AMI Meter Projects

New Challenges & Changing Technology That Improves Water Reading Performance

OTCO'S ANNUAL WATER WORKSHOP

USG WATER SOLUTIONS

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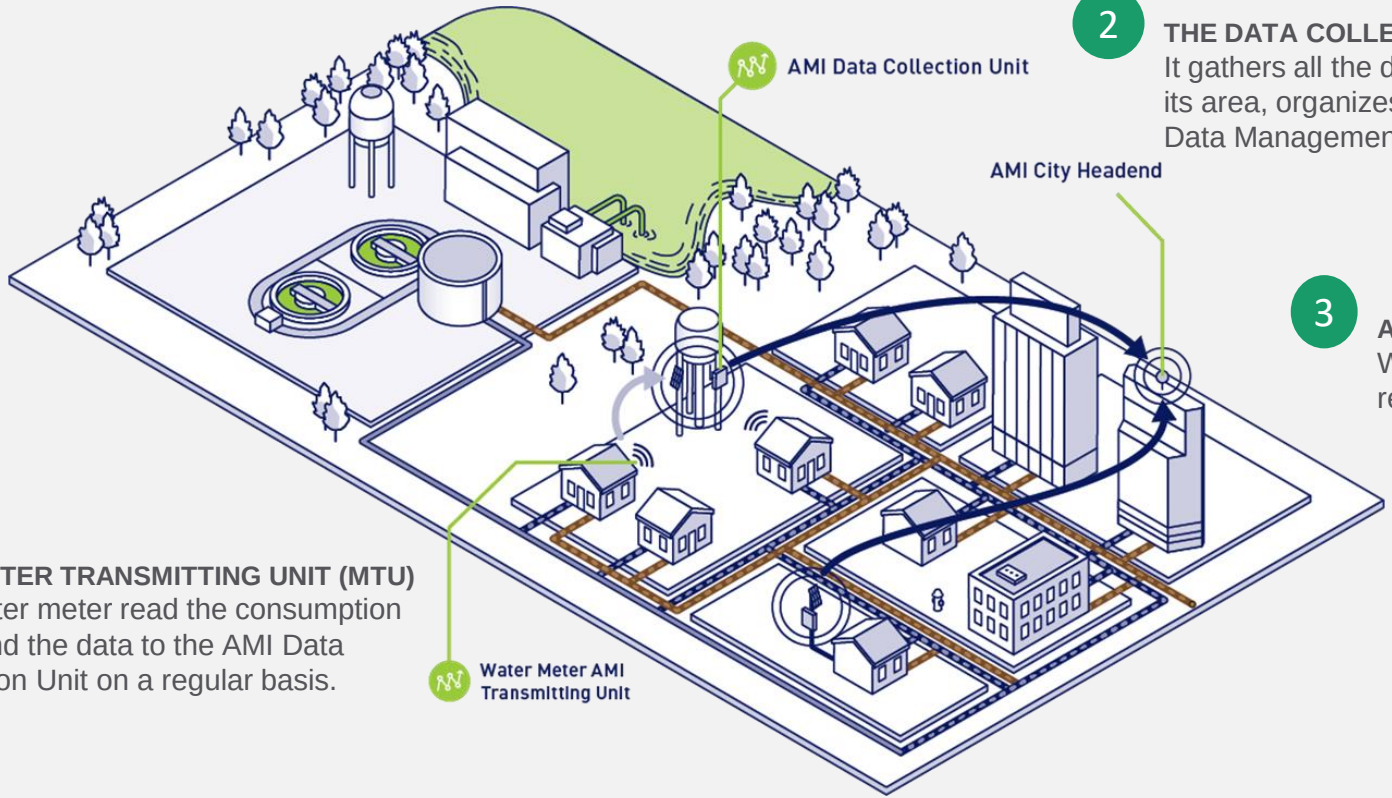
WHAT IS AMI?
A LEAP IN THE DIGITAL ERA



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THE DATA COLLECTION UNIT DCU)
It gathers all the data sent by the meter in its area, organizes it and sends it to the Data Management System.

3

AMI CITY HEADEND
Where the data is received and analyzed.

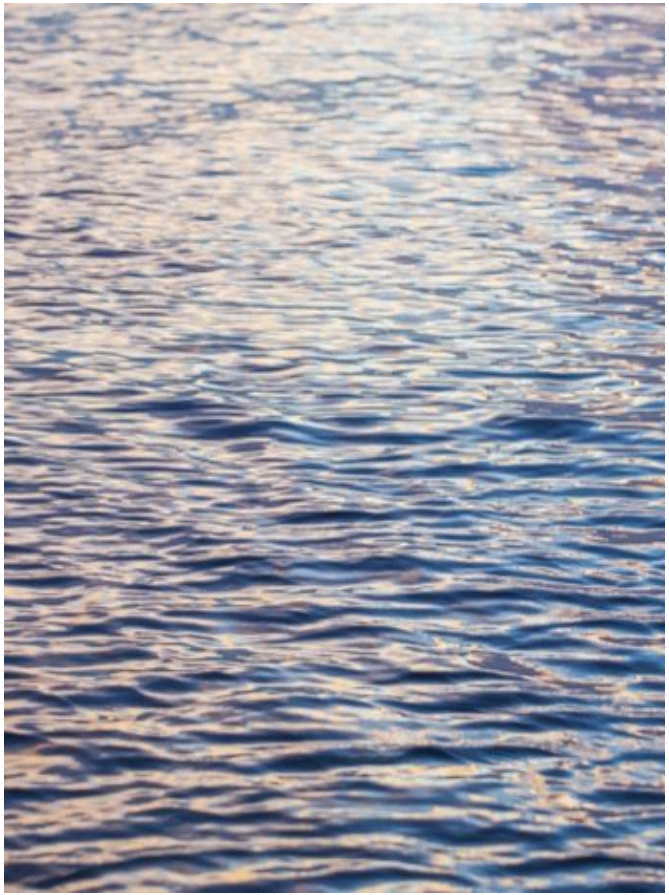
- Water Monitoring
- Billing system
- Customer Service

1

THE METER TRANSMITTING UNIT (MTU)
The water meter read the consumption and send the data to the AMI Data Collection Unit on a regular basis.

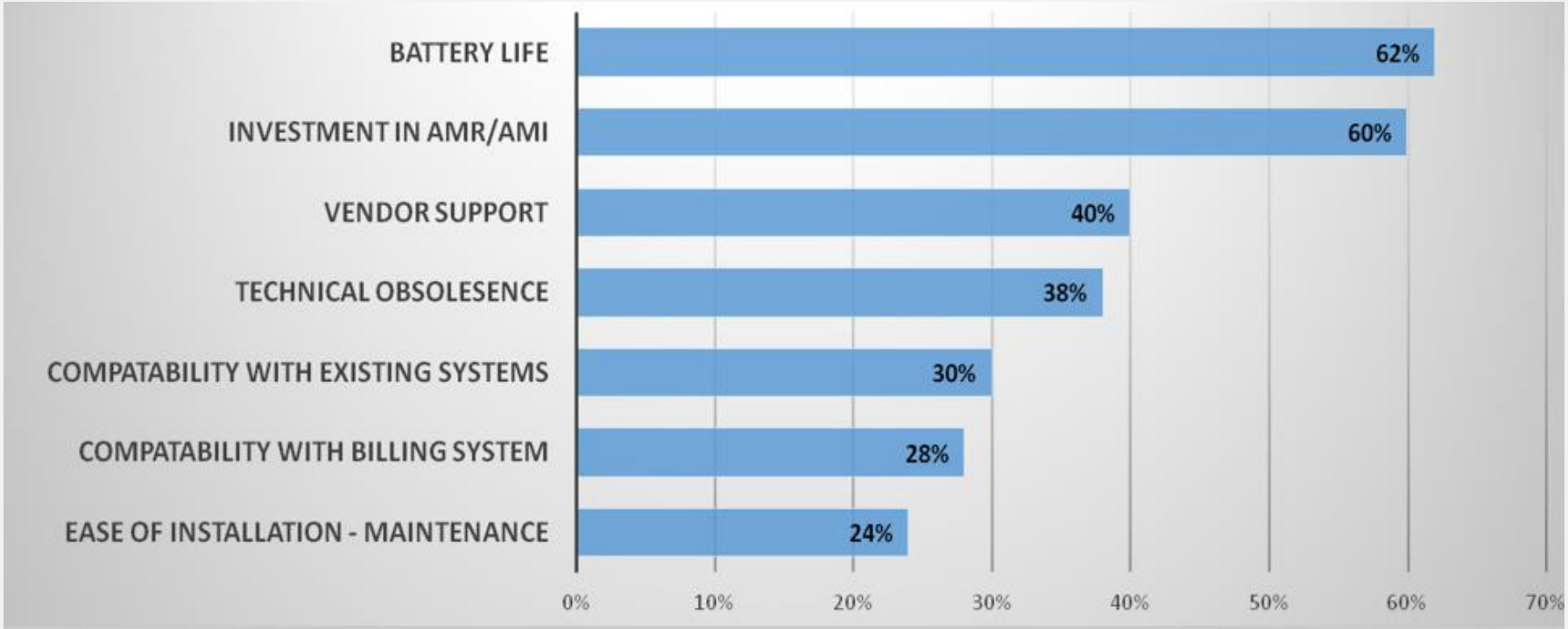
Benefits of AMI

1. More Meter Reads – Minimum 720/meter/month
2. Quicker Leak Detection (customer-side)
3. Accurate Move In/Move Out Reads
4. Customer Service Issue Resolution
5. Water Theft Investigation
6. Reduce Meter Tampering
7. Regulatory Compliance (water loss initiatives)
8. Proactive Alerts
9. Reduction in Bill-Forgiveness
9. Increased Emergency Preparedness
10. Safety Improvements (workers comp/injuries, vehicle accidents)



Top Utility concerns with AMI

Year after year, the same factors top the list – we will discuss many of these concerns.

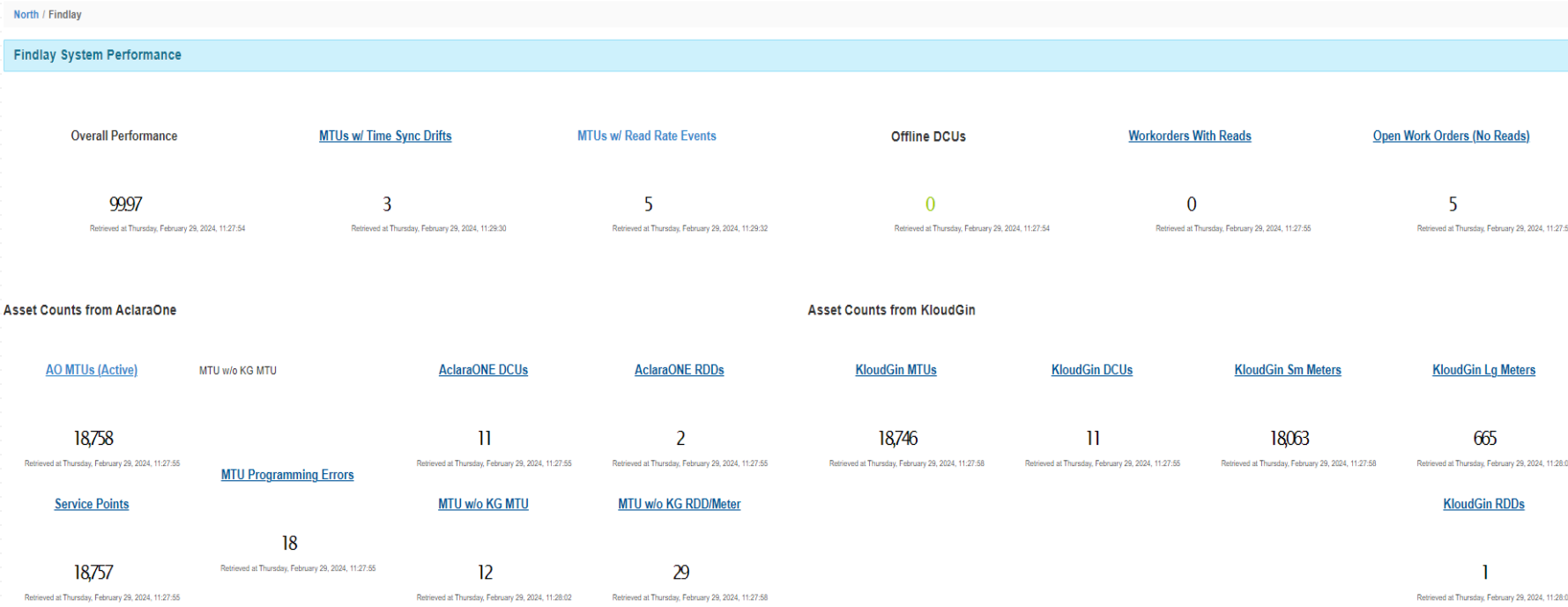


Source: California Energy Commission – PIER (Public Interest Energy Research) 2010 Status and Overview: Smart Meters and Water Agencies

USG's Approach to AMI

- We don't represent any AMI vendor or meter vendor.
- USG evaluates the available AMI technology and provides the one that best fits the specific needs of the utility.
- We also choose the best meters based upon the application: residential, commercial, production.
- We perform a turnkey installation of the complete AMI solution including the meters.
- Through our Visio Center in Atlanta, we monitor, manage, and maintain the complete system for 15 years under our Asset Management Program.

USG's Approach to AMI



USG's Approach to AMI

Surf City Daily AMI Summary

MTU System Performance KPI

System Performance	CRR Events	Active DCU	Active MTU	Open Workorders	Total Accounts	Total DCU	Total MTU
98.31%	81	2.0	4794.0	87	4792	3.0	5369.0

Small Meter Consumption

POSSIBLE Leaks (First Time Continuous Use)

MTU ID	Account Number	Meter Serial Number	Customer Name	City	Address	Event Date	Hourly Usage (gal)
68862317	000001405	70575867	Ratkiewicz, Michael	Surf City	123 SHAE"S LANDING	01/28/2024	5
68861357	000002086	70585221	Mock, Nicole D	Surf City	918 S SHORE DR	01/28/2024	13

POSSIBLE Growing Leaks (Use Growing at 1.5x over 3 Days)

MTU ID	Account Number	Meter Number	Customer Name	City	Address	Event Date	Hourly Usage (gal)
68861006	000002221	70573873	BLACKBEARD"S TRAILER PARK 1	Surf City	610 ROLAND AVE	01/28/2024	98
68861852	000002312	70584594	THE FISHING VILLAGE	Surf City	409 ROLAND AVE	01/28/2024	10
70622268	000003666	70575384	HEATH, CRYSTAL TAYLOR	Surf City	13971 2 HWY 50/210	01/28/2024	16

Continuous Use with Abnormal Use (Reported Severe or Critical Continuous Use and Abnormal Use on the same Day)

MTU ID	Event Date	Abnormal Value (gal)	Continuou Value (gal)	Customer Name	Address	Zip	Meter Size

USG's Approach to AMI

USG WATER SOLUTIONS

Daily Work Orders Summary Report

Findlay

Start: 2024-Feb-12 00:00:00
End: 2024-Feb-13 00:00:00
Run Time: 2024-Feb-29 13:04:57

Open Work Orders With No Readings

Work Order Number	Status	Message	MTU ID	Account Number	Meter Serial Number	Creation DateTime	Address
WO54411	OPEN	No readings for 5.0 days.	71571842	0013868	48572817	2024-02-15 16:52:21	9545 RINGLE RD
WO54584	OPEN	No readings for 5.0 days.	72327196	0006239	43201039	2024-02-24 06:22:31	1730 PARK ST
WO54611	OPEN	No readings for 5.0 days.	68520019	0029811	61221425	2024-02-25 06:33:37	3301 MCLANE DR #2
WO54667	OPEN	No readings for 5.0 days.	68518301	0028863	48810715	2024-02-27 06:24:57	11120 TR 109

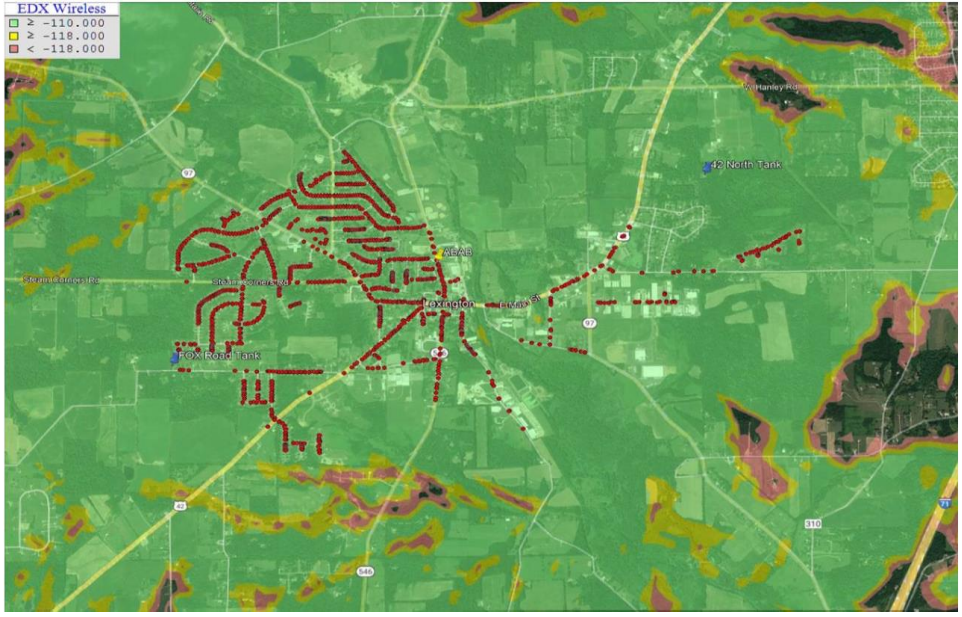
What to consider when looking at AMI

- Can I use any meter I want?
- Can I incorporate leak detection and/or pressure monitoring?
- Is it a true two-way system?
- What is the level of redundancy in the system?
- What is the communication technology to get the read from the meter?
- How high do the antennas need to be for the network?
- Is the radio separate or is it integrated with the meter?
- What kind of encryption and/or data security is there?
- How much data does the endpoint retain?
- How often does the radio ask the meter for a read?

What to consider when looking at AMI

- How often are reads sent from the meter to the software and how many reads are sent?
- What is the meter warranty
- Residential
- Commercial
- What is the transmitter/radio warranty?
- What services are included or required after the system is installed?
- Are there any “smart city” applications available.
- Street Light Control
- Sanitary Sewer Overflow
- Distribution System Leak Detection
- Is it for water only or can I use it for gas and/or electric meters as well?

SELECTION
PROPAGATION STUDY



Lexington, OH Water Full Deployment Propagation Study.		
Extended Range in Pit Endpoints		

Predicted Coverage		
Predicted Redundancy	MTU Coverage %	Overall Coverage %
Single	2.30%	**100.00%**
Double	24.70%	**97.70%**
Triple	73.10%	**73.10%**

DCU Count	
DCU Site Type	DCU Count
Customer Sites	2
Aclara Proposed	1
Total DCUs	**3**

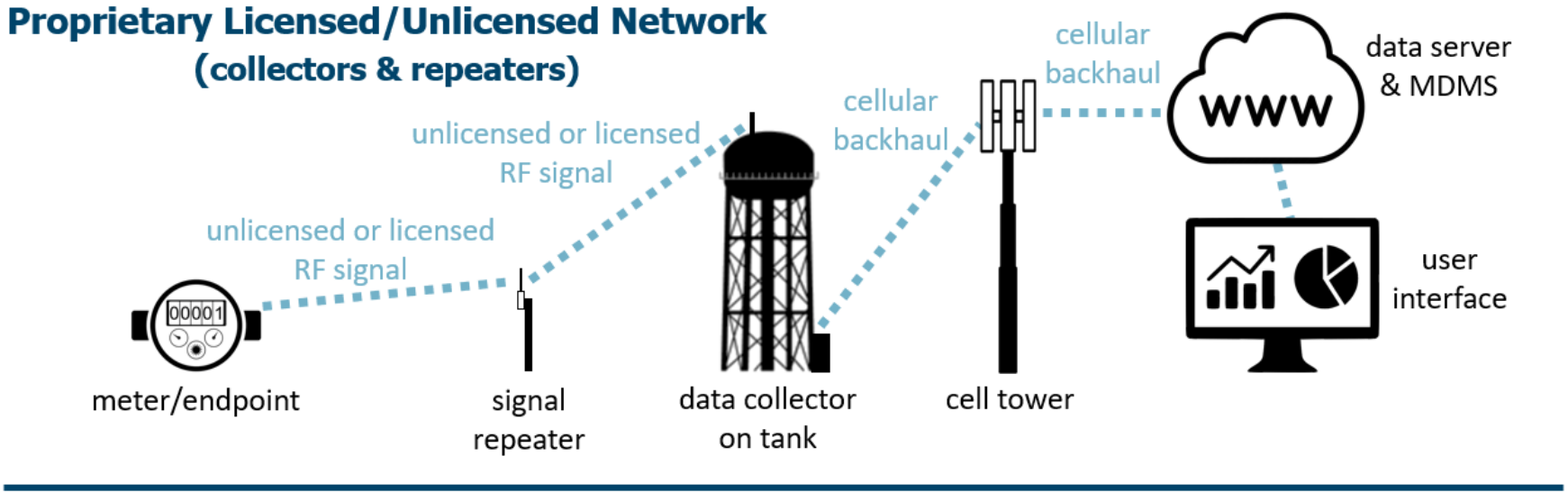
DCU Quantity and Install Type		
DCU Site Type	DCU Count	Antenna Height (ft)
Electric Pole	N/A	N/A
Non-Transmission Pole	N/A	N/A
Roof Mount	N/A	N/A
Tank / Tower	2	32 - 90
Lattice Tower	N/A	N/A
Aclara Proposed Pole	1	30
Total DCUs	**3**	

Customer Data		
Type	Provided Count	Modeled Count*
Meters	1,908	1,874
Customer Assets (Non-Poles)	4	2
Customer Poles	N/A	N/A

Environmental Factors		
Solar Panels Required:		2
Solar Panel Tilt:		55
Area Wind Rating > 120 MPH:		No
Antenna Type:		EM Wave

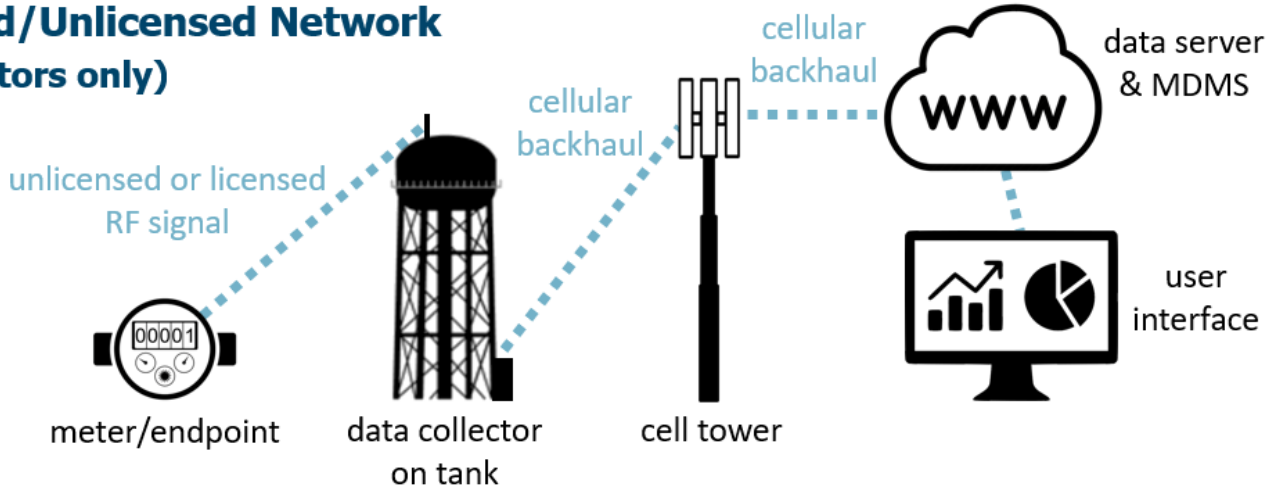
Coverage Territory	
Metric	Value
Total Area (SqMi)	4
Avg. MTU per SqMi	469
Avg. MTU per DCU	625
Highest DCU Elevation	1,430
Lowest DCU Elevation	1,190

What are the communication technologies available



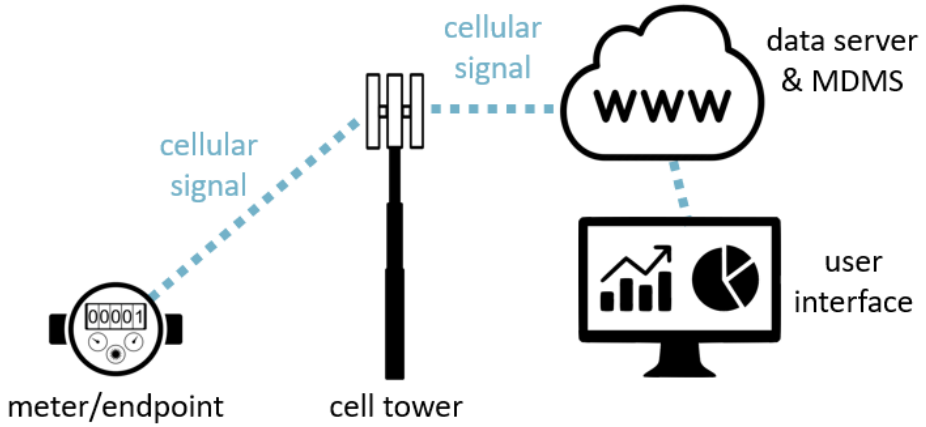
What are the communication technologies available

Proprietary Licensed/Unlicensed Network (collectors only)



What are the communication technologies available

Cellular Network



900MHZ UNLICENSED RF

Benefits:

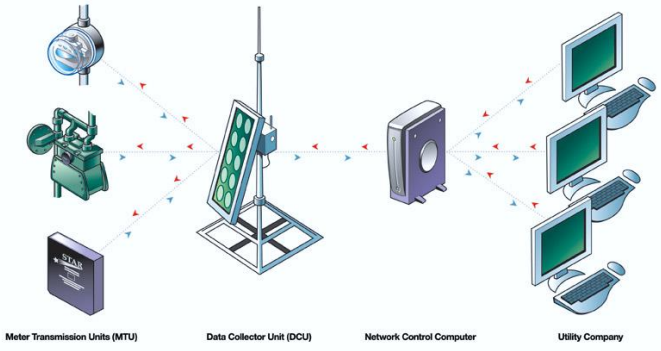
- RF Point to Multi-Point
- Two Way System
- 20 (10/10) Year Battery Life

Challenges:

- Water Only – Limited Smart Township / Smart Utility Roadmap
- Remote Disconnect Devices (Not available)
- SSO, Pressure Monitoring, (Not available)
- Unlicensed Frequency (unsecure) e.g. Amazon Sidewalk
- Through the Lid Antenna (900MHz)
- 75ft preferred Height / Installation & Redundancy
- Limited Meter Compatibility; Product Deliver

*estimate

450MHZ LICENSED RF



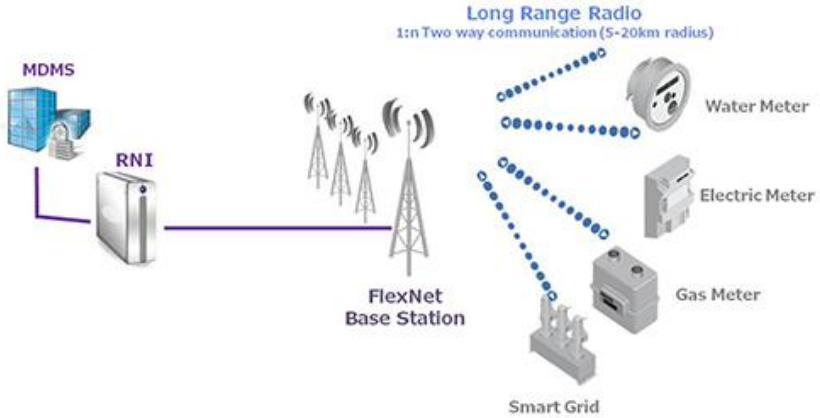
Benefits:

- RF Point to Multipoint
- Collector Based (No repeaters, Cellular or mesh)
- Two Way System
- **Open System**
- **Antenna Height; 30ft**
- **FCC Licensed**, Interference Free Private Spectrum
- Secure Data via AES 256 Encryption
- **Water, Gas and Electric**
- Under the Lid Installation with 20 Year Battery Life
- Leak, Methane, SSO & Pressure Detection, Detector Checks, SCADA
- Remote Shutoff (Up to 2” on any meter)
- Widest Meter Manufacturer Compatibility

Challenges:

- Coverage per Collector
- Topography

900MHZ LICENSED RF SYSTEM



Benefits:

- RF Point to Multipoint
- Powerful Towers (No Repeaters or mesh)
- Secure Data via AES-256 Encryption
- 20 Year Battery Life
- Two Way System
- Water, Gas, Electric
- Leak Detection, Pressure Detection, Remote Shutoff
- Detector Checks, SCADA, Sewer Overflow.

Challenges:

- Frequency leased to Utility, owned by vendor.
- Costly Monopoles/Towers, **80ft Antenna Height**, Installation & Redundancy
- **Property Site Acquisition and/or Property Leases for Monopoles**
- Limited Meter Compatibility, Through the Lid Antenna (900MHz)

* estimate

CELLULAR

Benefits:

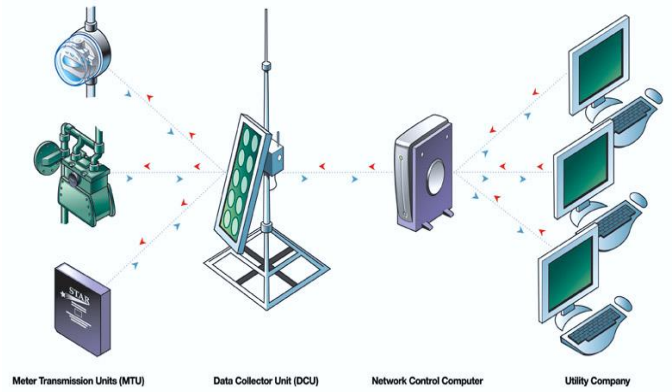
- No Towers, Collectors or Repeaters
- Two Way System
- Cellular Frequency
- Secure Data via AES-256 Encryption
- 20 Year Battery Life
- Remote Valve Control (limited)

Challenges:

- Redundancy
- Water Only. No Smart Utility Roadmap
- **Lack of Cellular Coverage**
- Remote Shutoff – **One size with One manufacturer**
- Cellular - **Technology Obsolescence**
- Per Endpoint / Per Meter/ Month data charges
- Limited Meter Compatibility

Aclara RF

- Licensed 450MHZ RF
- Point to multi-point
- Two-way system
- No repeaters
- Water, gas, and electric
- Radio separate from meter
- Radio warranty 10/10
- Endpoint is dual port capable
- Transmit reads every 6 hours
- Remote disconnect valve capability
- Lots of meter flexibility

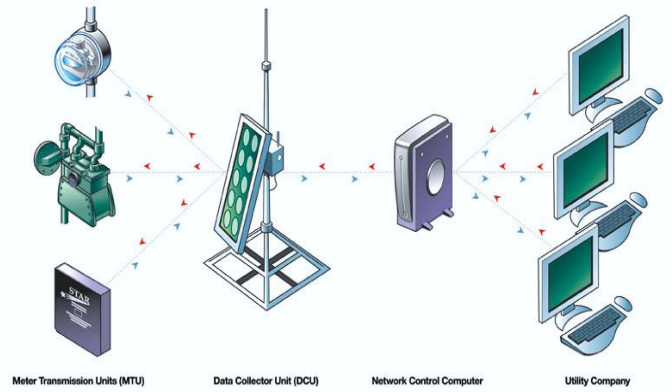


Badger

- LTE – M Cellular
- Water only
- Radio separate from meter
- Radio warranty 10/10
- Endpoint is not dual port capable
- Transmit reads every 6 hours
- Limited Remote disconnect valve capability
- Limited meter flexibility

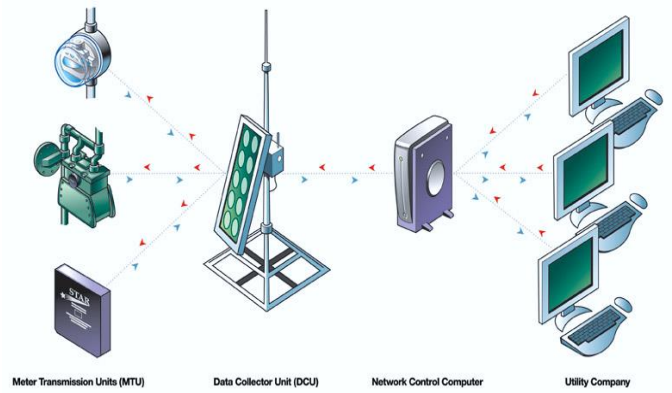
Kamstrup

- Licensed 450MHZ
- Point to multi-point
- Two-way system
- Water only
- Radio integrated with meter
- Radio warranty 10/10
- Transmit reads every 3 hours
- Currently no remote disconnect valve capability
- Must use Kamstrup meters



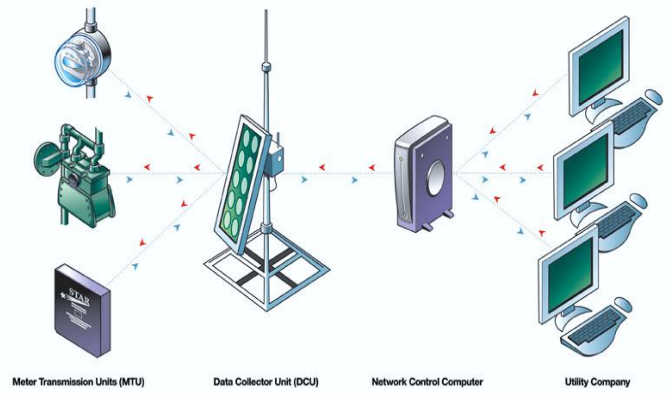
Master Meter

- Licensed 450MHZ
- Point to multi-point
- Two-way system
- Water with some electric capability
- Radio integrated with meter
- Must use Master Meter for meters



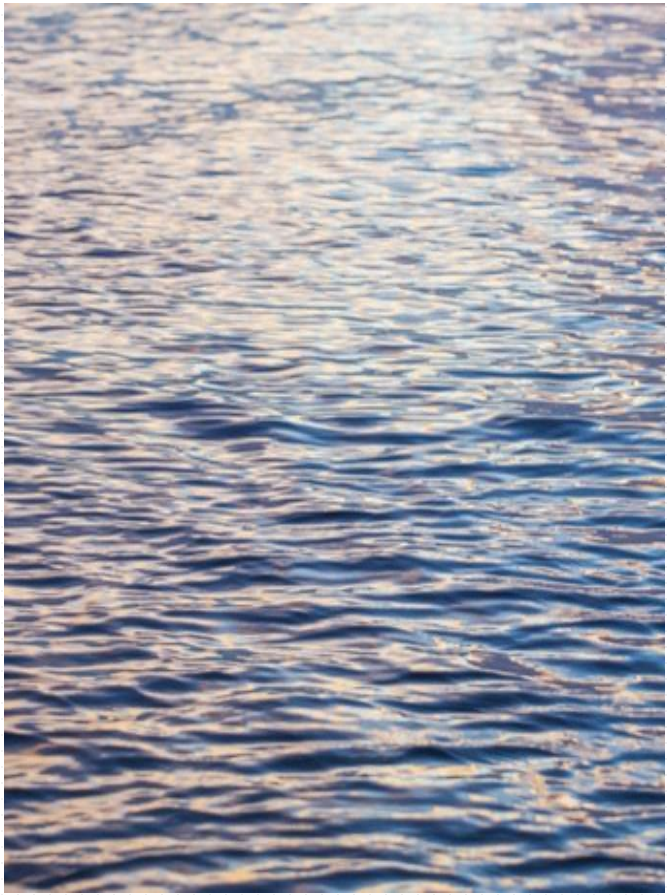
Sensus

- Licensed 900MHZ
- Point to multi-point
- Two-way system
- Water, Electric, and Gas
- Radio separate from meter
- Radio warranty 15/5
- Radio dual port capable
- Some remote disconnect capability
- Limited meter flexibility



Conclusions

- You should fully investigate all aspects of the AMI technologies available.
- Choose the technology that fits best with your particular system and topology.
- Look for maximum flexibility going forward in terms of choice of meters and applications.
- Carefully consider the resources that will be required if you choose to manage the system on your own.
- Make sure that the vendor you choose is responsible for the performance of the system over its lifetime both financially and from a resource standpoint.



Questions?