



Whitepaper

Utility Roadmap for Navigating AMI Procurements

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Introduction



Advanced metering infrastructure (AMI) revolutionized the utility industry by replacing manual meter readings, enabling two-way communications, and improving customer service. While AMI was ground-breaking 15 years ago, the technology has evolved to address the challenges of utilities today. Next generation AMI forms the foundation of a new digital future for utilities—a future that enhances the customer experience, delivers operational efficiencies, supports conservation and renewable energy goals, drives advanced analytics, and enables smart city initiatives.

While smart grid experts agree that AMI is the way of the future, it is important to understand that procurement decisions will have far-reaching consequences for the entire enterprise. Deploying AMI will require significant investment and years of effort and will affect every customer and utility business unit for decades. Approaching AMI in a strategic and deliberate manner will ensure that your utility deploys a solution that will serve the needs of your business and your customers.

This Util-Assist whitepaper explores how to navigate the complex choices that utilities will face to procure a first- or second-generation AMI solution that delivers real value backed by a solid business case.

Smart Meters Then and Now

When they were first introduced, smart meters represented a radical departure from traditional electro-mechanical meters. In addition to using wireless networks to collect usage data for billing purposes, smart meters provided utilities with information to help their customers manage their energy consumption and shift usage to off-peak hours. The days of “dumb” meters passively collecting information ended, and in their place “smart” meters formed a foundation for smart grids and smart cities.

The Next Generation

The technology continues to evolve at breakneck speed, and today the next generation of smart meters is changing the game again. AMI represents one of the fastest growth segments of utility spending, and vendors are investing heavily in solution development to meet utility demand. With enriched functionality, the ability to collect significantly more data, and computing power 100 times the power of first-generation AMI meters, next-generation AMI is revolutionizing the customer experience, streamlining operations, unlocking new value through advanced analytics, and setting the stage for smart cities.

The latest smart meters are not just consumption-recording meters—they’re smart sensors that collect data and record events anywhere on the grid network.

Electric meters have the intelligence to sense hundreds of values and conditions in real time and can be programmed to take action, notify the customer or notify the utility. They provide a gateway into the home to deliver services and capabilities behind the meter. On the water side, smart meters and sensors can track pressure, temperature, water quality, water flow, water leaks and more. Gas meters and sensors can also monitor pressure and temperature, as well as corrosion, and send alarms to the utility in the case of tampers, broken pipes and low batteries, or even seismic activity.

Living on the Edge

The most sophisticated metering technology embraces distributed intelligence or “edge computing.” Similar to running apps on your smartphone, embedded apps on meters (at the “edge” of the network) open the door to actionable insights and added network controls. The meters make peer-to-peer decisions and have the processing power to detect theft of power, manage demand response, identify electrical faults and safety issues, and much more. And by shifting the data analytics responsibility from the back office to the meters, utilities avoid bottlenecks with network latency and bandwidth. AMI vendors are now developing powerful ecosystems for their apps, and utilities are beginning to download applications and even build their own applications to meet specific utility requirements.

The AMI Landscape

In 2004, Ontario became the first jurisdiction in North America to mandate a large-scale deployment of smart meters. Since then, the deployment of smart meters has exploded. According to a study released by research firm Berg Insight, the penetration of smart electricity meters in North America reached 68% in 2020 and is expected to reach 84% in the U.S. and 92% in Canada by 2025.

There are many factors driving the growth of smart meter deployments, including advances in smart grid technology, improved operational efficiency, significant growth in distributed energy resources, increased consumer demand for greater choice, regulatory pressure, global attention on climate change, and an intense focus on renewable energies that will enable a less carbon-intensive future. And with water scarcity and aging gas infrastructure, the business case for cross-commodity AMI has strengthened, and gas and water AMI solutions are now gaining traction.

The first implementations of AMI are quickly approaching the end of the technology's 15- to 20-year lifecycle. Utilities in Ontario, for instance, are looking to refresh their solutions, and because the typical timeline from business case to the start of AMI meter deployment is two years, it is critical that early adopters act promptly.



Roadmap to Success: Simple Rules for Complex Decisions

Embarking on an AMI project is an expensive proposition and can be risky if mishandled. As AMI vendors continue to evolve their solutions and utilities look to gain increased benefits, procurement decisions become more complex, with a dizzying array of choices. Util-Assist advises that clients follow some proven best practices to help navigate the most efficient and prudent course of action.

Lay the Groundwork

Utilities with the most positive experience are those that take the time up front to ensure top-to-bottom alignment before embarking on their plans. A successful AMI project is founded on buy-in, not just from the regulatory body and executives, but from business units across the utility. Start by building a compelling business case that defines the rationale for the opportunity, assesses the risks, and outlines a solid financial case that elicits the support of key stakeholders, being careful to take into account all affected systems and business processes.

Be sure to include all operational costs, not just hardware and software, but training, integration, peripheral tools, testing, education and communications, ongoing maintenance, and security audits.

Consider the full range of capabilities and advanced features that could benefit the organization and its customers, and work with the regulatory team to develop a rate impact assessment. In accordance with your utility's capital plan and budget, the business case should outline the deployment strategy and proposed timelines, understanding that a shorter deployment means a faster path to realizing the business case. Keep the business case on hand; it is critical to reconcile back periodically to ensure you're unlocking the full value of the investment.

And don't forget about your front-line staff—the employees that will interact with the new systems, applying new skillsets and taking on different responsibilities. Start the dialogue early and jump-start positive change by presenting an energizing vision of the future. It is important that project sponsors are authentically dedicated and knowledgeable to set the tone and provide leadership. The common denominator for any successful utility automation deployment is a strategic communications and education plan, and your staff need to be on board from the beginning.



Address the Endless Debate

Different utilities will choose different solutions depending upon the utility's requirements, IT environment, smart grid vision, geography, and regulatory situation. But one question is common to every AMI project: is it better to procure best-of-breed solutions or secure all services and solutions from a single vendor? An AMI deployment consists of several elements:

- The AMI system to collect, transmit and store meter data (meters, data collectors, and the head-end system)
- The meter data management (MDM) system to store, analyze, validate, and edit meter data
- Meter installation services to deploy the meters and manage the meter inventory

In most situations, Util-Assist advocates for the right technology and/or services for the right function, positioning utilities to meet all of their requirements as well as capabilities they might not have considered yet. Releasing a single request for proposal (RFP) for the entire solution could constrain your utility.

For this reason, consider issuing separate RFPs for each technology solution, the AMI and the MDM, and issue a third RFP for meter installation services—some AMI vendors offer these services through a preferred partner, but securing the services directly from the installation provider could save you from paying the vendor's premium.

In terms of network installation services, utilities often elect to place that responsibility on the AMI vendor who will generally contract that work out to a third party. However, depending on the utility service territory, availability of internal qualified resources, and other factors, some utilities are taking this task on themselves. Either way, a prudent procurement strategy is to request that the AMI provider bid this service as a separate line item and outline details on the required process and qualifications, providing you with key information to make an informed decision.

Look to the Future

Technology “future proofing” is a core procurement strategy no matter what the industry. Think about purchasing a new laptop computer: if it had to last 15 to 20 years, would you choose a budget laptop or spend the extra money for significantly more processing power and memory to support future capabilities? With meters, you only have one opportunity to procure the hardware—be sure you thoroughly understand the technology, the potential benefits, the vendor's roadmap, and your own future needs.

AMI also sets the foundation for advanced data analytics that can accelerate your digitalization efforts. Use cases run the gamut from gaining better insights in billing, such as flagging high reads, to streamlining operations through load forecasting and better work management, to customer self-serve analytics.

The new competitive battleground will be defined by organizations that can transform raw data into information, knowledge, and intelligence, so it's important to have a strategic plan for your future analytics initiatives.

Reach for the Gold Standard



Utilities have long depended on standards to operate safely within acceptable levels of performance. Standards that ensure safety, security, and interoperability at all levels of the AMI network should be mandatory requirements for any AMI procurement today. Although historically vendors have each used their own proprietary protocols, the market is maturing and the trend is for solutions to adopt industry standards, including the following:

- UL has developed a voluntary safety standard for smart meters (UL-2735) to address consumer concerns about meter safety. Meter manufacturers are migrating to this standard to ensure a culture of safety for utilities.

- Security is an increased risk in today's cyber world, and several organizations are setting standards. The North American Electricity Reliability Corporation (NERC), responsible for the secure and reliable functioning of the electric grid across North America, has developed a series of Critical Infrastructure Protection (CIP) cyber security standards. The NIST Cybersecurity Framework, on the other hand, is a set of guidelines, recommendations and technical specifications that help organizations assess and address cybersecurity risks.
- In terms of interoperability, some vendors are moving to adopt Wi-SUN (protocol) standards. The Wi-SUN Alliance, created to provide interoperability standards for smart utility network communications, consists of more than ninety member companies including utilities, government institutions, product vendors, and software companies.
- Common Information Model (CIM) is another set of standards that enable system integration. Based on the Unified Modeling Language (UML) information model, it provides message/file schemas for information exchanges. It is key that AMI vendors keep pace with standards for information exchanges to downstream systems, such as the customer information system (CIS) and the outage management system (OMS) or advanced distribution management system (ADMS).

Standards like these will continue to evolve, so it's important that your AMI procurement strategy specifies the ability to upgrade software and firmware as standards change over the lifetime of the assets.

Ask and You Shall Receive

Given the complexity of AMI projects, utilities are wise to invest more effort than typical to develop the RFPs: taking the time upfront to develop detailed requirements will eliminate issues down the road. Ensure that stakeholders from all affected departments, including billing, operations, customer service and metering, are included in the requirements development and discovery discussions. Staff should be encouraged to avoid working in “silos” and think about end-to-end business processes and cross-departmental impacts. Understand how new AMI technology will affect existing upstream and downstream operating and business practices, and if changes are anticipated, what change management and/or business re-engineering programs will be required.

In addition to the detailed list of system requirements and specifications finalized during discovery, the technology RFPs should address standard topics such as integration, installation, training, operation, security and ongoing support. Vendors should be asked to state compliancy with security and system acceptance test parameters and complete a resource responsibility matrix.

As a best practice, include service levels in the

RFP for the AMI system so that vendors must agree to your requirements and design the network accordingly, and include warranties and key clauses to get vendor agreement up front, saving time in the contracting process. And to ensure that the technology is receptive to future changes, identify major goals and future milestones of your utility. A detailed pricing functionality matrix captures pricing for identical categories and quantities across vendor responses, simplifying comparisons.

Compare Apples to Apples

When proposals are received, keep bias out of the equation by evaluating vendor submissions on two fronts:

- **Operational strength**, as described by the vendor documentation and evaluated by subject matter experts from within the relevant teams at your utility
- **Pricing**, evaluated separately by a finance team and kept hidden from the eyes of the operational evaluators

RFP responses can be hundreds of pages long, so you'll want to proceed in an organized manner and follow a proven process. Develop a comprehensive evaluation package to track each evaluator's scores and comments—you'll need that to compile the final scores and to address any discrepancies or biases. Top scoring vendors can be invited to deliver technical demonstrations, following your scripts to ensure that all vendors present the same functionality. Visiting reference sites provides an opportunity to hear directly from the vendors' customers on the overall vendor experience and to dive into any solution pain points.

Strike a Good Deal



Because of the complexity of the agreements and statements of work governing the delivery of transformative technology like AMI, contract negotiations can take anywhere from six to twelve months. Vendor contracts tend to be skewed in the vendor's favour, and without a detailed statement of work (SOW) that protects the utility, the utility incurs significant risk to the project lifecycle and return on investment.

If this is your first time negotiating an AMI solution, consider bringing an experienced and knowledgeable party to the table to define vendor service levels, develop detailed specifications and warranties to protect against solution non-conformance, and to ensure pricing is at market value. To mitigate risks to project timelines, develop a liquidated damages schedule and a holdback schedule. A partner that understands the contractual terms to safeguard your business and has the subject matter expertise to capture the requirements in a quality SOW has the

potential to save your utility hundreds of thousands of dollars, improving your rate of return on the investment and reducing your financial and operational risks.

Finally, Be Realistic



Having internal alignment on the business strategy that is driving your AMI investment and following these guidelines will be key contributors to your ultimate success. But be realistic about not trying to do too much at once—procuring AMI in parallel with a CIS procurement, for example, significantly increases the complexity. It's also important to be realistic about what your utility's staff can and can't do on their own—and know when it's time to bring in outside expertise.

Conclusion

AMI represents an investment that can cost tens of millions of dollars and years of effort. If a first wave or second wave of AMI deployment is on your horizon, expect to devote time upfront for this major undertaking to carefully lay out a comprehensive plan that ensures a smooth transition to a technology that will serve your utility well for years to come.

An AMI project involves much more than selecting a vendor and procuring a solution, and this whitepaper represents just the tip of the iceberg. To discuss how Util-Assist can help you navigate a roadmap for procurement and beyond, contact:

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About Util-Assist

Util-Assist's solutions merge technology with strategy to streamline processes, boost productivity, enable data-driven business decisions, and deliver enhanced customer experiences, transforming how utilities operate and deliver value to their customers. Util-Assist has been at the forefront of smart metering since 2005 and has helped over 80 electric, water, and gas providers across North America transition to AMI with enterprise strategies to harness the full potential of smart grid investments. With professional services and managed services for electric water, and gas, utilities rely on Util-Assist to help them drive digital innovation that shapes the utility of the future.