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METERING TECHNOLOGY
WHERE WE'VE BEEN AND WHERE ARE WE GOING

Mike Phillips-Master Meter

Alex Grpcevski-Ferguson MAG Group



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VOLUMETRIC VS VELOCITY

Positive Displacement VS Multijet



POSITIVE DISPLACEMENT



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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 *
- * From USA Blue Book “Operator’s Companion”

“Nutating disc meters must be used only on completely clean water. Any suspended matter in the water may damage or stop the meter. Piston meters can generally be operated with limited amounts of suspended matter in the water.”

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



INFLOWING WATER

NEUTRAL WATER

EXHAUST WATER



MULTIJET WATER METERS

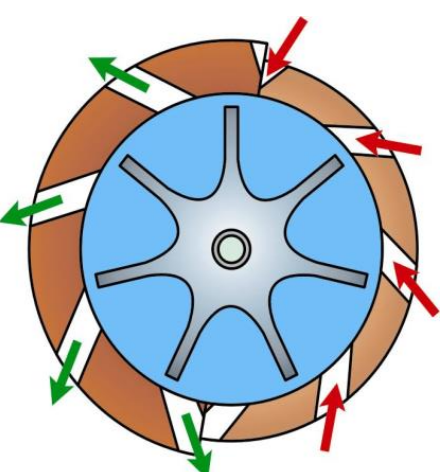


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OPERATING PRINCIPLE OF MJ

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





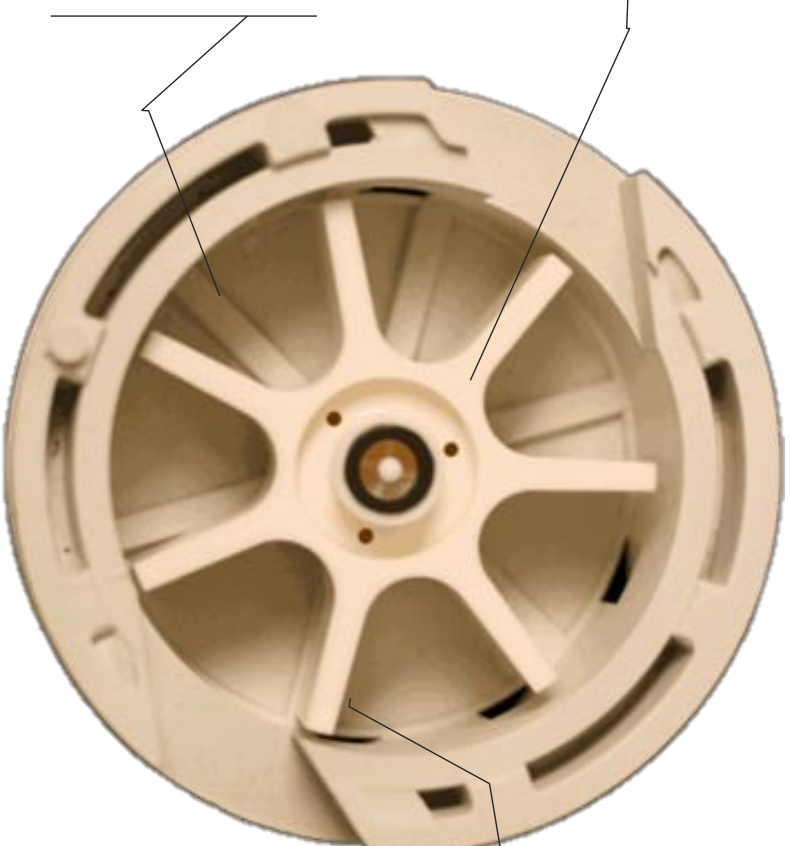
PRECISE CHAMBER DESIGN



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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.



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COMMERCIAL METERING

Legacy products Vs Ultrasonic

LEGACY PRODUCTS





ULTRASONIC METERS



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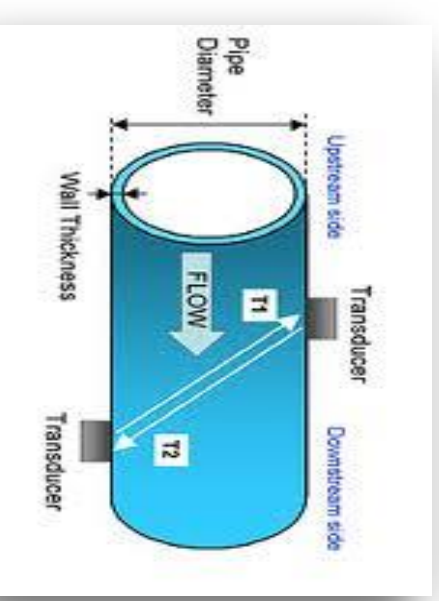
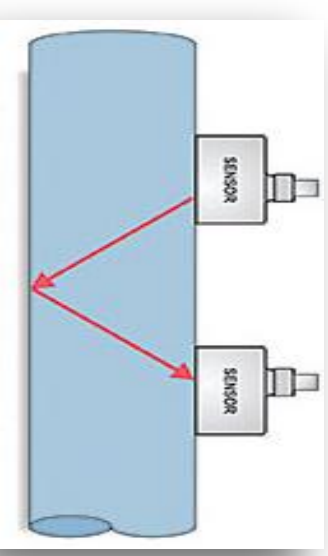


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WHAT IS ULTRASONIC?

HOW ULTRASONIC WORKS

- Basic Operating Principle is Sound
- Two types:
 - Transit Time (the Octave)
 - 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





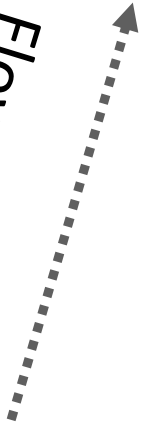
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HOW ULTRASONIC WORKS



- Dual Beam
- Ultrasonic Transit Time
- Sing Around

Flow •
Direction





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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



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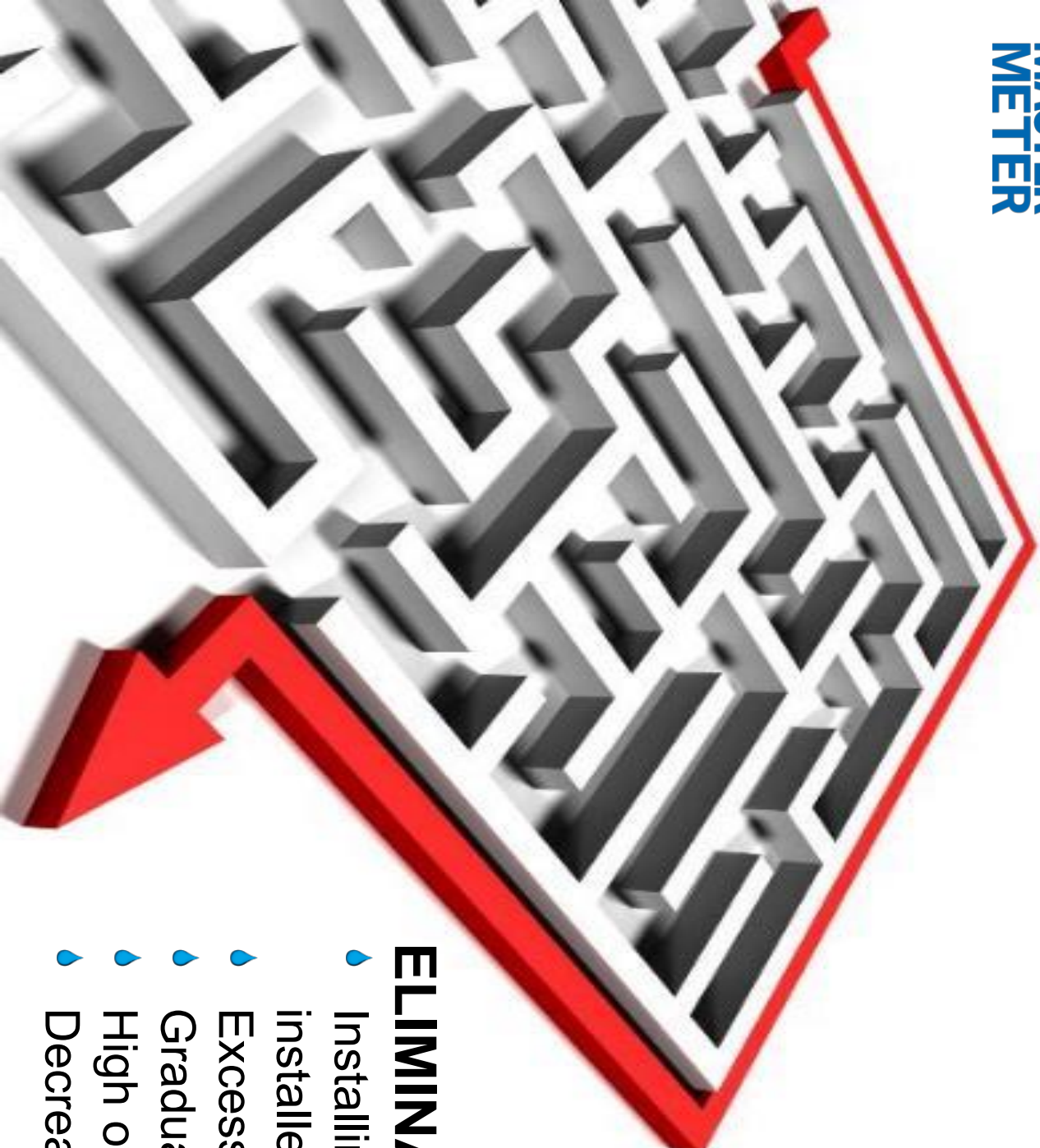




Keep It Simple



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ELIMINATE:

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

Simple Installation



VS.



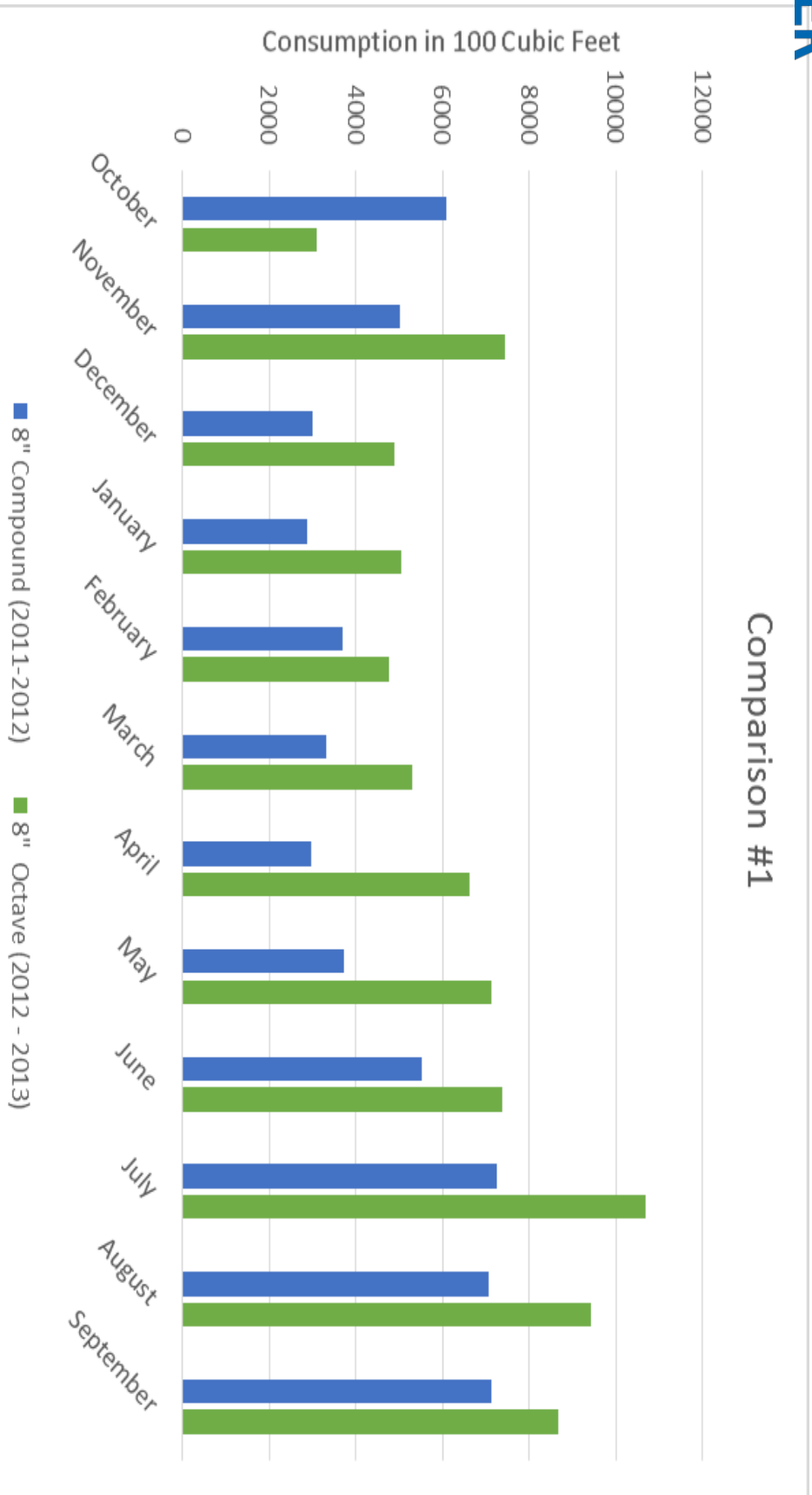
- Turbines up to 80% heavier
- Compounds up to 300% heavier
- Fire Assemblies up to 1800% heavier



Real World ROI



Comparison #1



- 💧 **\$52,315.80 | Annual Increase in Revenue**
- 💧 **39.38% | Increased % of Consumption**

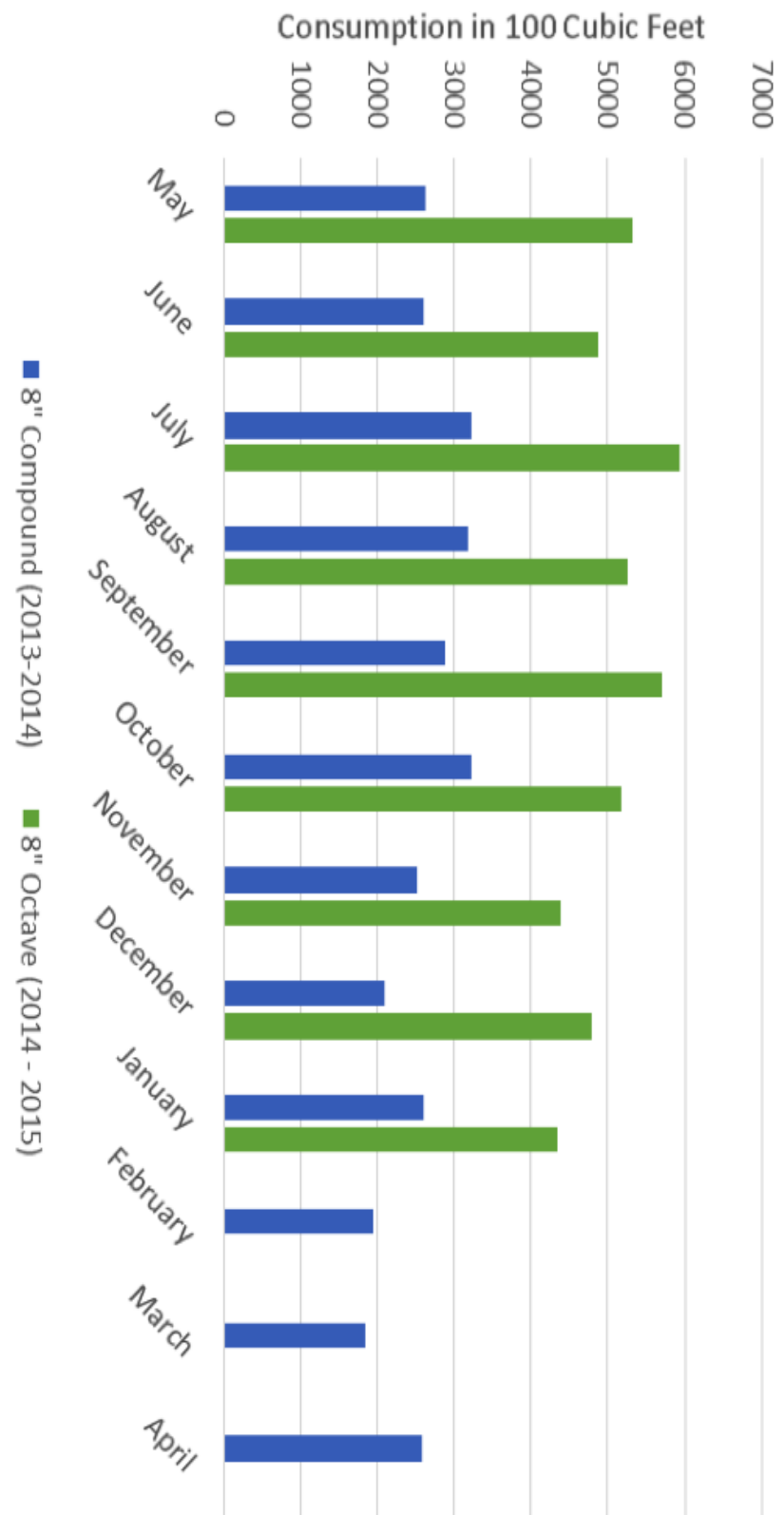


Real World ROI



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Comparison #2



💧 **\$48,028.60** | Annual Increase in Revenue

💧 **46.47%** | Increased % of Consumption

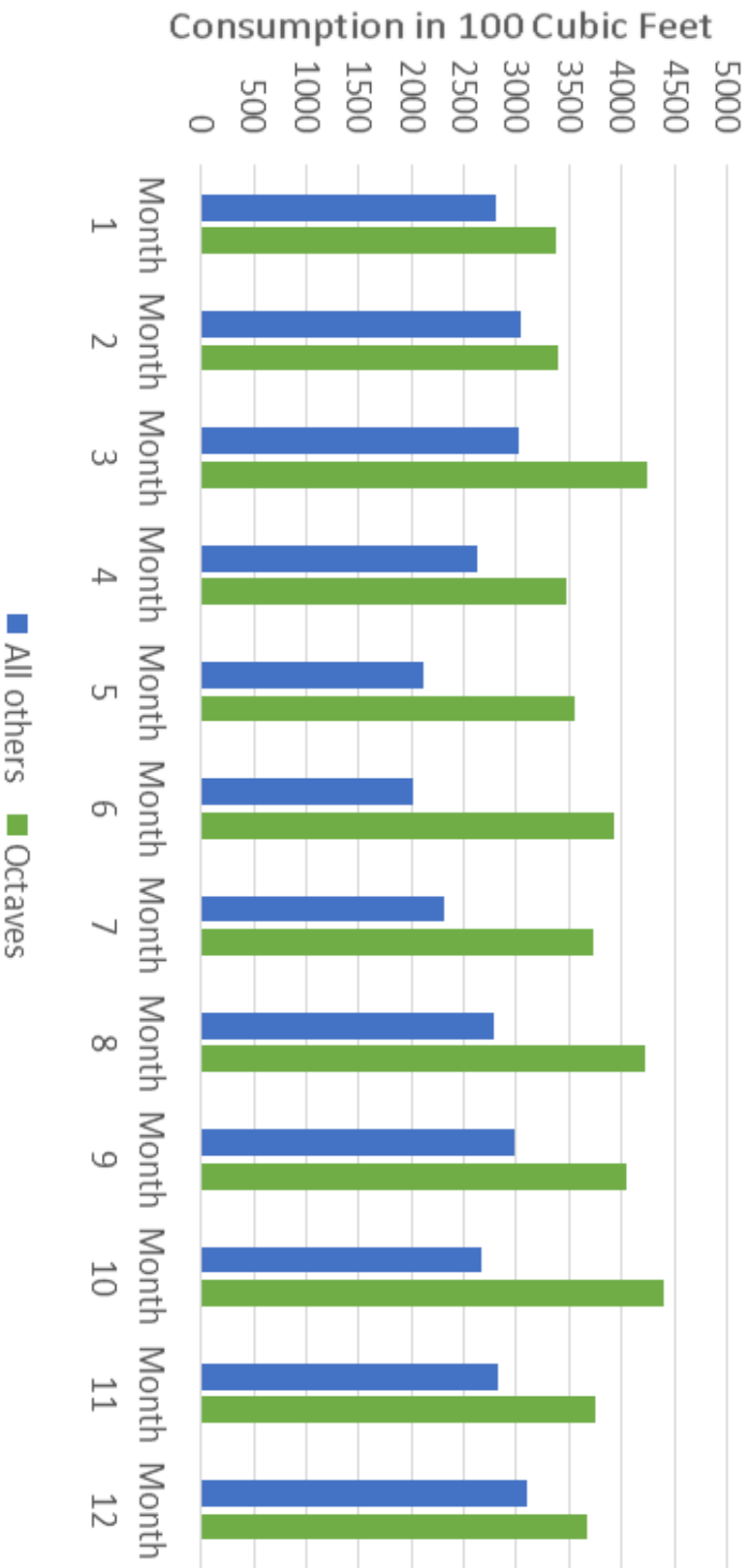


Real World ROI



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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%.



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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



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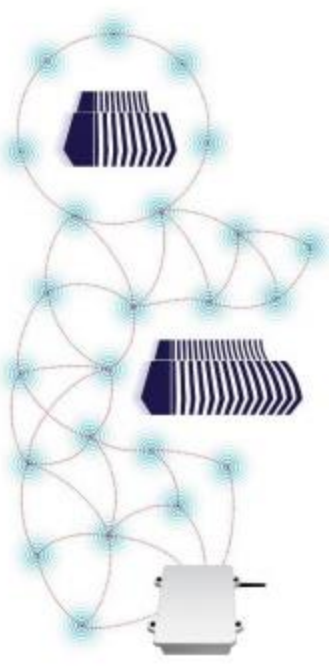
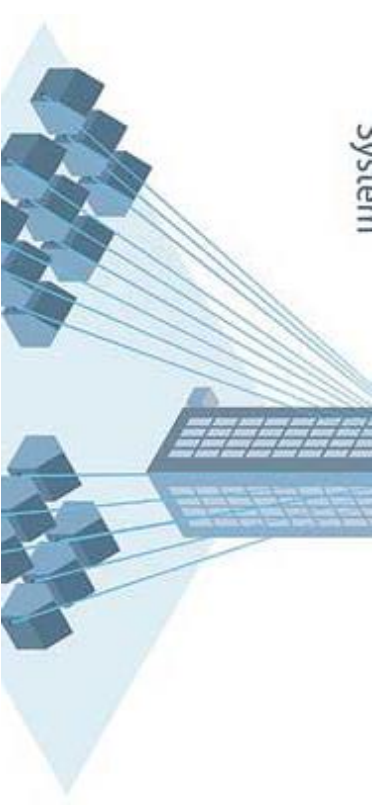


Benefits of AMI

- 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



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AMI is all about analytics

System Status

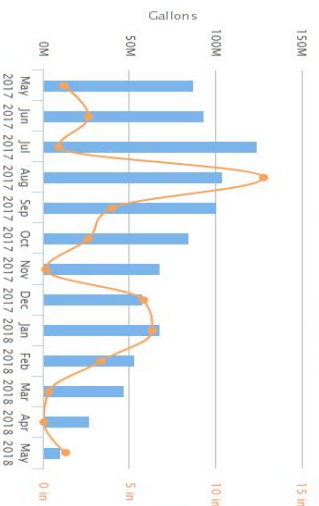
Reception Quality by Meters
99.2%
4654 Meters



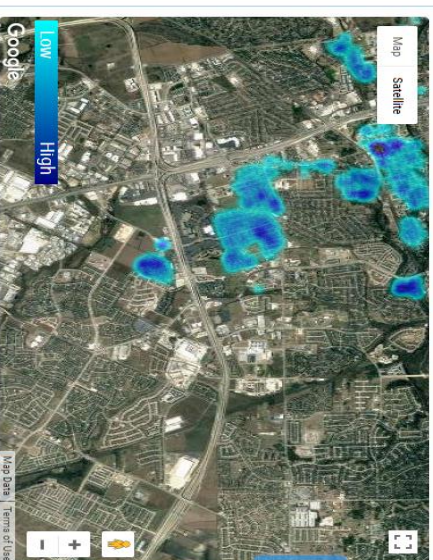
■ RX Level 1 ■ RX Level 2 ■ RX Level 3 ■ Not Received

Consumption

Monthly Total Consumption



Consumption Map



Critical Alerts

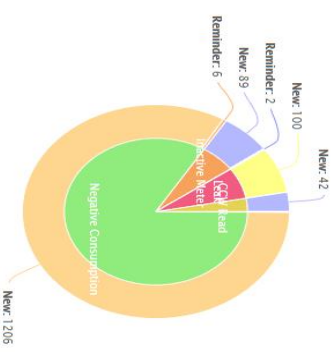
Meter ID	Alert Type	Severity
00010322233	Negative Consumption	High
00010351278	Leak	High
00010345645	Leak	High
00010348031	Tamper	High
00010345470	Leak	High
00010356482	Leak	High
00010349212	Leak	High
00010348892	Leak	High
00010351285	Leak	High
00010355987	Leak	High
00010349862	Leak	High
00010348906	Leak	High
00010350251	Leak	High
00010350135	Leak	High
00010349046	Leak	High

Meters with no reception

Meter ID	Unit Type	Address
00010345548	Allegro 4CBL	1503 CIRCLE DR
00010350533	Allegro 4CBL	901 TIMBERWOOD DR
00010345409	Allegro 4CBL	2113 ANDOVER DR
00010345945	Allegro 4CBL	1001 WESTWOOD DR A
00010350964	Allegro 4CBL	710 BRASCHEN DR
00010345949	Allegro 4CBL	1911 ASTER WY
00010683928	Allegro 4CBL	2105 SOUTHEASTERN TR
00010692340	Allegro 4CBL	1761 WINDY PARK CR
00010354095	Allegro 4CBL	404 PARKHILL CV
00010683392	Allegro 4CBL	2101 SOUTHEASTERN TR
00010672728	Allegro 4CBL	1616 WINDY PARK CT
00010678579	Allegro 4CBL	2203 STRATFORD DR
00010688892	Allegro 4CBL	901 MA'S ST S 3
00010350720	Allegro 4CBL	2208 STRATFORD DR
00010349351	Allegro 4CBL	1302 CLENDIA DR B

Alerts

Alerts Status and Handling Status



New: 1205
Reminder: 6
New: 89
Reminder: 2
New: 100
New: 42
ICOL Head
Leak
Tamper



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Detailed Meter Profiles

Meter ID: 00010345586 Back

Meter ID	00010345586	Account Number	02-1795-03	Customer Name	SMITH, JOSEPH W	Last Read (Gallons)	188419.4	Email	
Serial No.	9397908	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	18900		

Alerts

Severity	Alert Type	Status	Alert Time
No data			

Related Entities

Related Entities More

Events

Replaced Date	Old Electronic No.
No data	

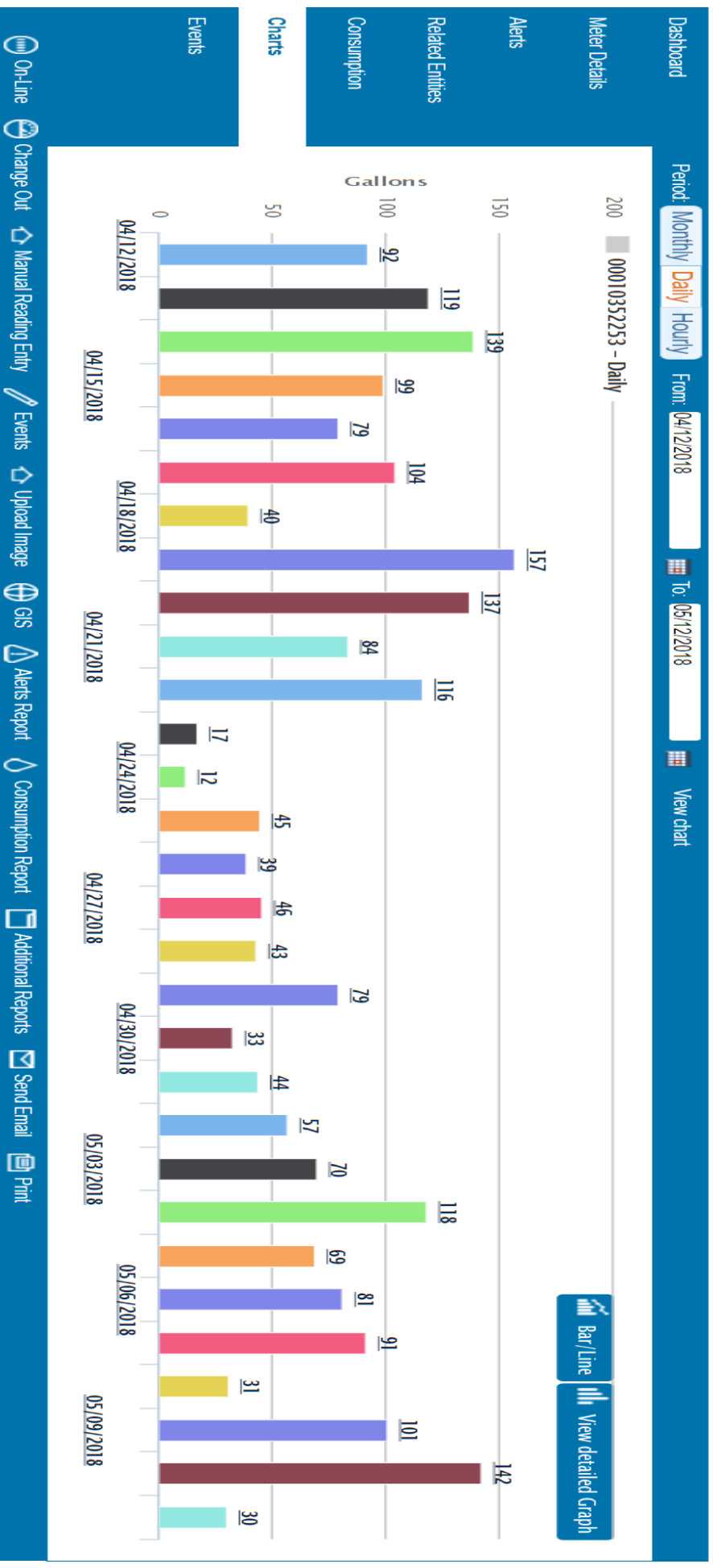
Last Event: Form Date: 04/04/2018 Letter Sent Sent By: admin

Charts

Charts More



Readily Available Consumption Reports





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Import GIS Data

The screenshot displays a GIS application interface. At the top, there is a 'Layers' panel with a list of layers: Infrastructure, City Limits, Drainage, Hydro, railroads, streets, Subs - Muds, Muds1, and Subdivisions1. Below this, there are sections for 'More Options', 'NRM Layers', 'Communications', 'Work Orders', and 'Display Meters From File'. The main map area shows a residential area with various colored overlays: orange for city limits, yellow for drainage, and blue for hydro features. A red line indicates a specific path or boundary. Numerous blue and green icons representing meters are scattered across the map, primarily clustered in the central and right-hand areas. The map includes street names like 'Whitestone Blvd', 'W Partner Ln', and 'Brushy Creek Lake Park'. The interface also features a search bar and navigation controls.

Customer Engagement Tools



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

Different types of AMI

- Line of Sight
- Cellular
- Mesh



QUESTIONS?