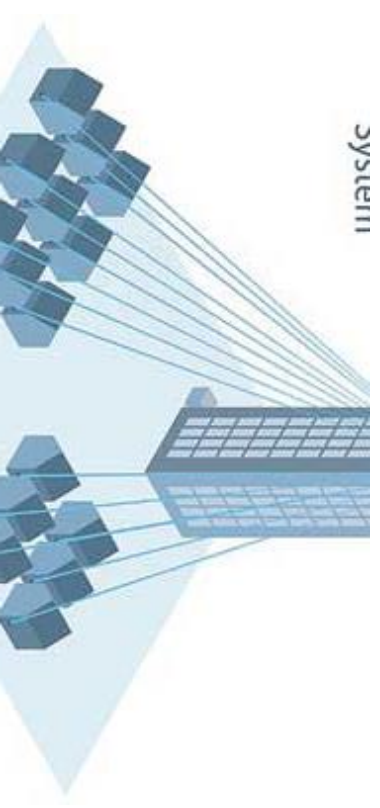
- Line of Sight
- Cellular
- Mesh





# Benefits of AMI

- 3 Day Reading Becomes 3 Minute Reading
- AMI from AMR more challenging than Direct-AMR
- Automated Data logging
- Hourly Reads
- On Demand Reads
- Functional Leak/Theft Detection
- Customer Service Tool
- Remote Software Upgrades
- Shut-Off Valve Capable



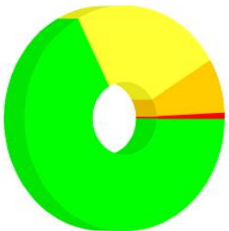


# AMI is all about analytics

## System Status

99.2%  
4654 Meters

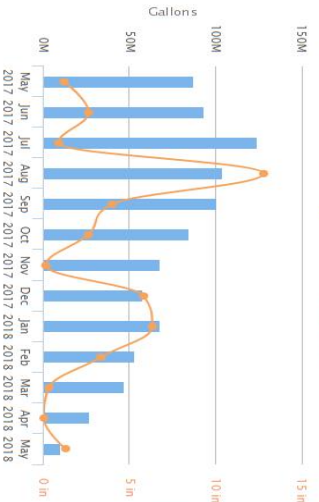
Reception Quality by Meters



■ RX Level 1  
 ■ RX Level 2  
 ■ RX Level 3  
 ■ Not Received

## Consumption

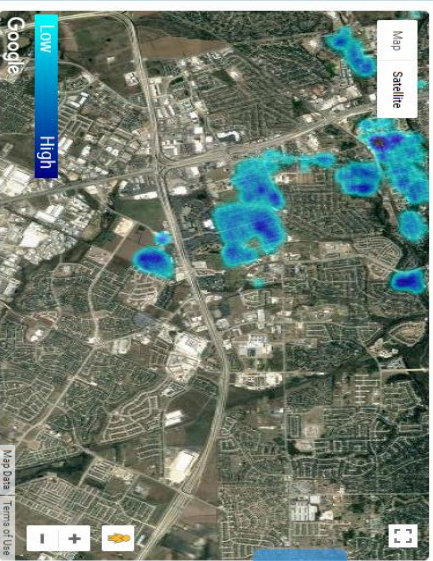
Monthly Total Consumption



Monthly ▼

■ Residential  
 ◆ Rainfall

## Consumption Map



widgets

## Critical Alerts

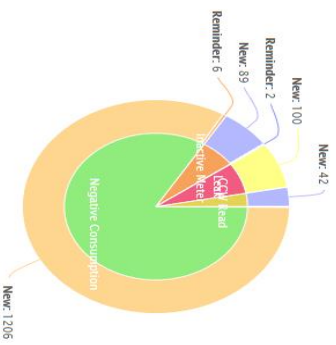
Meter ID	Alert Type	Severity
000103452233	Negative Consumption	●
000103451278	Leak	●
000103454545	Leak	●
00010348031	Tamper	●
000103454570	Leak	●
000103456482	Leak	●
00010349212	Leak	●
00010348892	Leak	●
00010345185	Leak	●
00010345987	Leak	●
00010348982	Leak	●
00010348906	Leak	●
00010348231	Leak	●
000103450135	Leak	●
00010349046	Leak	●

## Meters with no reception

Meter ID	Unit Type	Address
000103454548	Allepro 4CBL	1503 CIRCLE DR
000103456533	Allepro 4CBL	901 TIMBERWOOD DR
000103454569	Allepro 4CBL	2113 ANDOVER DR
00010345845	Allepro 4CBL	1001 WESTWOOD DR A
000103450964	Allepro 4CBL	710 BRASCHEN DR
00010345949	Allepro 4CBL	1911 ASTER WY
000106833918	Allepro 4CBL	2105 SOUTHEASTERN TR
00010682340	Allepro 4CBL	1761 WINDY PARK CR
000103454085	Allepro 4CBL	404 PARKHILL CV
000106833392	Allepro 4CBL	2101 SOUTHEASTERN TR
00010672728	Allepro 4CBL	1616 WINDY PARK CT
00010678579	Allepro 4CBL	2203 STRATFORD DR
000106838932	Allepro 4CBL	901 MA'S ST S 3
000103456720	Allepro 4CBL	2208 STRATFORD DR
00010349351	Allepro 4CBL	1302 CLENDIA DR B

## Alerts

Alerts Status and Handling Status



New: 1205 (Negative Consumption)  
 New: 120 (Leak)  
 New: 100 (Tamper)  
 New: 89 (ICOL Head)  
 New: 42 (Leak)  
 Reminder: 2 (Leak)  
 Reminder: 6 (Tamper)



# Detailed Meter Profiles

Meter ID 00010345586 Back

Meter ID	00010345586	Account Number	02-1795-03	Customer Name	SMITH,JOSEPH,W	Last Read (Gallons)	186419.4	Email	
Serial No.	9307908	Location Number	02-1795	Location Address	518 KARNOLYN DR	Last Read Time	05/12/2018 1:00 PM	Mobile Phone	
Service Type	WAT	Meter Size		Status	OK	Remarks			

Dashboard

**Additional Data**

Electronic No.	10345586	Model	
Unit Type	Allegra 4GBL	UpLink RSSI	-102
Route Description		DownLink RSSI	-93
Read Sequence	16900		

**Alerts**

Severity	Alert Type	Status	Alert Time
No data			

**Related Entities**

Related Entities More

**Events**

Replaced Date	Old Electronic No.
No data	

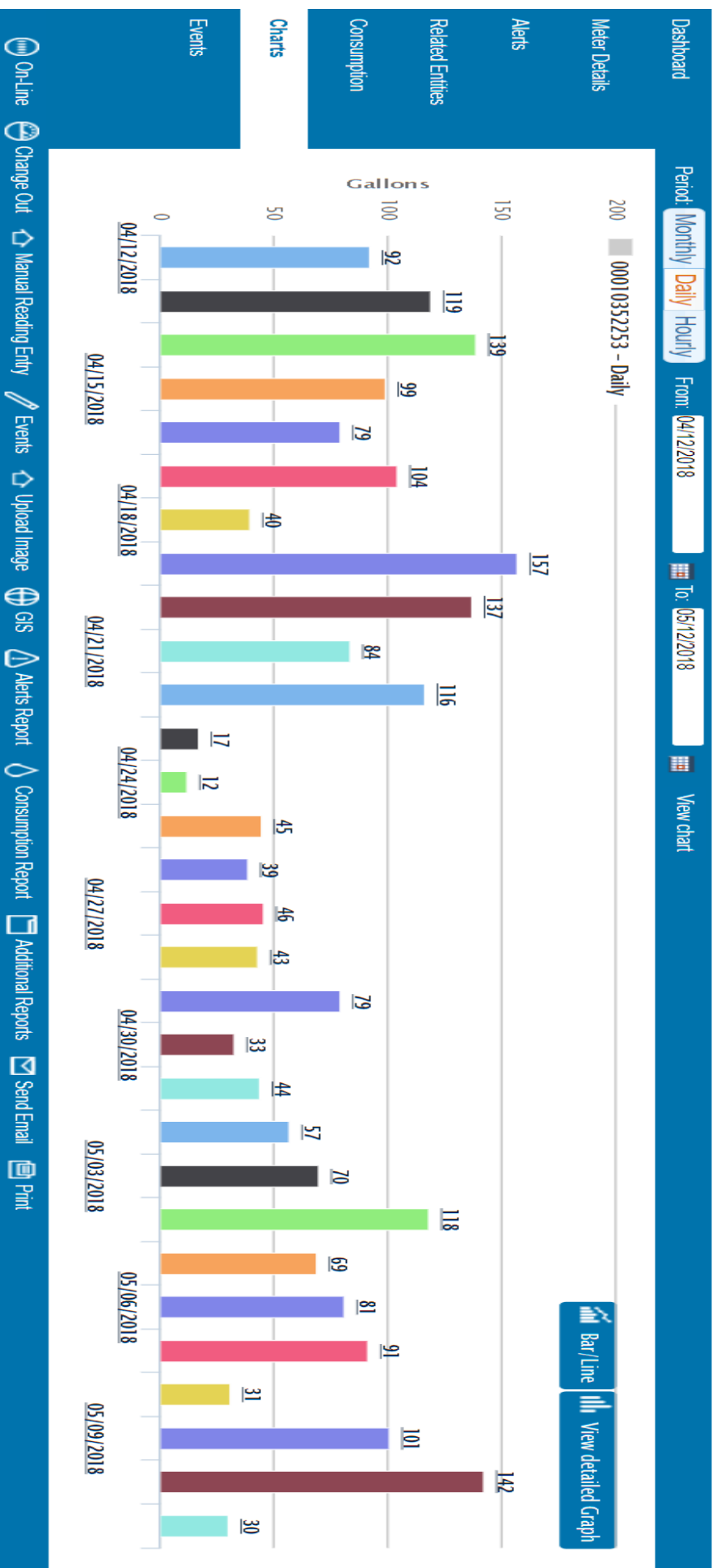
Last Event: From Date 04/04/2018 Letter Sent Sent By admin

**Charts**

Charts More

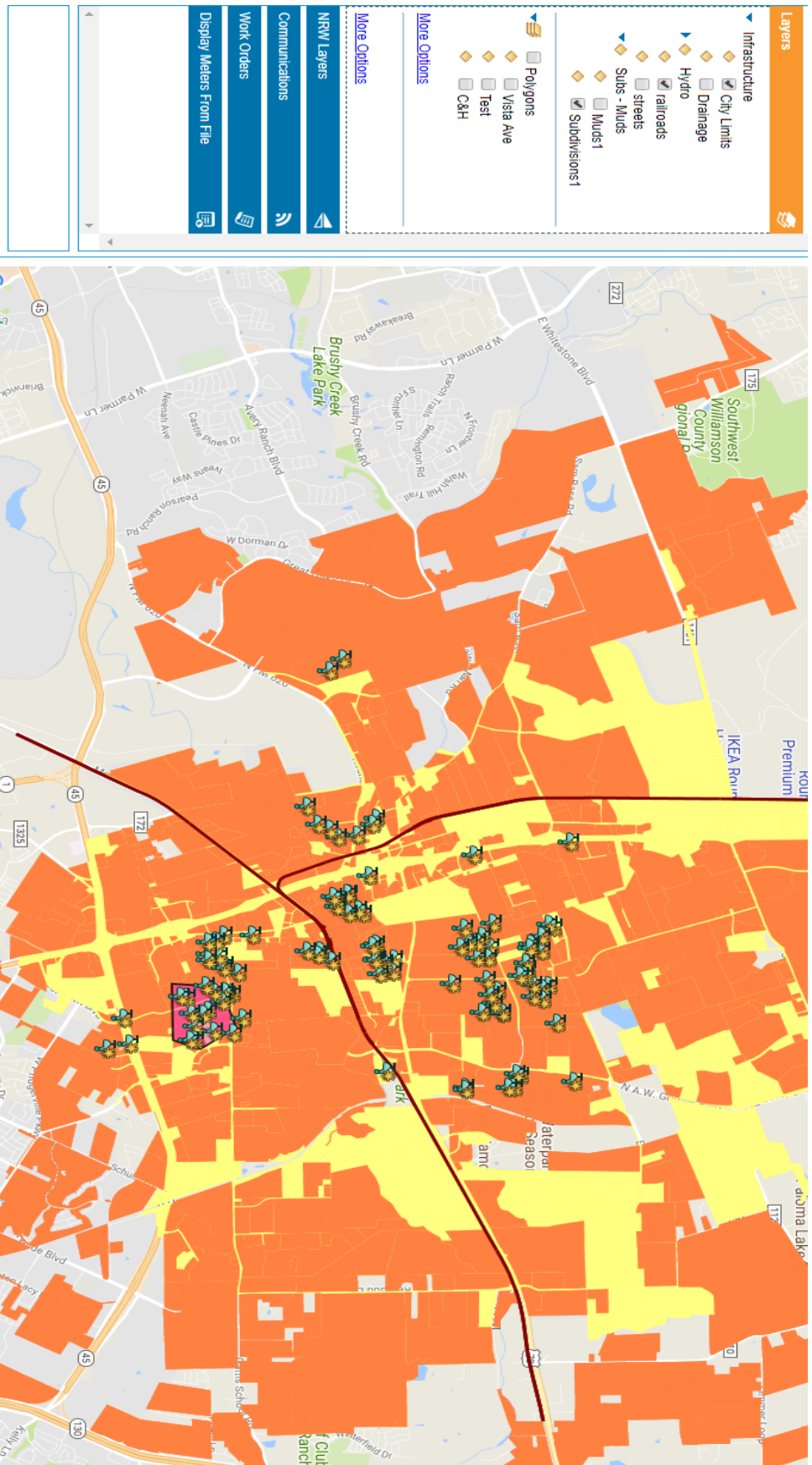


# Readily Available Consumption Reports





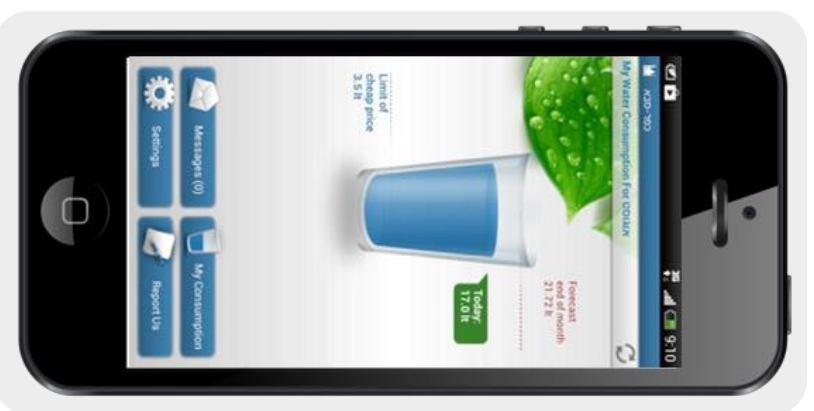
# Import GIS Data







# Customer Engagement Tools



- Customer Premise Leak Alerts
- Household Water Budgeting
- Vacation Period Usage Notifications
- Email or Text Messaging
- Apple or Android Smartphone App

**QUESTIONS?**