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SMART CITIES START WITH SMARTER UTILITIES:

# The migration from AMR to AMI





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RANDOLPH WHEATLEY

Vice president for communications,  
solutions marketing  
Sensus

Walking neighborhoods alongside mail carriers, utility meter readers would move from house to house, recording those barely legible numerical values of consumer usage. Along with getting plenty of exercise, these readers would also endure bad weather and the occasional dog bite. But Automatic Meter Reading, or AMR, changed everything.

AMR is a group of technologies used primarily for collecting monthly meter reading data and transferring that information to the utility office for billing and analyzing. Instead of having to walk directly up to the meter, utility personnel need only to walk or drive by using a handheld device that accurately records data.

AMR can gather information when the readers are in close proximity and can collect more data than basic meter reading. However, AMR is a one-way communication, merely gathering information only as often (or as infrequently) as the meter reader walks or drives by. Still, as compared with manual reading, the benefits are unmistakable.

## AMR benefits

- Lowers the cost of meter reading
- Reduces estimated readings, billing errors and disputes
- Enhances employee and customer safety
- Increases cash flow by converting accounts to monthly billing
- Increases customer confidence

Even with all the improvements AMR affords utilities and consumers, another metering technology takes operations and service to an even higher level. Advanced Metering Infrastructure, or AMI, uses a wireless, fixed-base meter-to-infrastructure network. Smart meters record consumption in intervals of an hour or less and communicate that information at least daily back to the utility for monitoring and billing.

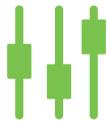
“AMI is ‘one step ahead’ with always-on communication,” explains Randolph Wheatley, vice president for communications, solutions marketing, for Sensus. Information is gathered every day, in regular intervals (for example, every 15 minutes), providing very granular data. Moreover, AMI can send information to meters, such as issuing commands like “turn off” and “turn on.” “With both inbound and outbound communication,” Wheatley says, “the level of visibility is raised for both the utility and the consumer, improving operational efficiency and customer service.”



## Key benefits of AMI



Access to timely data for better-informed decisions



Real-time management of intermittent outages



Fast, reliable remote connect and disconnect



Improved customer satisfaction



Low operational costs

## AMI benefits

- Timely data delivery
- Access to timely data for better-informed decisions
- Real-time management of intermittent outages
- Fast, reliable remote connect and disconnect
- Improved customer satisfaction
- Faster system restoration
- Balance of supply and demand
- Low operational costs
- Management of distributed generation

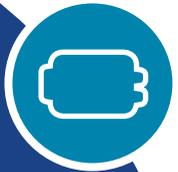
## Why migrate to AMI?

“The greatest benefit of AMI,” explains Wheatley, “can be summed up in one word: timeliness.” The difference between having always-on communication versus periodic (once every month or two) is highly significant—even when you’re just addressing inbound data. “When you receive information in a timely fashion, the utility can respond in a timely fashion,” says Wheatley. For example, the utility can identify a customer’s unusually high usage immediately and then engage that customer to determine the reason. Whether the spike was caused by user operation or by a leak or other problem, communication is proactive. And a potentially negative, or even volatile, situation becomes positive.

Historically, certain communities viewed AMR as the logical final evolution from manual meter reading. The transition requires a small capital expenditure, and utilities realize the efficiencies that seem to suffice for their population and density. If further technology transition is planned for, then there is an accepted sequence of moving from meter reads to AMR to AMI. But, according to Wheatley, this mentality is changing. “Utilities are looking at bigger-picture efficiencies that come with a direct move to AMI, including fewer people on the road, reduced expenses and improved safety,” he says. “When you add up all the avoided costs and numerous benefits, including improved operation and customer satisfaction, there really isn’t a reason not to migrate to AMI.”



**The right devices, software, analytics and smart communication network complete the migration to AMI.**



Devices



Software

Smart  
Communication  
Network



Analytics

## Making the case to migrate

The key to building a business case for AMI is to determine the most seamless and cost-effective transition. "If a utility has AMR, they've already made investments in end points, software and head-end systems that gather information for billing," Wheatley explains. "So these capabilities already are preparing customers for the transition."

Hurdles are constantly being removed to simplify the migration. Once an AMI communication network is in place, the utility can move from walk-by or drive-by reading to base-station mode, immediately realizing cost and efficiency savings. "Customers don't need to change their existing software, given available solutions in the marketplace that allow for simultaneous use of AMR and AMI technology," says Wheatley. In fact, as AMR meter batteries fail, they can be replaced with new technology end points that can still be communicated with by walk-by or drive-by readers. Then the switch to AMI can happen slowly and at the customer's own pace.

The right devices, software and analytics are clearly vital for effective AMI. However, the foundation of the system is having the right smart communication network to make it all come together.

## Choosing the right network

Because AMI affords constant connectivity to request real-time data on demand and issue outbound controls, the communication network must be robust and resilient, without many end points that may interfere with or impede data delivery. Information must also be sent to and from devices and base stations in a manner that doesn't drain battery levels, thus keeping them prepared for crisis mode.

"When it comes to a smart communication network, utilities must first look for key attributes that align with their mandate as utility providers," asserts Wheatley. "They must ensure not only that the network is suitable for reading and controls no matter the weather, but also that it supports operational safety, resilience and technology enhancements."



## Network attributes



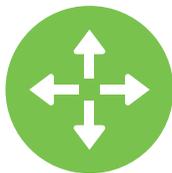
**RESILIENCY:** AMI is needed most during a crisis, so it's imperative that the communication system be robust, reliable and hardened to remain operational when needed most. Key resiliency attributes include:

- Utility-hardened, point-to-multipoint technology
- Minimal infrastructure to support
- Redundant communication paths
- Powerful RF network
- Superior outage and restoration performance
- IPv6-based network architecture
- Reduced latency



**SECURITY:** Data breaches are all too prevalent today—just read the daily news. So a utility's AMI communication network must stand up to the security required to protect data and retain customer trust.

- Private, licensed spectrum
- No shared data
- Elimination of noise and interference from non-utility users



**SCALABILITY:** Utilities investing in AMI are establishing a multi-decade solution, so the communication network must be expandable to accommodate new devices and applications—without compromising performance. A private, licensed network can also scale to be shared with multiple utility providers within a community, thereby reducing capital expenditures as smart technologies are implemented across utility verticals.

- Supports multiple applications
- Metering
- Alarms
- Outage Management
- Demand Response (DR)
- Distribution Automation (DA)
- Robust network architecture
- Prioritized channels and applications
- Reduced latency
- Improved network performance
- Increased application range



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*“The bottom line of today’s AMI technology, as well as everything the future has in store, is empowering utilities to better serve their customers, enrich their communities and sustain our global resources.”*

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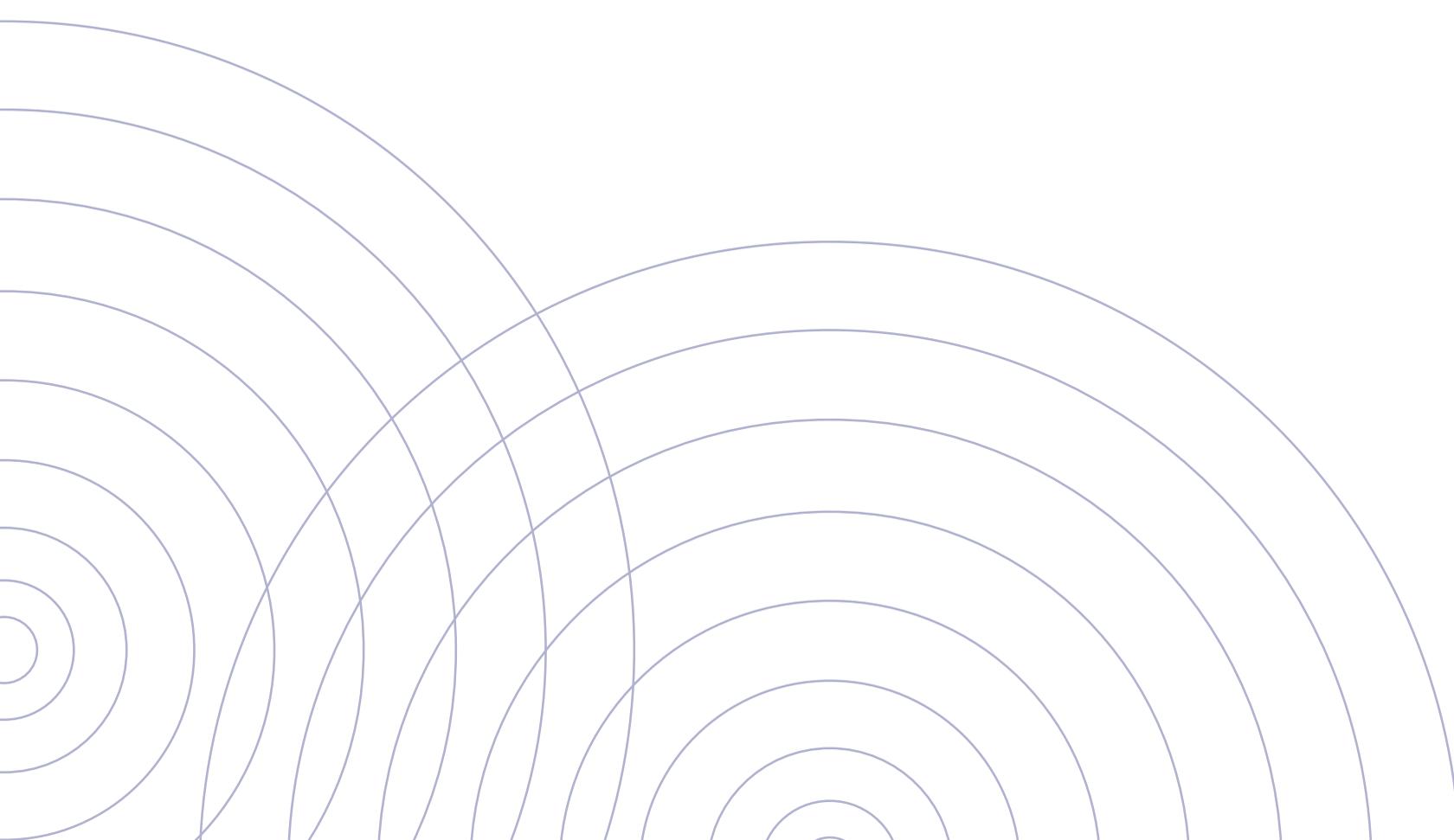
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## What’s next?

AMR did provide technology that changed the face of utility usage metering. But now, that technology is merely limiting the potential of what can be. AMI has established a new norm for today’s capabilities—and tomorrow’s.

“The future of AMI will be a continual situation of adding more and more applications,” Wheatley explains. Once a utility invests in the right communication network to deploy AMI, that utility can maximize value, enhancing the benefits far beyond metering usage. A gas utility can monitor pipe corrosion, a water utility can reduce non-revenue water costs, and the network can enable a power company to implement smart outdoor lighting, just to name a few.

The additional applications and ever-smarter devices will continue to reduce costs, improve operational efficiencies and enhance safety. “The bottom line of today’s AMI technology, as well as everything the future has in store,” Wheatley says, “is empowering utilities to better serve their customers, enrich their communities and sustain our global resources.”





## About Sensus

Sensus, a Xylem brand, helps a wide range of public service providers—from utilities and cities to industrial complexes and campuses—do more with their infrastructure to improve quality of life in their communities. We enable our customers to reach farther through the application of technology and data-driven insights that deliver efficiency and responsiveness. We partner with them to anticipate and respond to evolving business needs with innovation in sensing and communications technologies, data analytics and services. Learn more at [sensus.com](http://sensus.com) and follow us on Facebook, LinkedIn and Twitter through @sensusglobal.

## Sensus by the numbers

