



TOWN OF PAXTON

Water Commissioners

Minutes of Meeting

Date: Thursday, March 9, 2017

Time: 7:00pm

Meeting Place: John Bauer Senior Center, 17 West Street, Paxton, MA 01612

Attendees: Jack Malone, Commissioner; Dave Trulson, Commissioner; Mike Putnam, DPW & Water Superintendent ; Travis Thibault, Water Foreman; Carol Riches, Town Administrator

Guests: Ian Kasowitz, Stiles Company

The meeting was called to order at 7:02 pm.

Minutes

Motion (DT) seconded (JM) to accept the meeting minutes of February 23, 2017. Unanimous, all in favor.

Presentation of Badger Water Meters by Ian Kasowitz, Stiles Company (Full presentation attached)

Highlights:

- Presented differences between mechanical vs. electronic (E-series ultrasonic) meters. E-series meters are fully electronic with no moving parts. This eliminates mechanical wear and maintenance.
- Mechanical meters have a 6 digit visual display whereas the E-series meters have a 9 digit visual display. The E-series will measure more accurately because its minimum measurement is .10 gallons versus .25 gallons with a mechanical meter.
- Biggest advantage of E-series meters is that they are guaranteed for accuracy for 20 years. There is a 10 year warranty on the radio device. The radio endpoint can be changed out for \$89.
- E-series meters are equipped with status indicators/alarms for low flows and leak detection, low temperature, unauthorized removal, magnetic tamper, reverse flows, and end of battery life.
- E-series meters can be installed vertically whereas mechanical meters cannot.
- E-series meters are fully submersible and are watertight.
- Meter readings are done through a fixed network using cellular to transmit data. This eliminates meter reading and will report data hourly from every meter. It piggybacks off of cell towers and uses cloud based software so all updates to the software are automatic and no additional cost. Software is simple to use and can give lots of detail (as little or as much as you want).
- E-series meters will store hourly data for 120 days.

- There is an option for a customer portal so that customers may monitor their own water usage at no additional cost.
- There is also an option to have an integrated shutoff valve that would allow the municipality to control flow of water into the customer's home. It would allow us to close the gate to ¼, ½, or shut flow off completely. This would eliminate shutting the water off at the curb stop for customer's that are delinquent in paying their bill.

Travis Thibault (Water Foreman)

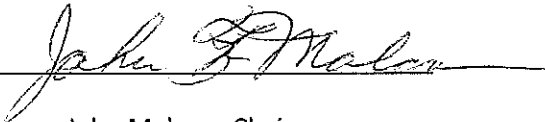
- Vadar Systems said that they would not be able to give us a quote on billing software because there are too many variables. They will get back to us in a couple of months.
- CUSI (Continental Utility Solutions Inc.) gave us a quote on billing software startup of \$20,700 with an annual maintenance fee of \$1,800.
- (TT) informed us that Phil Guerin from the City of Worcester told him to expect a 3% increase in water rates from the City of Worcester beginning 7/1/17.
- Also, the City of Worcester informed us that they had to purchase water from the MWRA. According to our contract, we have to pay a percentage of what they pumped. The estimated cost is expected to be around \$40K due at the end of July.

At 8:44pm, Jack Malone motioned to adjourn the meeting. It was seconded by Dave Trulson.

Respectfully submitted,

Kim Peloquin, DPW Admin. Assistant

Accepted: _____



John Malone, Chair

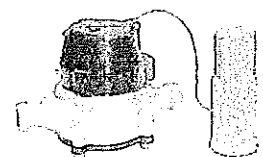


Water Meter Presentation

Presented by: Stiles Co. Inc. / Badger Meter Inc.



STILES CO Inc
WATER WORKS PRODUCTS





Badger Meter Corporate Overview

- Founded in 1905 and headquartered in Milwaukee, Wisconsin, the core competency of Badger Meter is flow measurement solutions.
- The company is a leading innovator, manufacturer and marketer of flow measurement and control products, serving water and gas utilities, municipalities and industrial customers worldwide.
- Publicly traded on NYSE since 1971 (BMI)
- Over 2,200 Utility Customers with 7+ million endpoints deployed
- Field Proven Reliability: *LESS THAN A ½ OF 1% RETURN RATE*

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Badger Meter, Inc.

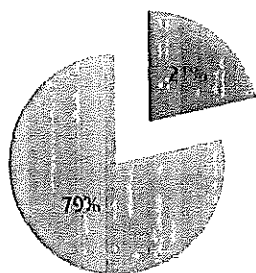
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Badger Meter Market Share

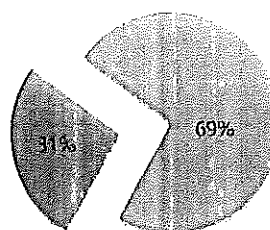
AMI/AMR Shipments

■ Badger Meter ■ Other (27)



Meter Shipments

■ Badger Meter ■ Other

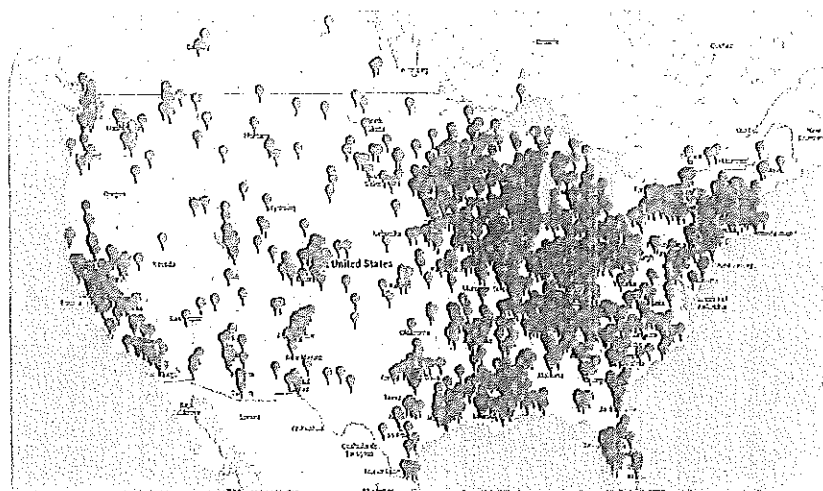


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These utilities chose ORION®



Utility Goals :
What's on your white board?

Utility Goals

- ☒ Improve Customer Service
- ☒ Increase Efficiency of Meter Reading Process
- ☒ Decrease Non-Revenue Water / Monitor Conservation
- ☒ Increase Meter Accuracy / Maintenance
- ☒ Focus More Time on Utility Core Competencies
- ☒ Decrease Needed Support from IT



Water Loss Control and Efficiency

- American Society of Civil Engineers (ASCE) estimates that 7 billion gallons of water go unaccounted for every day in the United States alone
- Real vs. Apparent :
 - Real = Physical loss of water resources
 - Apparent = Non physical losses; water consumed but not properly measured, accounted or paid for
- As mechanical meters age, moving parts within the meter casing begin to deteriorate and wear out, forcing inaccurate readings and the need for replacement.**



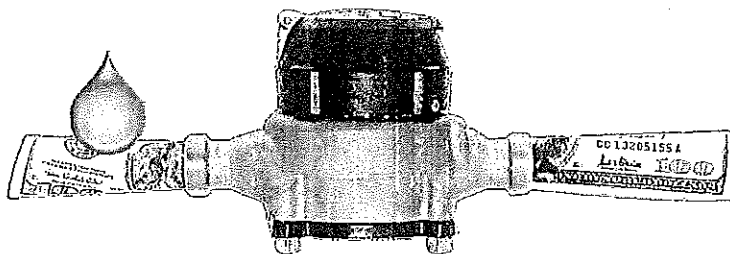
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Water Efficiency via Accurate Metering

- The Role of Metering
 - Resource accounting
 - Revenue generation
- "Cash Register" OR "Point-of-Sale-Device"



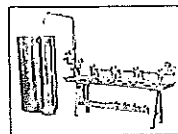
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Importance of Meter Accuracy



- Meter accuracy improves state and country conservation efforts
- Accurate Meters help lower unaccounted for water issues
- Water meters need to be accurate at normal operating flow rates, as even small errors in the accuracy of residential, commercial and industrial water meters can create shortfalls in water utility revenues or result in over-billing of customers.
- Lower accuracy means lower revenue for you and inequitable cost distribution for your customers
- Higher long term accuracy means fewer rate adjustments, more revenues, and lower replacement costs

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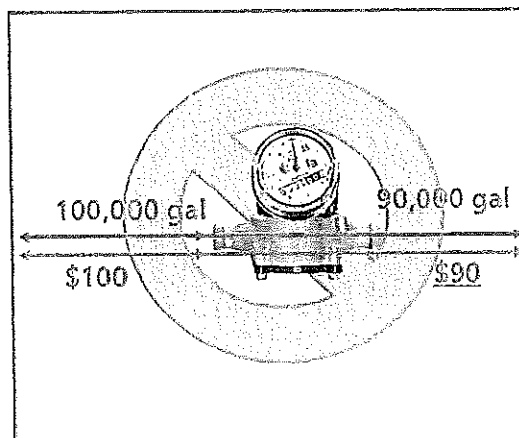
Unaccounted-for-Water = Non-Revenued-Water



- The reasons for Non-Revenued Water or Unaccounted-for-Water are the following:

- Unbilled Metered Consumption
- Unbilled unmetered consumption
- Unauthorized Consumption
- Customer Metering Inaccuracies
- Data Handling Error
- Mains Leakage
- Service Line Leakage

" New/Accurate Meters and an AMR Meter Reading System are proven to lower Non-Revenued and Unaccounted for Water "



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Meter Testing: AWWA Recommendations

Meter Size (Inches)	Test Interval (Years)
5/8, 3/4, 1	10
1-1/2 and 2	4
3 and 4	2
6 and Over	1

Water conditions may require more or less frequent testing

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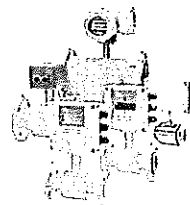
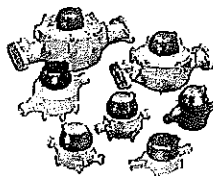
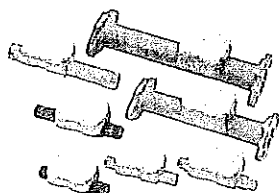
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Badger Meter



Residential and Commercial/Industrial Water Meters



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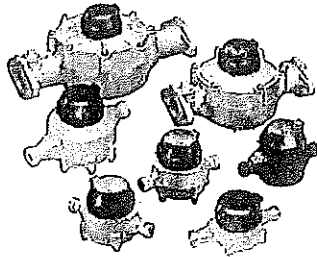
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Badger Disc Series Meters



- Combines the accuracy of *positive displacement* meters with the reliability and economy of *nutating disc* technology, the simple but efficient design of this meter makes it an ideal solution for measuring flow.



- NSF/ANSI standards 61 and 372 certified
- Exceeds AWWA C700 and C710 standards
- Nutating Disc technology results in the most accurate mechanical meter on the market

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New Meter Accuracy vs. Standard

Meter Size	AWWA Low Flow Standard	Badger Meter Low Flow Specs
5/8"	1/4 GPM @ 95%	1/4 GPM @ 98.5%
3/4"	1/4 GPM @ 95%	3/8 GPM @ 97%
1"	3/4 GPM @ 95%	3/4 GPM @ 95%
1 1/2"	1 1/2 GPM @ 95%	1 1/4 GPM @ 95%
2"	2 GPM @ 95%	1 1/2 GPM @ 95%

Meter Size	AWWA Flow Range	Badger Meter Flow Range
5/8"	1/4 to 20 GPM	1/8 to 25 GPM
3/4"	1/2 to 30 GPM	3/8 to 35 GPM
1"	3/4 to 50 GPM	1/2 to 55 GPM
1 1/2"	1-1/2 to 100 GPM	1-1/4 to 120 GPM
2"	2 to 160 GPM	1-1/2 to 170 GPM

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5/8" Meter Comparison Chart

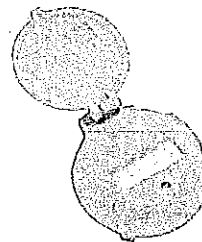
	AWWA M11 Standards	Budget Record M11	Sensus SR II	AMCO C 700
Housing	Bronze	Bronze or Polymer	Bronze	Bronze
Measuring Element Type	Disc / Piston	Rotating Disc Type	Oscillating Piston Type	Oscillating Piston Type
Normal Operating Accuracy Flow Range	1-20 GPM	1/2-25 GPM	1-20 GPM	1-20 GPM
Accuracy @ Low Flow	1/4 GPM @ 95%	1/4 GPM @ 98.5%	1/4 GPM @ 95%	1/8 GPM @ 95%
Maximum Cont. Flow	10 GPM	15 GPM	10 GPM	15 GPM
Rotations / Oscillations per Gallon	58	49.59	57.6	57.4
Pressure Loss at AWWA Max Flow	15 PSI @ 20 GPM	4.9 PSI	7 PSI	8.5 PSI

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High Resolution Encoders

- HR-E LCD
 - Fully electronic, solid-state encoder with no moving parts.
 - 9 digit visual display
 - Rate of Flow
 - Status Indicators / Alarms:
 - Low flows and leak detection
 - Low Temperature Alert
 - Unauthorized encoder removal
 - Magnetic Tamper
 - Reverse flows
 - End of Battery Life

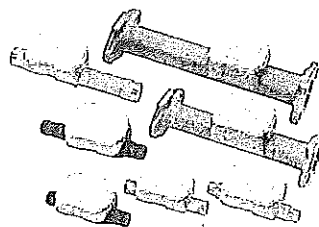


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E-Series Ultrasonic Meter

- Released for sale in 2010
- Fully potted housing includes, battery, electronics, and display (fully submersible).
- No moving parts virtually eliminates mechanical wear and maintenance.
- 20 year warranty, 5/8 – 1 inch
 - Potential to eliminate one meter change-out
 - 5 year warranty for 1 1/2 and 2" meters
- Wider measuring span
 - Lower extended flow
 - Higher continuous flow
- All-electronic meter provides long term sustained accuracy.
 - Meets or exceeds accuracy for normal flow ranges, $\pm 1.5\%$
 - Meets or exceeds extended low-flow accuracy, $\pm 3\%$
- Low temperature alarm
- Horizontal or vertical mount



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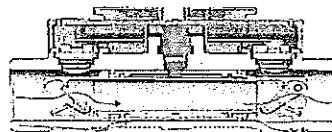
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Ultrasonic Measurement Technology

- Doppler Shift: Measures difference in frequency of the sound wave reflected off acoustic discontinuities or particles in the flow stream
- Well suited for dirty water applications.
- Transit-Time: Measures the time differential between signal sent upstream and a corresponding signal sent downstream. The differential is directly proportional to the velocity of the water.
- Well suited for clean water.
- E-Series Ultrasonic meter uses Transit-Time technology



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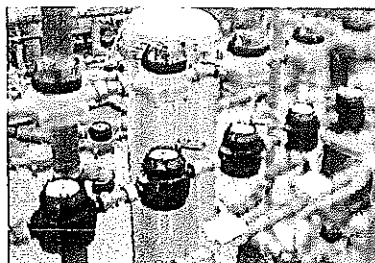
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Ultrasonic vs. Positive Displacement

- The Ultrasonic meter has:
 - A greater operating flow range
 - A greater visual display resolution
 - A lower extended low flow limit
 - A greater maximum continuous flow limit
 - Reverse flow capability
 - A rate of flow display
 - Higher operating temperature
 - Smaller dimensions
 - A potentially longer life



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Ultrasonic vs. Positive Displacement

	Meter	5/8 in.	¾ in.	1 in.	1-1/2 in.	2 in.
AWWA Applicable Standard	Ultrasonic	N/A	N/A	N/A	N/A	N/A
	Mechanical	C700	C700	C700	C700	C700
Typical Operating Range (gpm)	Ultrasonic	0.1...25	0.1...32	0.4...55	1.25...100	1.50...160
	Mechanical	.5...25	.75...35	1...55	2.5...120	2.5...170
Extended Low Flow Rate (gpm)	Ultrasonic	0.05	0.05	0.25	0.40	0.50
	Mechanical	0.25	0.375	0.5	1.25	1.50
Maximum Continuous Flow (gpm)	Ultrasonic	25	32	55	100	160
	Mechanical	15	25	40	80	100
Typical Operating Range Accuracy	Ultrasonic	+/- 1.5%	+/- 1.5%	+/- 1.5%	+/- 1.5%	+/- 1.5%
	Mechanical	+/- 1.5%	+/- 1.5%	+/- 1.5%	+/- 1.5%	+/- 1.5%
Weight (lbs.)	Ultrasonic	2.2	2	3	8.2	11.9
	Mechanical	4.5	5.5	8.75	19	30
Length (Inches)	Ultrasonic	7.5	7.5 or 9	10.75	13	17
	Mechanical	7.5	7.5	10.75	12.62 or 13	15.25 or 17

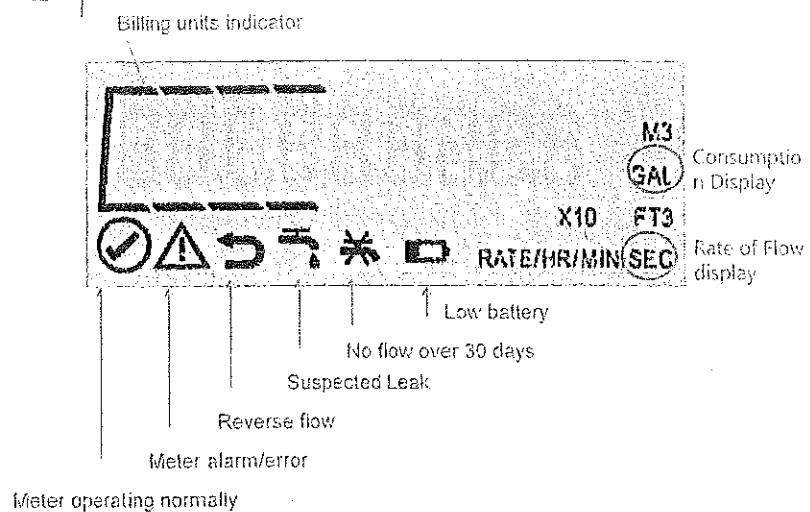
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E-Series Indicators and Alarms

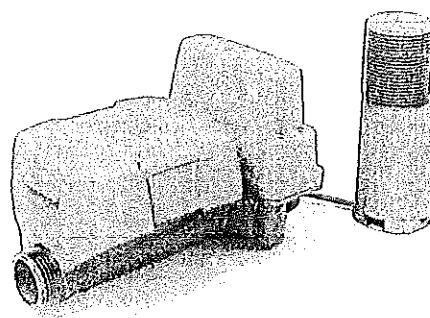


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E-Series Plus – w/ Integrated Shutoff Valve

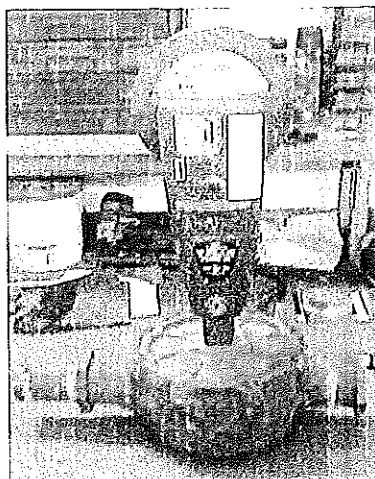
- Patented flow restriction valve supports open, closed, and partial closed settings
- Permanent seal maximizes field life through patent pending magnetic coupled valve
- Flexible, tamper-proof design; install meter now and valve later – in the field
- Valve actuation and management controlled through Beacon AMA software



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Badger Meter

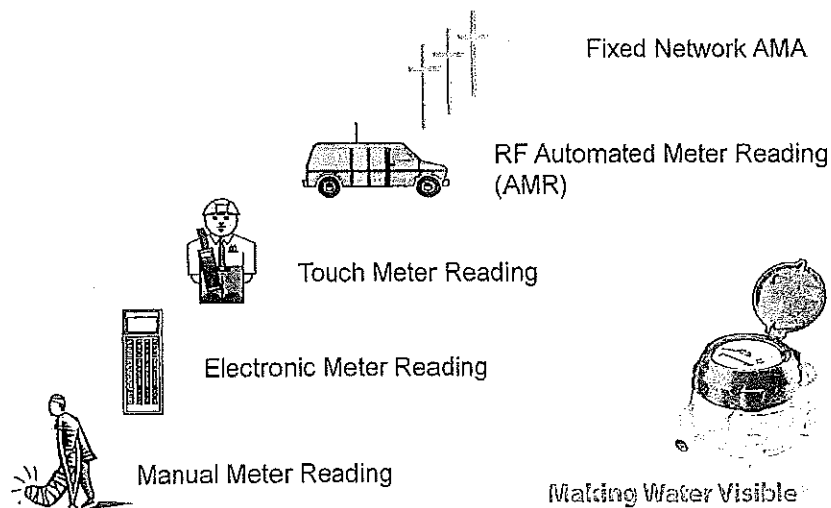


Meter Reading AMR/AMI & Meter Reading Technology

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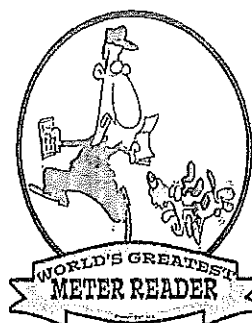
Meter Reading History:





Mobile Radio Read Benefits

- Increased reading productivity
 - Restructure field services functions/staff
 - Reduced meter reading labor costs – vehicles
 - Improved cash flow due to shorter (or even more frequent) reading to billing period
- Operational impacts
 - Reduced read times
 - Reduced worker injuries
 - Reduce costs of special, high risk and final reads
- Customer service impacts
 - Fewer customer complaints
 - Reduced customer property intrusion
 - Accurate & on time reads –reduced estimated reads
 - Increased billing accuracy
 - Help detect household leaks



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Orion Classic Endpoint



- ORION® Classic endpoint (CE) is a one-way water endpoint designed for mobile meter reading
- The Orion product family was introduced in 2002 and boast superior field reliability: **LESS THAN A ½ OF 1% RETURN RATE**
- The Classic endpoint broadcasts its unique endpoint serial number, current meter reading and applicable status indicators every 4 seconds and utilizes frequency hopping modulation
- The Orion Classic endpoint is suitable for use with all Badger Meter encoders as well as competitive Badger Meter approved three-wire encoder registers that have a manufacturers date of 2000 or newer, including: Neptune (ProRead, E-Coder and ARB V), Hersey, Sensus, MasterMeter...and others. (Information and details passed through the endpoint depend on the capabilities of the competitors encoder and meter)

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Orion Endpoint Evolution



- Orion CE
 - One-way water endpoint designed for mobile meter reading. The CE endpoint will store 2.4 years of hourly data that has to be accessed directly from the endpoint.
- Orion ME
 - two-way water endpoint for mobile applications with the capability of migrating to fixed network mode to support future utility capabilities. Can receive 90 days of historical data without needing access to the endpoint.
- Orion SE
 - two-way water endpoint for use in a traditional fixed network system
- Orion Cellular
 - two-way water endpoint that utilizes existing cellular technology to efficiently and securely deliver meter reading data back to the utility via the reliable cellular network

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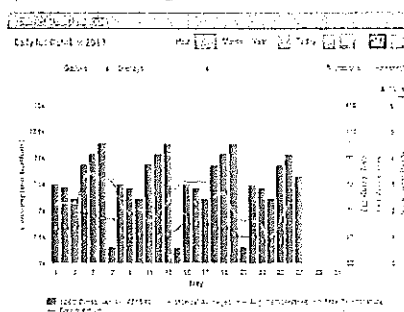
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Orion Mobile Data-Profiling

• Data Profiling:

- Ability to store hourly data
- Can show a customer their usage history
- Badgers Classic Endpoint will store up to 2.4 years of hourly interval data (most competitors data profiling feature stores data for approx. 90-120 days)



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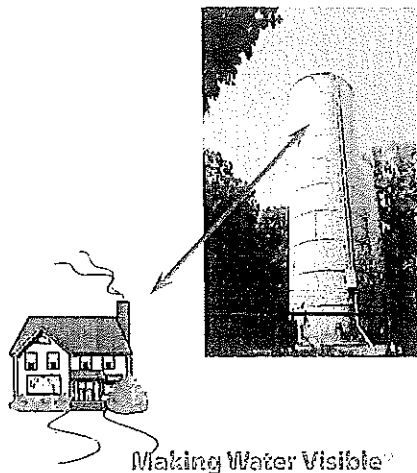
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Traditional Fixed Network AMI – Advanced Metering Infrastructure

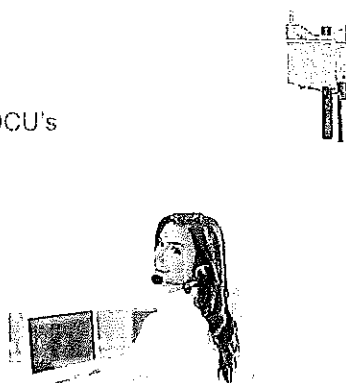
- Fixed network systems

- AMI – Advanced Meter Infrastructure
- Collects hourly "reads"
- Readings get sent directly to the office – eliminated the need to drive or walk around to collect reads
- Consist of an array of antennas, towers, collectors, repeaters, or other installed infrastructure to collect transmissions of meter readings from the meters and relay the data to a central computer, without a person in the field to collect it.
- Traditional Fixed networks use Star (point-to-point) or Mesh technology



Obstacles of Traditional Fixed Networks


- Expensive
 - Costly infrastructure
- Difficult Topography
 - Typically requires multiple DCU's
- Pole/Tower Rental Fee's
- IT Personnel
- Costly Servers



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BEACON[®] AMA – Managed Utility Solution

Advanced Metering Analytics provides proactive intelligence for optimal utility management.

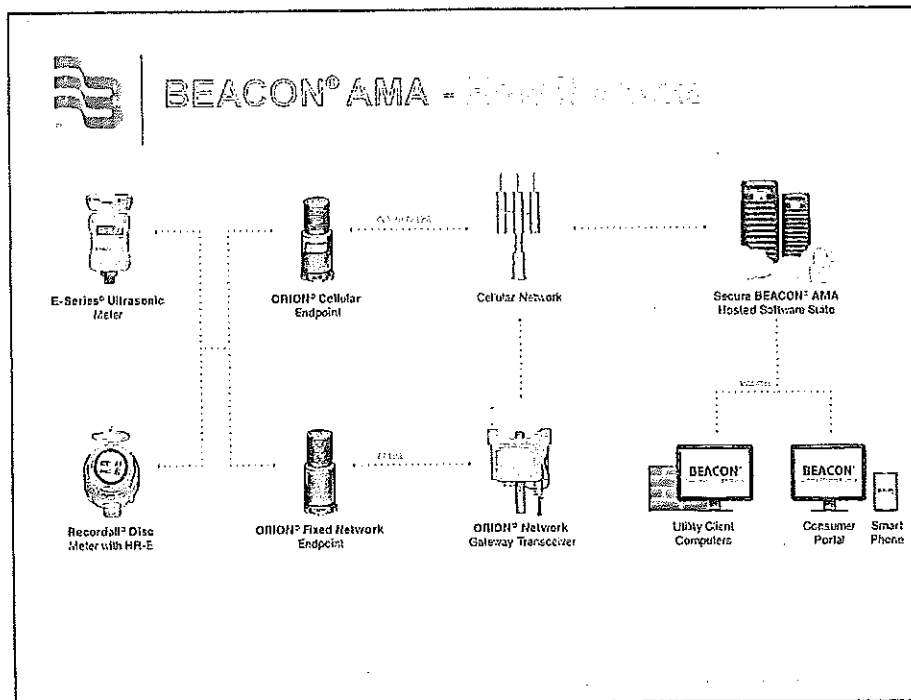


BEACON
Advanced Metering Analytics

Powerful data tools provide greater water usage visibility to you and your customers.

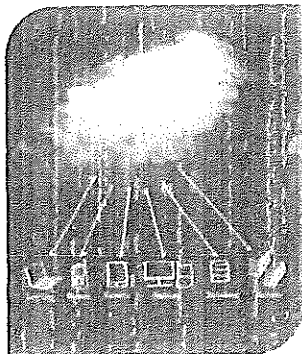
Our system design provides the flexibility to keep you in step with technology advancements.

We provide the hosted software platform, system maintenance and software support and allow you to focus on what you do best.





Benefits of a Hosted Software



- Reduce computer hardware and IT support requirements
- Automatic software updates and upgrades
- Software is accessible anywhere, not just within utility (mobile computers / smart phones / tablets)
- Includes utility and consumer engagement software offerings
- Secure, cloud-based software platform - ISO 27001 and SOC-2 certified for data security

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BEACON – CELLULAR METER READING

- Badger Meter has recently introduced a Cellular Endpoint that sends the readings right to the office, instead of having to drive or walk around town
- The Orion Cellular endpoint is a full-functioning, two-way water endpoint that utilizes existing cellular technology to efficiently and securely deliver meter reading data back to the utility via the reliable cellular network. (Badger uses a cellular aggregator that will allow the connection to multiple cellular networks)
- The Orion Cellular solution will help reduce upfront expenses and minimize reoccurring expenses that come along with gateways, network installations, servers, software, IT support, and up-keep on all the above 'infrastructure'
- The system will include a consumer engagement platform that enables customers to view and understand their usage profile through easy-to-understand web portal or smart-phone app.



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Badger Meter Cellular Strategy

- Advantages of Cellular
 - Leverages existing infrastructure
 - Machine to machine (M2M) data now very cost-effective
 - Ubiquitous coverage, even in rural areas
 - Fast recovery / high uptime
- Aggregator Partners With Major CDMA Network Providers
 - Sprint
 - US Cellular
 - Verizon
 - Additional 60+ Regional Providers
 - With aggregator, switch between carriers is made automatically

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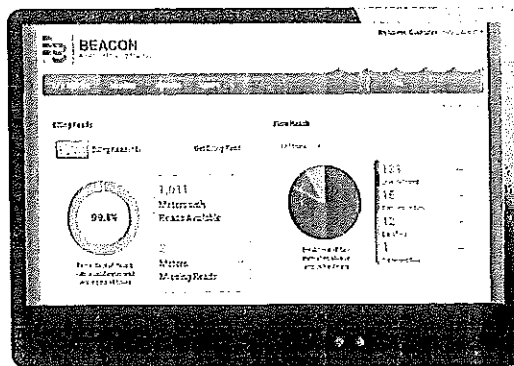
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Solutions Provided In Beacon

- AMA provides automatic proactive notifications and eliminates the need to run a variety of reports to monitor exception conditions
 - Metering-Based Analytics
 - Hourly / Daily Consumption
 - Consumption Percentages
 - Exceptions (Continual Usage Leaks, Cut-Wire Tamper, No Usage, Reverse Flow, Encoder Error, Water Main Leaks) – dependent on encoder capability
 - Inactive Account Usage
 - Asset-Based Analytics
 - Needed Maintenance
 - AMR / Network Issues
 - Notification by System Dashboard, E-mail or SMS



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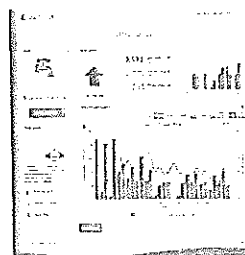
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Consumer Portal – EyeOnWater Product Suite

- Consumer Web Portals
- Consumer Smart Phone / Tablet Apps
 - Allows consumer to:
 - View / analyze detailed usage
 - Setup / receive usage alerts
 - Monitor usage / exceptions remotely
 - Determine / monitor personal conservation
 - Social / gamification affect encourages conservation
- Monthly Consumer Usage Summary Emails
- The customer will be able to log-in to their own account via a secured website anywhere internet is available, or through a smart-phone application
- Smart Phone Apps are the future of customer engagement tools because of their natural connection to peoples everyday lives



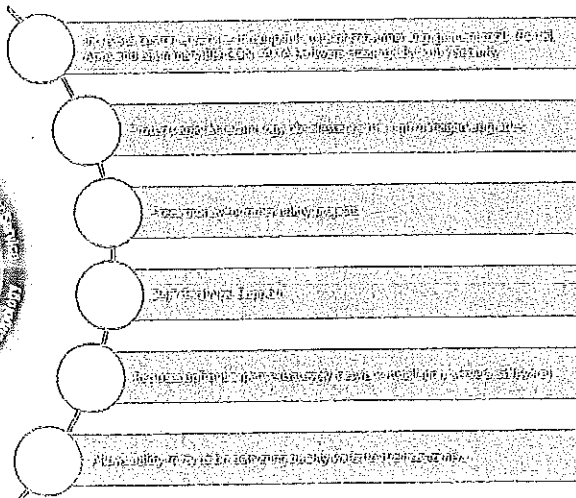
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More Than Just a Read - Managed Services Includes



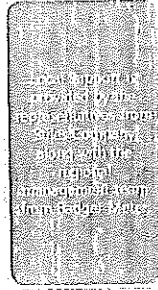


Service & Support

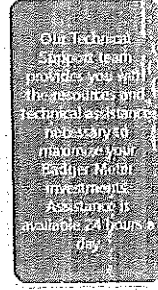
Training Support



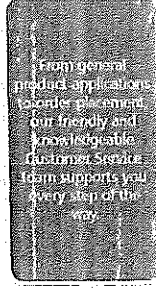
Field Support



Technical Support



Customer Service



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Conclusion & Questions / Answers/ Discussions



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