



Flexible & Affordable Meter Reading Solutions

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Objective & Introductions

Objective

Enable you to make educated product investment decisions by introducing new meter reading equipment that allows mix-and-match technology to fit your specific needs and budget.

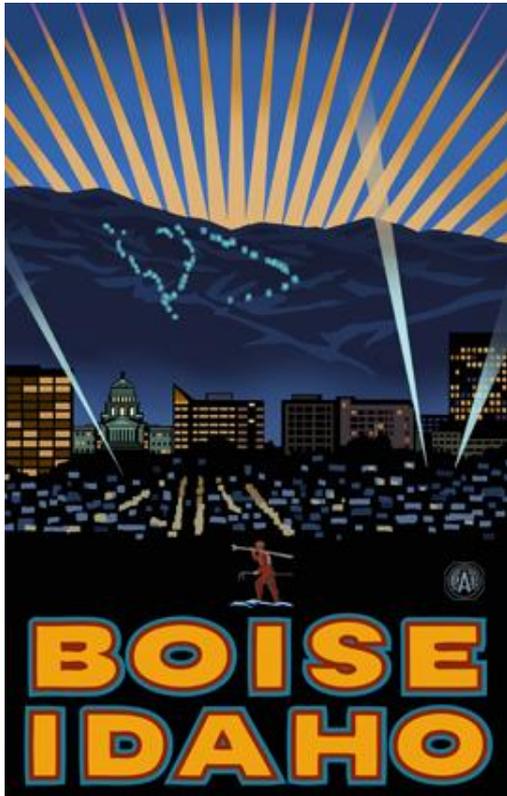


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Agenda



Meter Reading Technology

- Advantages
- Challenges
- New Technologies
- Flexible & Affordable Solutions
- Time Permitting
 - Advanced Metering Analytics





Questions for You



Show of Hands ..

- Reading with Fixed Network?
- Reading with Mobile?
- Reading with Touch?
- Reading Manually?





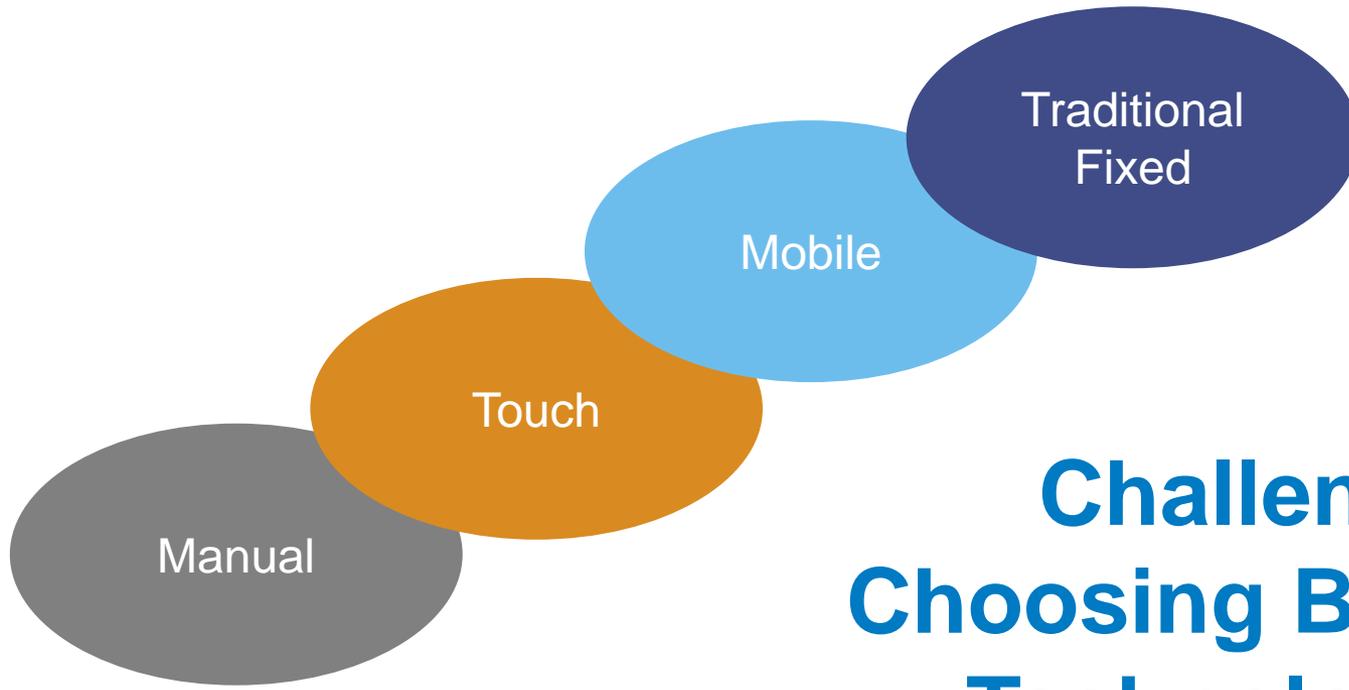
Meter Reading Technology Advantages

Automatic reading systems provides the utility with the tools to **better manage** material and human resources

- Customer service is improved
 - Billing disputes are handled with proof of customer's water use
- Workman's comp claims are reduced
- Man power is repurposed for improved utility management
- Data supports required regulatory reporting and conservation efforts
- Routes are read more efficiently

Northshore reads its meters in **four routes** with approximately 5,000 meters each. Prior to deploying the ORION system, reading time was **70 to 75 man hours per route**. Today, it has **reduced that time to 6 to 9 hours per route** – more than **900 percent faster** and the routes are not yet fully optimized.

“The ORION Fixed Network (SE) system sold us in many ways. A job that used to take three people and **five to seven days** to accomplish, now only takes us one hour from start to finish. With just the push of a button, we get all of our reads in **10 minutes**. Our hills are now read and processed the san

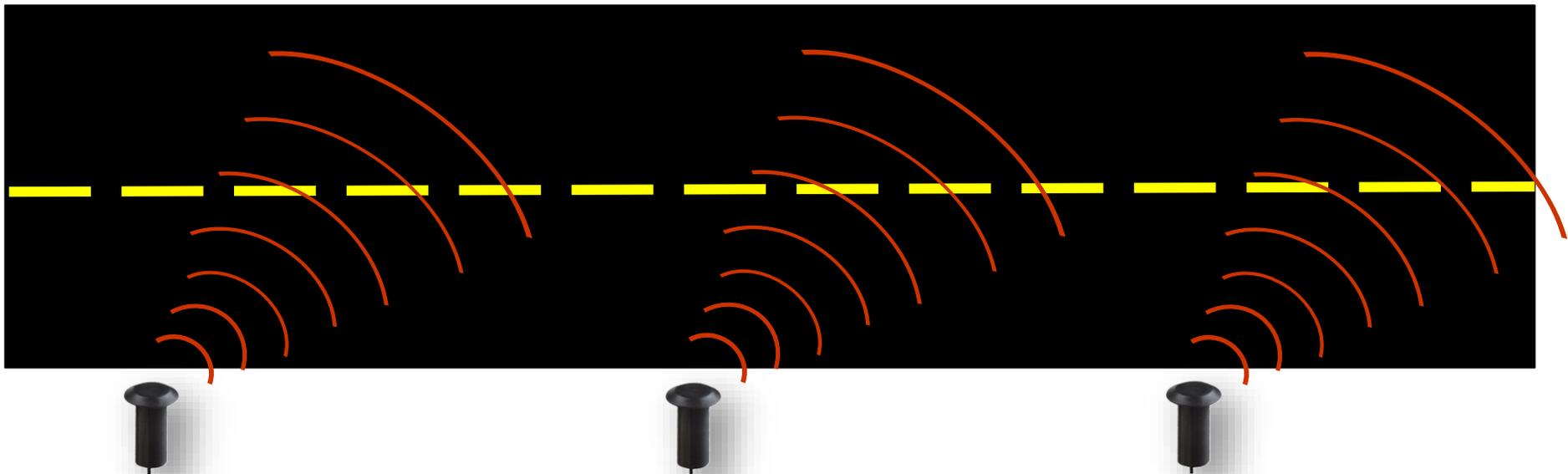


Challenge Choosing Between Technologies



Definition - AMR

- Automatic Meter Reading
 - Drive-By, Walk-By, Mobile Reading Systems
 - Meter is connected to radio via an encoder register and the reading equipment is located in the hands or vehicle of the meter reader.





Definition - AMI

Advanced Metering Infrastructure

- Fixed Network System
- Meter is connected to a radio via an encoder register and the reading equipment is located in fixed geographical locations such as ground storage tanks, buildings, light poles, etc.
- Cellular options are now available



Billing Software



Meter Management Software



Data Collection Hardware



Meter Location Hardware



Computer



Computer



Handheld



Server



Server



Laptop & Receiver



Meter/Encoder & Radio



Hosting



Hosting



Collector

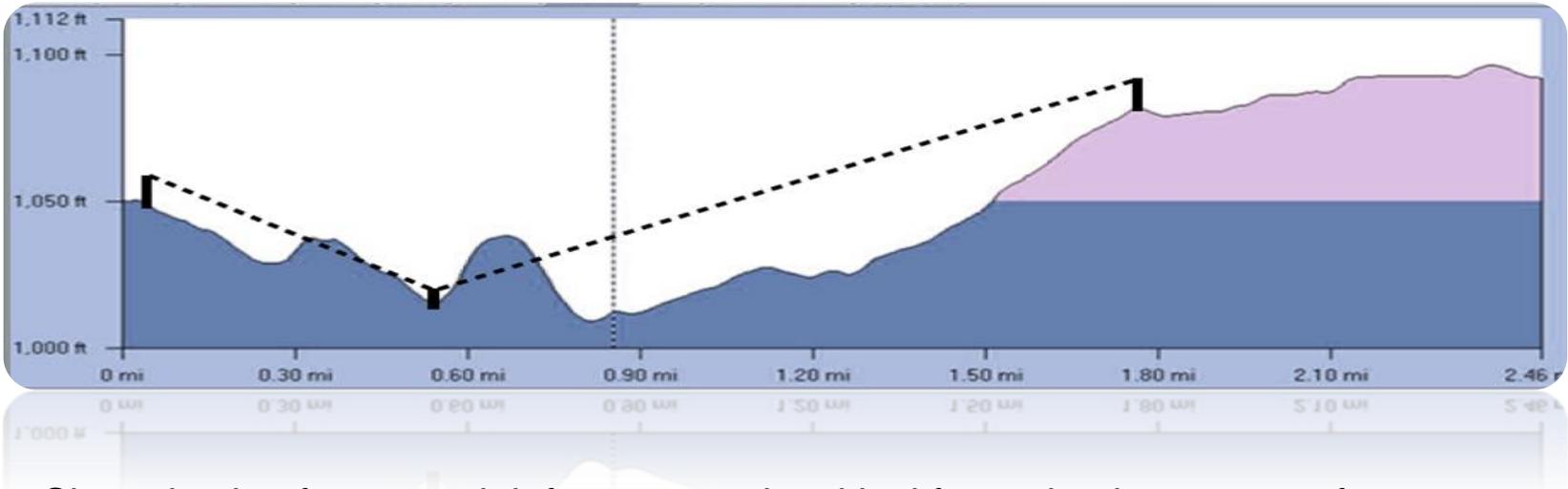
Challenge Geographical Terrain



Every drop counts.



Radio Frequency & Line-of-Site



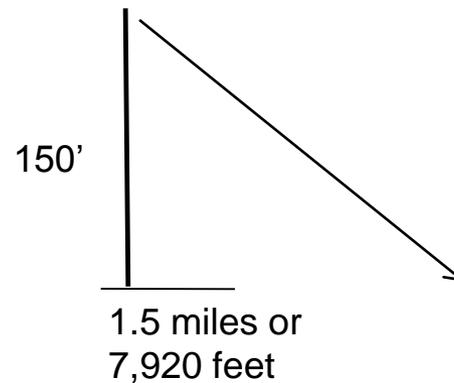
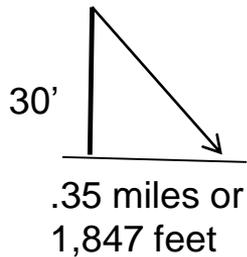
- Site selection for network infrastructure is critical for optimal system performance.
- Radio waves start out at a certain strength and lose their strength due to distance traveled and impediments (buildings or terrain) along the way.
- This is referred to as “Path Loss” or “Attenuation” and is measured in units called a deciBels or dB.
- Output power is typically measured in the unit of *Watts* (“W”) but can also be measured in a unit known as “*dBm*”, or decibels referenced to 1 milliWatt.





Tower Height, Range and Quantity of Collectors

- The higher the gateway is installed, the farther it “sees”, reducing number of collectors that are required to cover the same geographic area



- With the height to reach distances above, to cover a one square mile area, assuming the terrain is relatively level, a system of three or four gateway transceivers at 30' or one gateway at 60' may be deployed





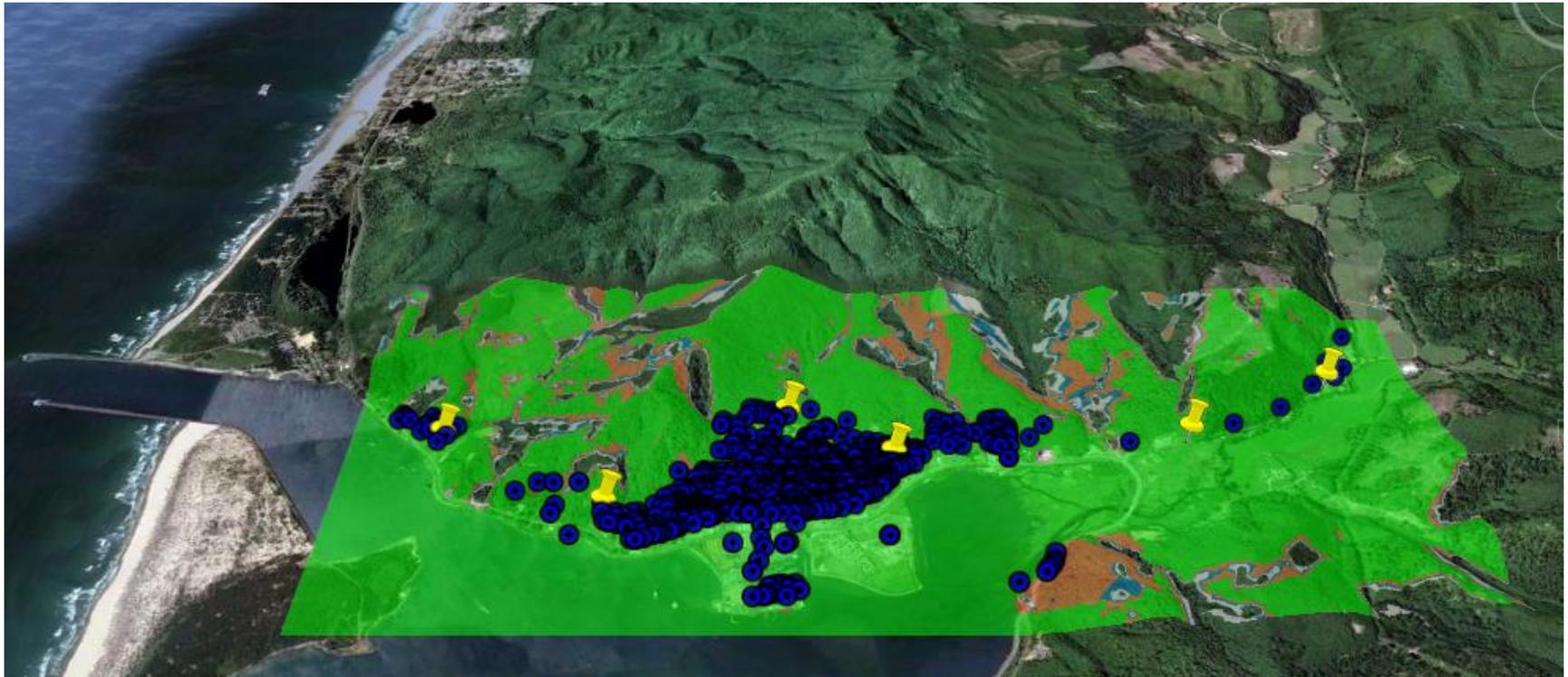
Traditional AMI = Custom Design

- No 2 Cities Are The Same
 - Each must be designed
 - Topography, vegetation, buildings, etc.
 - Engineers work with the utility
- Infrastructure Flexibility
 - Water Towers and Tanks
 - Publicly-owned Buildings
 - Communication Towers
 - Utility Poles
 - Street Lights





Traditional AMI = Custom System



Garibaldi, OR
6 collectors for 400 meters



Challenge High Buy-In Costs

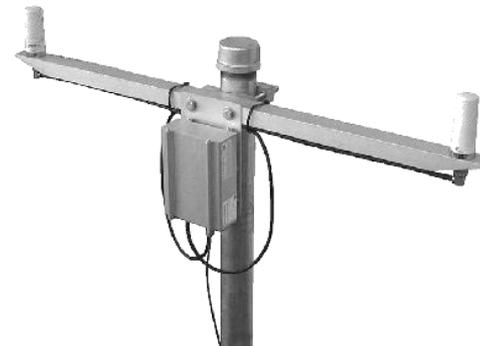


Every drop counts.



Traditional AMR/AMI Costs

- \$ Purchase Collector(s)
 - \$ Installation costs
 - \$ Possible vendor engineering charges
 - \$ Electricity charges or Solar costs
 - \$ Annual vendor backhaul fees
 - \$ Annual vendor maintenance fees
 - \$ Regular replacement
 - \$ Unexpected replacement





Traditional AMR/AMI Costs

\$ Purchase Meter Data Management Software

- \$ Annual vendor maintenance fees
- \$ IT services for back-up and updates
- \$ Possible vendor upgrade charges





Traditional AMI Costs

\$ Purchase Server

- \$ Annual vendor maintenance fees
- \$ IT services for back-up and updates
- \$ Regular Replacement

\$ Purchase Handheld

- \$ Annual vendor maintenance fees
- \$ Regular Replacement



New Technologies



Every drop counts.

Cellular Networks & Hosting



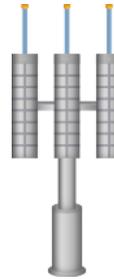
Every drop counts.



Cellular AMA - How It Works



Cellular Endpoint



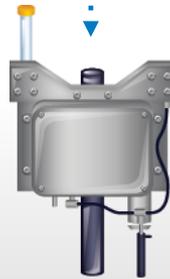
Cellular Network



Secure Hosted Software Suite



Fixed Network Endpoint



Data Collector



Internet



Utility Client Computers

Consumer Portal

Smart Phone

ENDPOINTS

DATA COLLECTION

SYSTEM MANAGEMENT



Infrastructure-Free AMI

Use of cellular communication networks will continue to grow for AMI

Cellular deployment is as easy as a mobile deployment

Universal coverage and regulations make it the right choice

Reliable

Easy

Regulated

Coverage

Utility-oriented business models now support business case

Supports hybrid model for most important meters



Solutions Flexible & Affordable



Every drop counts.



Questions for You



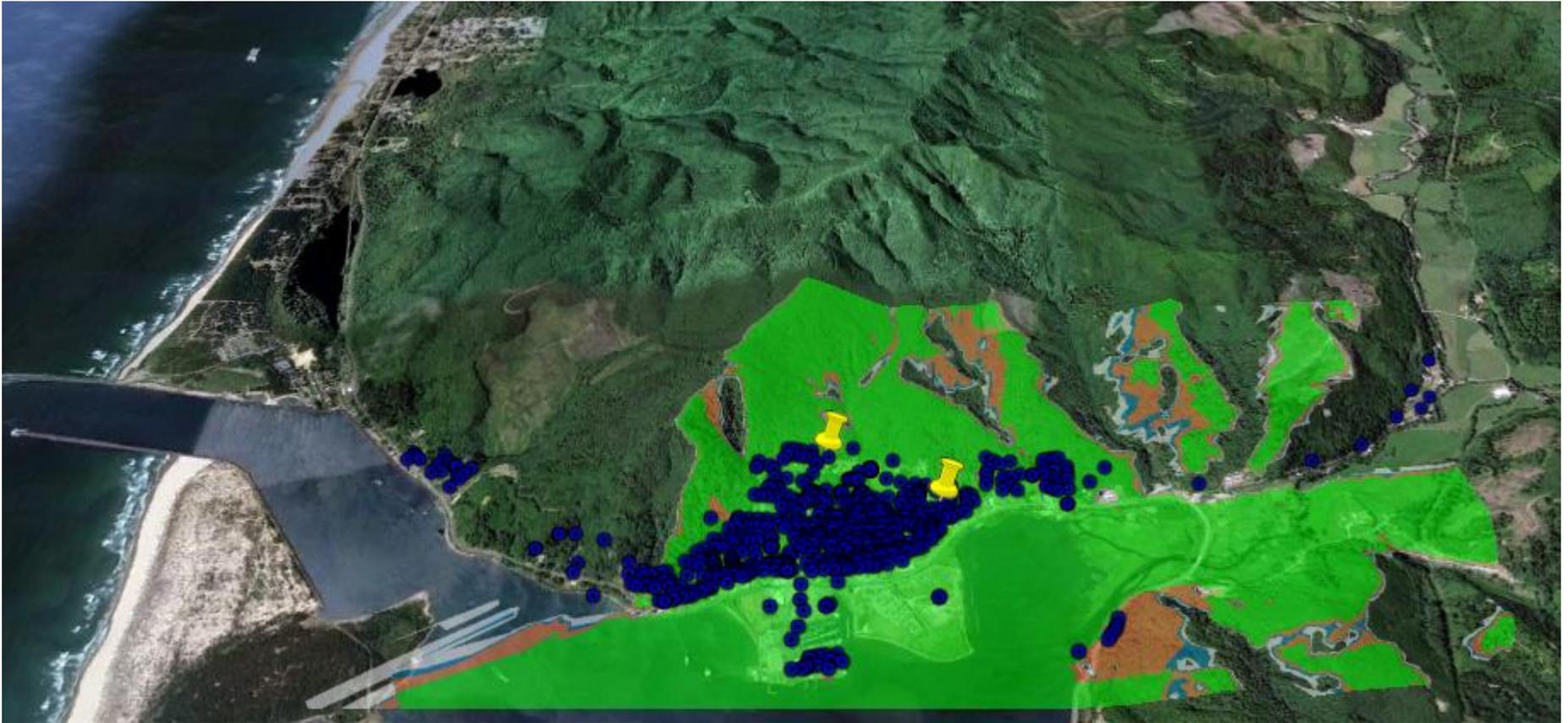
True or False ...

- Cellular systems are more scalable than traditional fixed network
- Hosted software is more scalable than local server based software
- Cellular + Hosted solutions enable flexible mixed-technology solutions





Hybrid Options



Garibaldi, OR
Hybrid: 2 collectors & cellular



High Density Systems



Cellular =
65% Savings

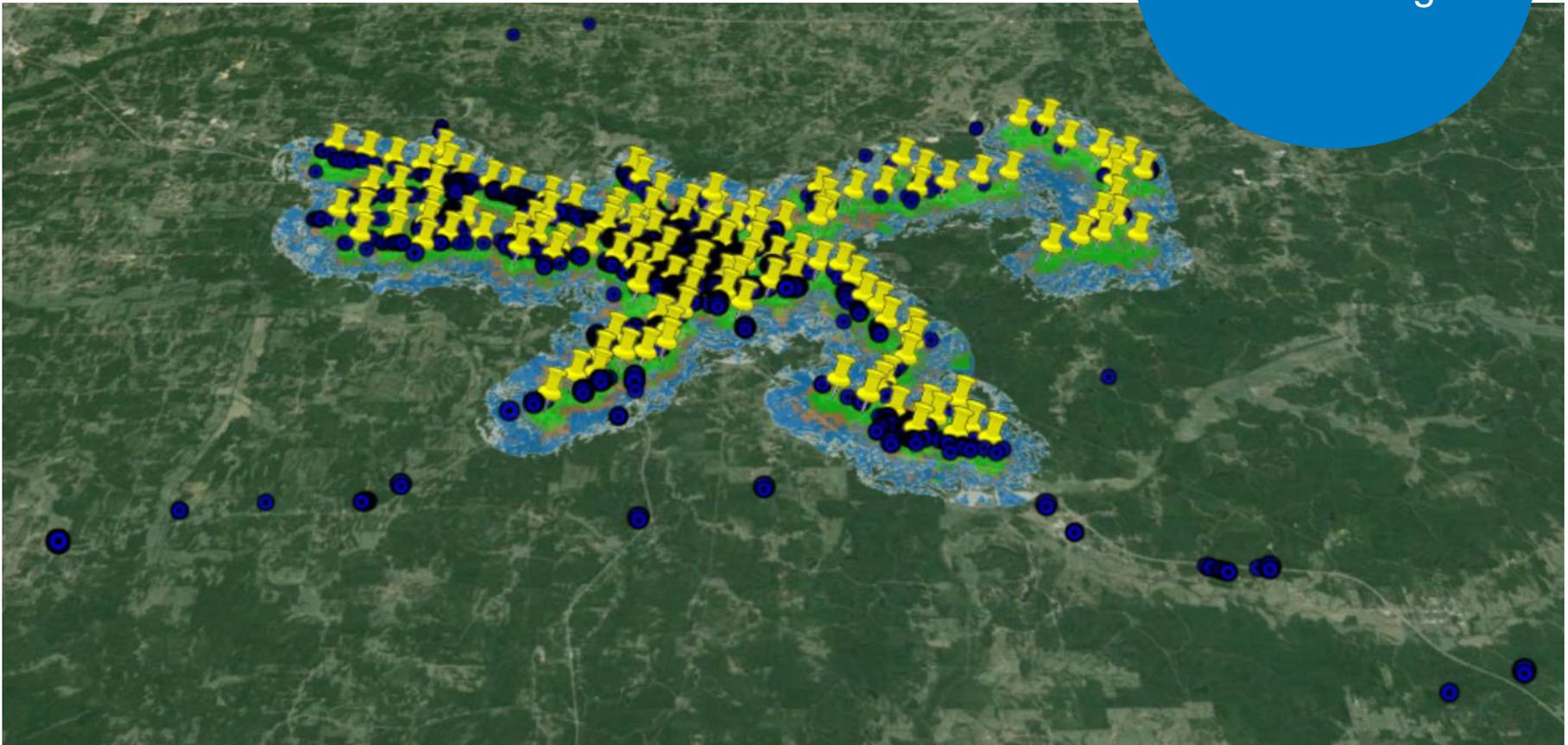
Hanska, MN
1 collector, 200 meters





Low Density Systems

Cellular =
49% Savings

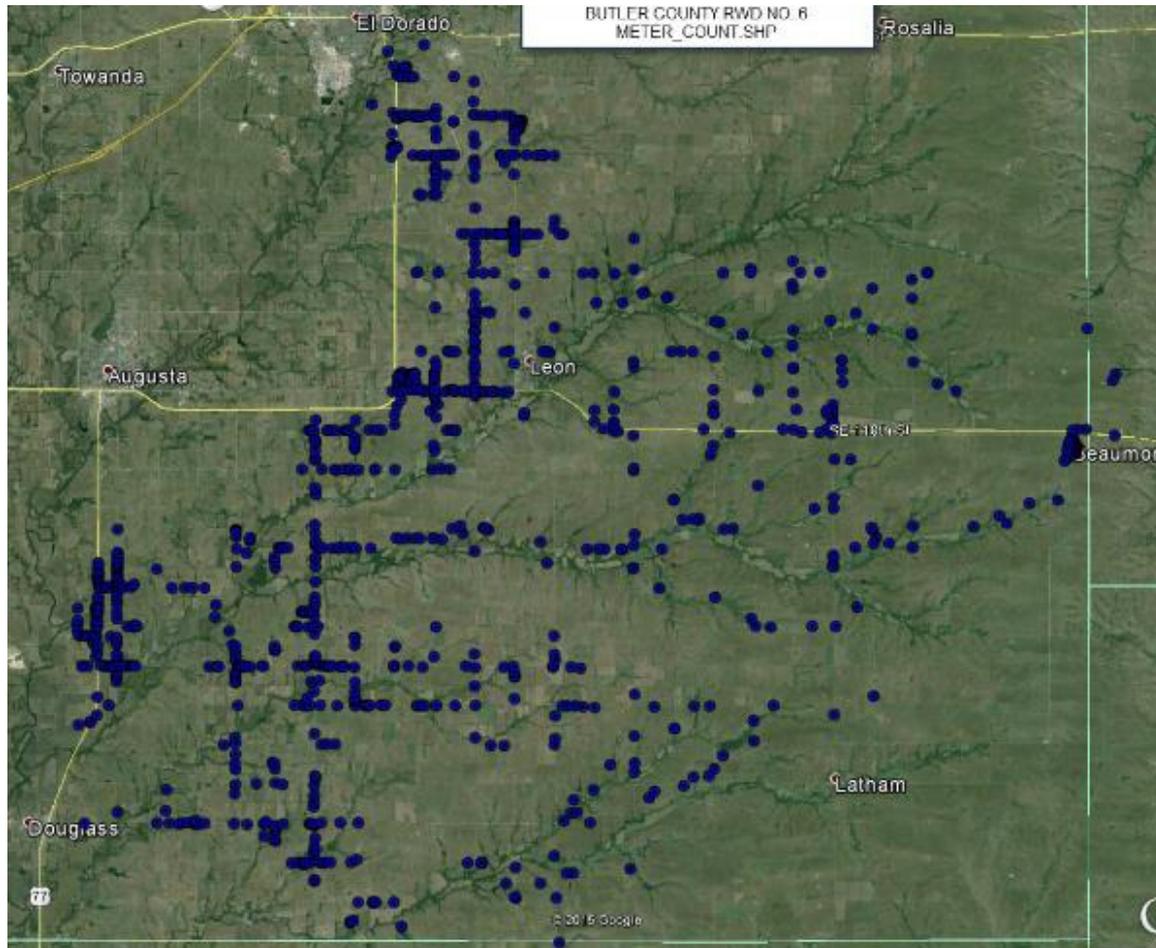


Holly Springs, MS
131 collectors for 6000 meters over 200 square miles
68 collectors for 90%





High “Value” Services



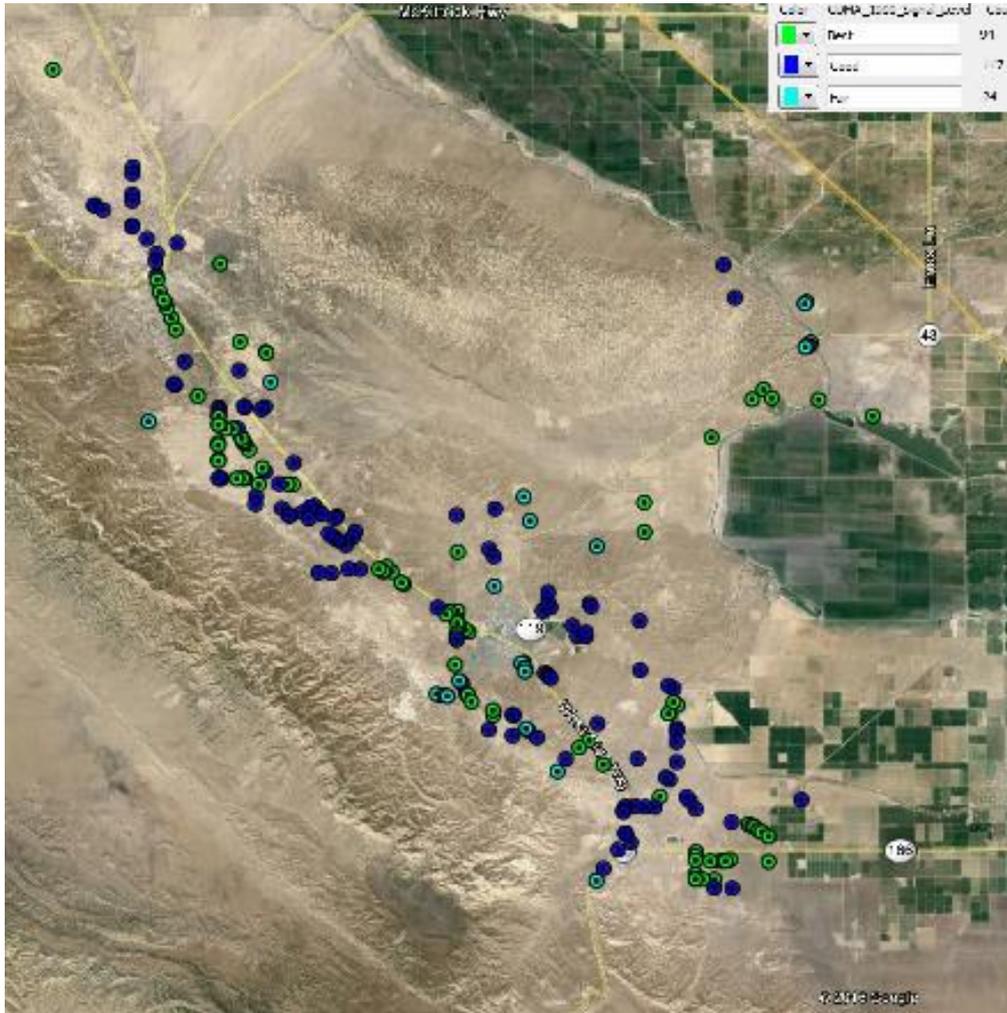
Industrial & Commercial

Butler County, KS
950 Services
600 Square Miles





High “Value” Services



Irrigation

West Kern Water District
500 Services
600 Square Miles



Advanced Metering Analytics (AMA)



Every drop counts.



Increased Visibility

AMA = AMI + Smart Software

**AMR – Automated
Meter Reading**

**AMI – Advanced
Metering
Infrastructure**

**AMA – Advanced
Metering Analytics**

**Mobile Meter
Reading**

**Provides
Efficient
Reading with
Monthly
Billing Data**

**Fixed
Network
Meter
Reading**

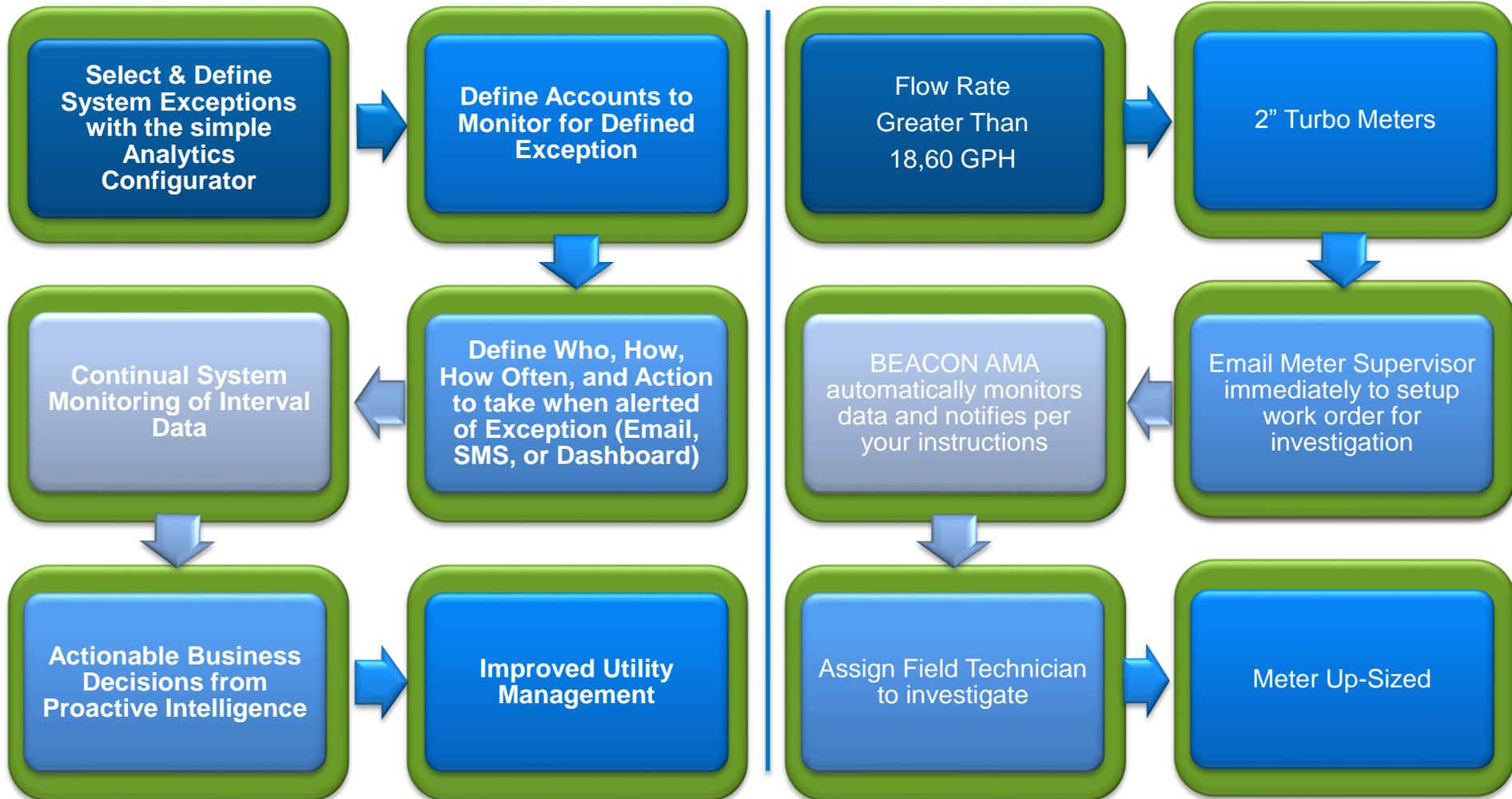
**Provides
Raw Daily or
Hourly Data**

**Fixed
Network with
Powerful
Analytics
Software**

**Provides
Actionable
Proactive
Intelligence**



Providing Advanced Metering Analytics





Resource Management – Proactive System Analytics



- Eliminates the need to run a variety of reports to monitor exception conditions
 - Metering-Based Configurations
 - Hourly / Daily Consumption
 - Consumption Percentages
 - Exceptions (Continual Usage Leaks, Cut-Wire Tamper, No Usage, Reverse Flow, Encoder Error, Water Main Leaks)
 - Inactive Account Usage
 - Notification by System Dashboard, E-mail or SMS





At a Glance

Monitor

Assets

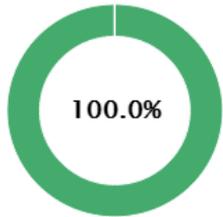
Users



Add / Remove

Endpoint Health

All Meters



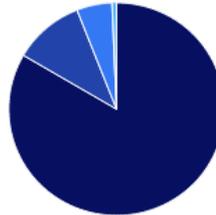
Percentage of endpoints with OK status

✓ **1,013**
Status OK

0
Reporting Issues

Flow Health

All Meters



Breakdown of flow anomalies, click on arrows for details

- 126** →
Leak detected
- 16** →
Continuous flow
- 8** →
Backflow
- 1** →
No recent flow

Gateway Health



Percentage of gateways with OK status

✓ **1**
Status OK

! **1**
Reporting Issues

1 Error →

Top Accounts By Usage (Weekly)

Rank ▲	Account Name	Gallons	Δ Rank
1	I sense Labs Inc	850,000	▲ 2 →
2	Smugkee Co	848,000	- →
3	Jahop Inc	790,000	▲ 2 →
4	Vertbo Labs Co	787,000	▼ 3 →
5	Flobox Inc	760,000	▼ 1 →
6	Ibispac Media Inc	719,000	- →

Making Water Visible





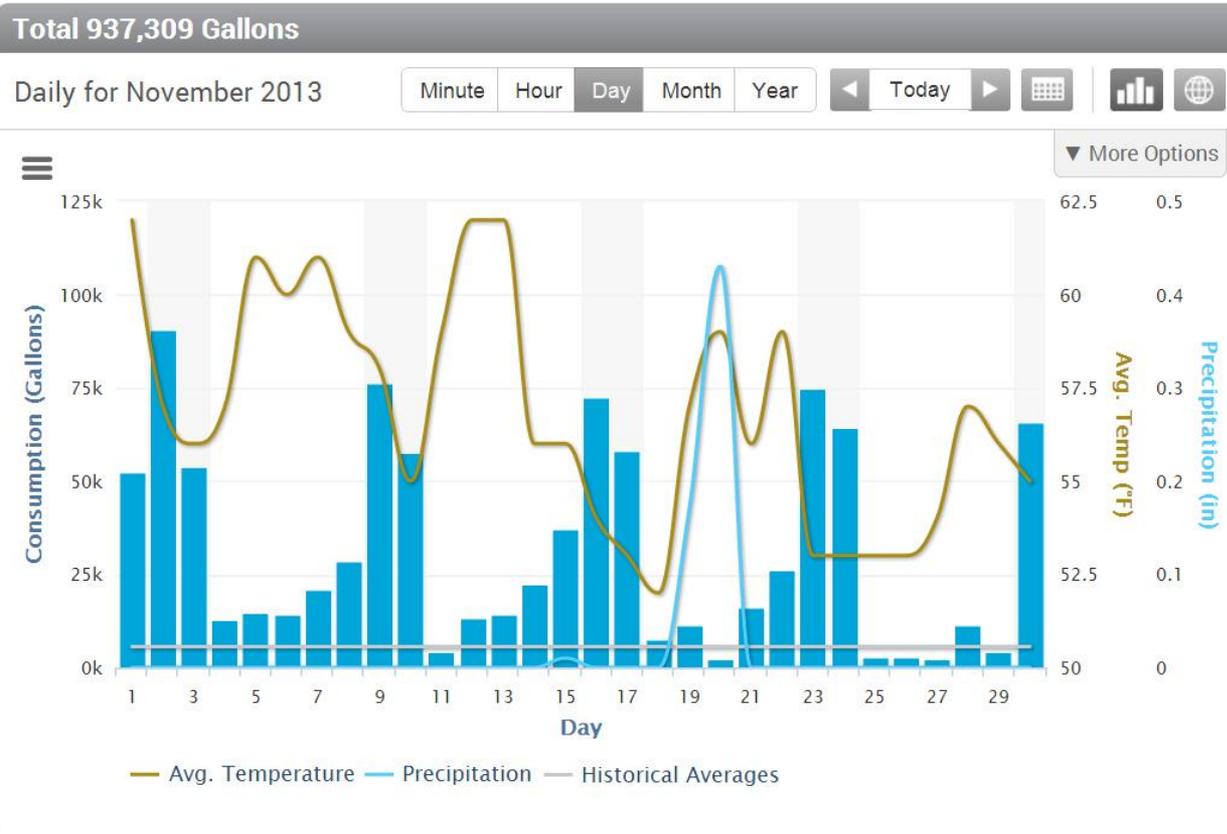
Enhanced Customer Service

- Today, innovative customer engagement is the key to providing a revolutionary customer service experience
- Empowering the consumer to understand and control their own water usage
 - Builds a better relationship with the customer
 - Educates them on ways to take ownership and responsibility of their usage





Billing Dispute Resolution





AMA & Consumer Engagement





Focus on Water Efficiency

Tracking Conservation Program Results





Focus on Water Efficiency



Sprinkler/ Water Day Restriction Enforcement





Questions / Answers / Discussion

- Automating reading has many advantages
- Mobile & Fixed reading systems are comprised of the same basic components
- Fixed reading systems have physical & financial challenges
- Both cellular-based systems and hosted software provides scalability.
- Hybrid systems made up of cellular, traditional AMI and AMR are very popular.
- Advanced Metering Analytics (AMI + smart software) provides proactive management tools.
- Customer engagement tools impact water efficiency,

Thank You!

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