Five Steps to Building the Next Generation Gas Utility

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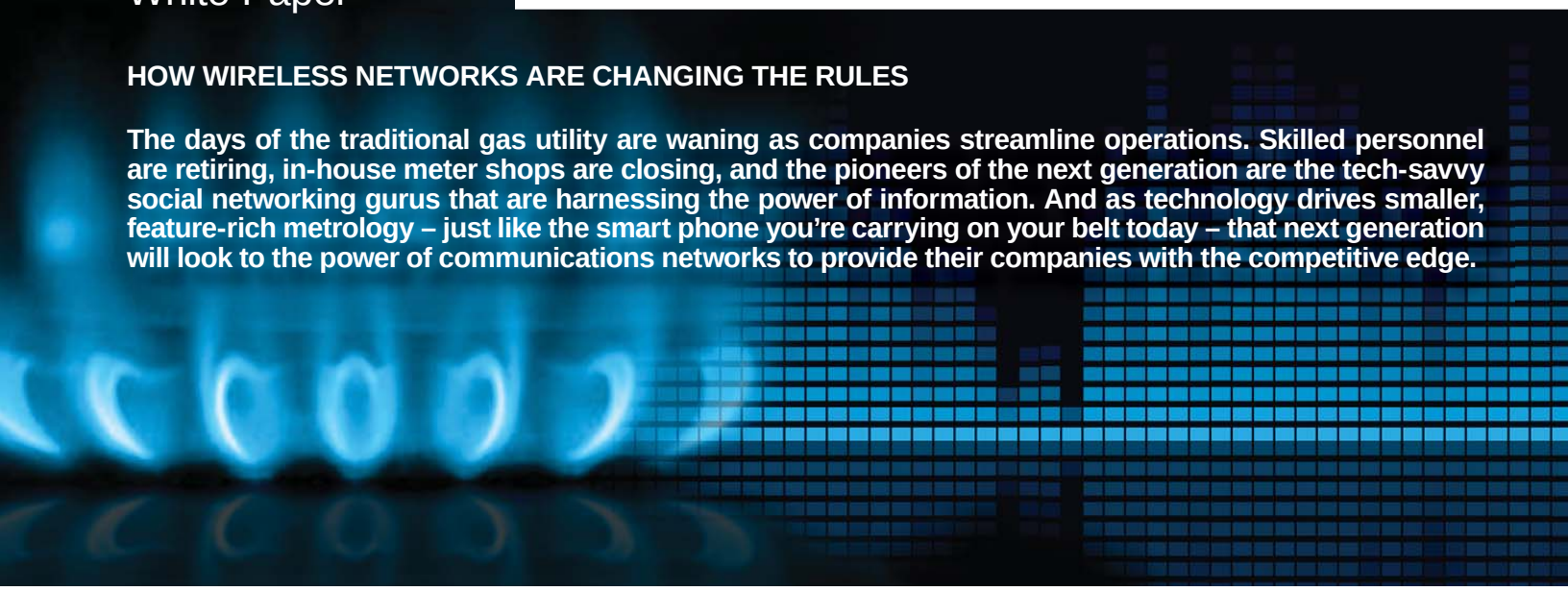
White Paper

HOW WIRELESS NETWORKS ARE CHANGING THE RULES

The days of the traditional gas utility are waning as companies streamline operations. Skilled personnel are retiring, in-house meter shops are closing, and the pioneers of the next generation are the tech-savvy social networking gurus that are harnessing the power of information. And as technology drives smaller, feature-rich metrology – just like the smart phone you're carrying on your belt today – that next generation will look to the power of communications networks to provide their companies with the competitive edge.



The outlook for the natural gas industry is bright as new exploration technologies have dramatically increased the availability of this valuable resource. Natural gas utilities are adapting to maximize this growth opportunity by investing in technology to boost operational efficiency and strengthen relationships with consumers.

Natural gas supplies approximately 25 percent of the energy needs in the United States. Recent advancements in exploration and availability of shale gas, coupled with innovations in techniques that decrease the cost and increase the efficiency of drilling for natural gas are putting the industry in the spotlight. As the nation seeks opportunities to create jobs and reduce emissions, natural gas is poised to play a growing role in the nation's clean energy future. The Department of Energy predicts that 900 of the next 1000 power plants built in the United States will be fueled by natural gas.

The electric and water utility industries have accelerated adoption of advanced metering infrastructure (AMI) technology most often associated with the electric "smart grid." Natural gas utilities have typically relied on walk-by or drive-by automated meter reading (AMR) systems. Today, fixed-base AMI technologies are delivering immense value to natural gas utilities and their customers by automating certain operations and delivering unprecedented business intelligence through two-way communication networks, smart meters and other monitor and control devices.

Industry growth presents challenges in addition to opportunities, particularly as utilities recruit and train a new generation of utility workers. The adoption of new technologies that improve the efficiency and safety of utility operations and transform the relationship between a utility and its customers will attract top tier talent in the coming decades.

This paper examines five critical steps gas utilities should take to build a communications infrastructure that will deliver immediate benefits and provide the foundation for future growth and technology advancements.

STEP 1: BUILD A BUSINESS PLAN FOCUSED ON OPERATIONAL EFFICIENCY

Improving reliability is a key business driver for electric utilities' investments in smart grid technology, and water utilities are primarily focused on conservation. Like electric and water utilities, gas utilities recognize the value of building a business case for AMI technology based on improving operational efficiency.

A smart utility infrastructure relies on two-way communication networks to transfer data from smart meters and other devices to the utility, where it is analyzed by software and utility staff. This data creates many opportunities for natural gas utilities to increase operational efficiency.

A fixed-base AMI system gives utilities the ability to interact with meters remotely, drastically reducing operating expenditures when compared to deploying teams of field personnel on a monthly or bi-monthly basis to read meters or perform other routine, non revenue-generating tasks. These processes require trucks and fuel in addition to staff time that is now freed for other initiatives. The capability to remotely gather final readings alone has saved one utility an estimated 28,000 orders – 7,500 man hours – in a year since AMI system deployment.

AMI systems can also identify issues that require personnel to visit a customer property, but technicians arrive with the background

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information needed to address the customer's concern. Centralized access to detailed data also enables customer service to resolve inquiries over the phone, often on the first call.

Combination electric and natural gas utilities can leverage the investment being made in an electric smart grid by equipping natural gas meters with radio transceivers connected to a shared communications network. The Sensus FlexNet™ two-way communications system can support electric, gas and water utilities on a single network by simply allocating dedicated communication spectrum channels. The FlexNet system is a point-to-multipoint network that communicates via private spectrum, which is powerful enough to reach distributed devices over greater distances with far less radio infrastructure than shared spectrum solutions.

"According to a recent study sponsored by the American Gas Foundation, integrating natural gas in the development of the smart energy grid will lead to cost efficiencies at the retail level and a network that takes advantage of all energy resources."

--American Gas Association

Stand-alone natural gas utilities may also consider adapting this model to create additional revenue streams by partnering with neighboring utilities to lease bandwidth on the FlexNet network, or seek partnership opportunities with nearby utilities that have the capacity within their AMI system.

STEP 2: INVEST IN A ROBUST AND SECURE COMMUNICATIONS NETWORK

A two-way communications network is the backbone of a smart utility infrastructure and serves as the conduit for delivering information between a utility and its customers. Each utility must consider its specific needs and priorities when selecting a network.

A gas utility should seek a system that offers flexibility over the life of the product. Most natural gas utilities currently have legacy walk-by or drive-by systems with limited functionality attached to decades-old meters that may be nearing the end of their lifecycle. An AMI system that can support their walk-by/drive-by meter reading needs today with the ability to transition to a fixed-base meter reading system in the future will ensure their operations will be able to keep pace with changes in their business.

Sensus SmartPoint™ GM transceivers are meter-based radios that allow utilities to migrate from walk-by/drive-by reading capabilities to a fixed-base system. Migration between the communication platforms is supported by a simple, over-the-air reconfiguration of the SmartPoint transceiver.

Installation of a FlexNet network is flexible and affordable. The system transmits at two watts of power – nearly four times broadcast power of public-domain frequencies – allowing a fully functional network to be deployed with a lower infrastructure investment over the life of the system. Utilities serving customers across varied or challenging terrains can therefore better control capital costs while reaping the benefits of a system delivering maximum reliability and performance. The system can affordably scale to support more customers simply by adding more endpoints to the powerful network.

A communications network should be built upon open standards to deliver full benefits and preserve a utility's flexibility to select components from numerous manufacturers. A utility may select meters, smart devices or meter data management software from one or more providers. A communications network must offer an interoperable infrastructure to seamlessly integrate these elements into one smart utility system. An interoperable approach to utility communications also preserves the networks' ability to support future applications.

Adopting a standards-based approach to smart utility systems is a fundamental principle for Sensus, and the industry is now beginning to see future potential beyond just a meter reading. Customers will have the flexibility to realize a return on investment as swiftly as possible through a network that supports complementary technologies to meet the individual needs and preferences of each utility.

The open nature of two-way communications networks may create the same security vulnerabilities that have faced the Internet and enterprise networks and is a prudent concern. It is critical that utilities select a communications network with measures that can protect continuity of service and customer data. Consumers, regulators and utility officials are all closely monitoring the security of smart utility networks to ensure operational and privacy concerns are safeguarded.

The FlexNet network utilizes FCC-licensed spectrum and was built using a multi-layered approach to security with robust encryption tools. Sensus has verified the security of its network through a series of third-party security certification processes and in early 2011 became the first AMI vendor to achieve both Achilles Communication and Practices certification for overall cyber security through industrial testing and certification firm Wurldtech Security Technologies.

Recognizing that security is a moving target, Sensus continues to identify further opportunities to enhance its network security capabilities. In July 2011 Sensus began a program to incorporate IBM software into the FlexNet system to centralize and automate the encryption key management process for all network deployments.

STEP 3: CONNECT ADVANCED MONITOR AND CONTROL DEVICES TO THE NETWORK

The communications network provides the infrastructure that allows a utility to accommodate existing and emerging devices that will enhance the delivery of service and data. Solid state metering, with integrated sensors and monitoring features, has already helped advance natural gas metering, and will continue to play a central role in facilitating a smart utility infrastructure. However as solid state technology displaces mechanical metrology – like smart phones and tablet computers have done to their respective industries – gas utilities

will discover the significant benefits of advanced integral features versus the basic reading that today's mechanical meter provides.

Solid state meters such as the Sensus Sonix commercial and industrial meters represent the first significant advancement in gas metering technology since the mechanical diaphragm meter. Within its compact envelope, the Sonix contains integral pressure and temperature correction and monitoring capabilities that otherwise would require additional equipment, space – and significant investment.

Each year, gas utilities dispatch thousands of orders to shut off residential service for safety, move-outs or lack of payment. If service personnel can't access the meter, an additional trip is required, further increasing operational costs. By connecting a natural gas meter to a smart utility network with a two-way radio transceiver and the Sensus Remote Gas Shutoff (RGS) device, utilities can safely discontinue service on the first call from a walk-by or fixed-base system. Remote access also helps protect utility staff and reduce the potential for on-the-job injuries, such as protective pets – one of the top liabilities utility workers face every day.

One gas utility in the midwestern United States schedules more than 50,000 shut-offs per year – 20,000 of which are indoor installations.

Another gas utility averages 60,000 disconnects annually that cost the company $42 million in operations & maintenance expense.

– Sensus customer data

Beyond a simple shut off valve, the RGS device provides accurate pressure readings from individual meter sets, enabling a utility to view service line conditions without having to take the meter down and set a pressure gauge. For added safety, utilities may program alarms to automatically shut off service if predetermined thresholds are reached, for example if high or low pressure was indicated or rising temperatures, which might indicate a fire. The RGS device also includes tilt and tamper detection alarms to prevent theft and the on-board data log captures time-stamped information for complete incident chronology. The device can be programmed to automatically shut down if vibration, such as seismic activity, is detected, with real-time notification to the utility. In the future, the RGS device may be connected to in-home carbon monoxide or natural gas detectors for added in-home safety and customer peace-of-mind.

In the near future, solid state meters will continue to integrate communication and applications that are available today as add-on options through devices such as the RGS or SmartPoint transceiver. Meters with integral communications, gas connect and disconnect, distribution pressure monitoring, gas leak detection, internal meter intelligence and alarm capabilities will all play a significant role in improving efficiency and safety for the utility and its customers.

Looking ahead, utilities may be able to integrate an AMI network with cathodic protection (CP) monitoring systems. Since the AMI system is built to receive input data from a source, a system application could be used to collect voltage information from CP monitoring systems for centralized control and increased system integrity. Corrosion costs are an estimated at $276 billion in the United States and $2.2 trillion worldwide.

STEP 4: COLLECT DATA THAT PROVIDES ACTIONABLE INTELLIGENCE

A smart utility infrastructure will provide gas utilities with far more data than ever before, offering opportunities for unprecedented business insights. From increased meter read frequency to monitor and control data throughout the distribution system, this intelligence is driving greater efficiency, customer service and safety.

Residential meters are typically read monthly or bi-monthly. Accounts read bi-monthly were often billed based on estimated usage in the off-reading month, creating the opportunity for human error to impact billing accuracy. This drives increased call volume and decreased satisfaction. After an AMI system is installed, a utility will have access to hourly meter reads, offering an extraordinary level of data integrity and detail to the utility. Solid state metering could provide consumption data in even more granular detail.

For example, a Sensus utility customer is currently gathering hourly meter reads from their AMI system and posting them to the customer information system (CIS) daily. The utility is experiencing a daily read success rate of more than 99.5 percent. Hourly reads provide data that is valuable for identifying outlier conditions such as usage spikes and improving the flow of information for a variety of back office functions, such as audit and billing.

Different utility departments will use this data for diverse purposes. Operations staff may gain insights into how to allocate resources based on a better understanding of system performance; service and billing can now resolve questions over the phone on the first call from a customer. One utility has used the FlexNet network and its smart utility system to eliminate a three-day lag between the date of a meter reading and when the bill is sent to the customer, thus improving meter-to-cash process time. Meter reads required to open or close an account can be executed remotely, reducing the burden on field personnel and inconvenience to the consumer.

STEP 5: ADOPT A PROACTIVE CUSTOMER COMMUNICATION STRATEGY

Data gathered from a smart utility infrastructure enables utilities to improve customer service and provide customers access to information that allows them to make educated choices about energy usage. Natural gas utilities can benefit by proactively communicating with customers about smart meters and wireless meter reading programs, addressing concerns early and ensuring the benefits are clearly understood.

Natural gas utilities are beginning to offer customers more detailed information about their bills – and more opportunities are on the horizon. While online portals are most common, some electric utilities are taking this a step further by sharing this information through

home energy management devices, similar to a thermostat. This information empowers customers to learn as much as they choose about their usage and the impact it has on their bill. Over time, this will help educate customers as to how behavioral changes can lower their bill, conserve energy and reduce their overall carbon footprint.

Electric utility smart grid programs also offer some key lessons for natural gas utilities on how to operate as changing consumer expectations are driving a new, open relationship with their utility. Natural gas utilities are taking a proactive approach to communicating with customers about changes to expect related to the deployment of an AMI system through website, newsletter and bill insert communications in addition to town hall meetings and outreach to local media outlets.

One of the largest stand-alone natural gas utilities began a very successful launch of their AMI program with a Texas-based pilot. By emphasizing the use of the customer's trusted gas meter and using common, plain language terms, the utility was able to build credibility in "wireless meter reading." This transparency allowed the utility to focus more time on perfecting reading validation processes and programming routines and less time working to gain customer confidence. Since the existing customer meter and index did not change and a wireless transmitter was simply connected to the trusted meter, the reading transition was seamless for the customer. The first billing cycle under the new system did not draw any controversy or customer complaints. As the AMI system was fully deployed, the utility had their communications processes in order and ready for larger-scale implementation.

A fixed-base network empowers utilities to manage many billing questions in real time without having to dispatch personnel or relying on customers to provide information. Hourly data gathered from meters can identify issues that customer service teams can explain over the phone. This data may also identify a areas for customer education that once required a field visit, and may have never truly pinpointed the root cause.

One natural gas utility received a call from a customer who discovered an unusual spike in his bill. Customer service staff pulled up the hourly account data with the customer to pinpoint the time the spike occurred. Upon review, the customer realized that while the spike correlated with a weekend that he was out of town, his son had been home and had used the pool heater during a party. Although the customer was unhappy with his son and the resulting charge, he was satisfied at the utility's ability to identify specific data that otherwise would have resulted in costly investigation and auditing.

The enhanced level of customer interaction and usage data also help customers identify behaviors they can adapt to lower their bills, such as using appliances more efficiently. For accounts that reflect a trend toward increased usage over time, the utility could offer suggestions for conservation or offer new services or billing options.

THE OUTLOOK FOR AMI AND NATURAL GAS

Advancements in AMI systems, positive deployment case studies and advancements in standards are helping to reduce the reluctance of some natural gas utilities to invest in the technology. Stable, sophisticated platforms requiring minimal infrastructure allow for system upgrades without disrupting service or customers, and higher efficiencies in operational costs and human capital are creating a compelling business case to justify the investment.

Natural gas utilities have a significant opportunity to successfully transition into the utility of the future. By beginning with a business plan based on improving operational efficiency throughout the organization – not just faster meter readings – utilities will see the cause for investing in a robust and secure communications network, connecting monitor and control devices to the network, analyzing data gathered to provide actionable intelligence and proactively communicating with their customer base.

As natural gas utilities learn more about the benefits of an AMI system for their specific needs, the technology will continue to be adopted at a growing pace. Fixed-base communications networks, the ability to connect monitor and control devices to that network, and the software that turns the data into business intelligence will deliver the benefits that drive the bottom line results.

ABOUT SENSUS

Sensus is a leading utility infrastructure company offering smart meters, communication systems, software and services for the electric, gas, and water industries. Sensus technology helps utilities drive operational efficiency and customer engagement with applications that include advanced meter reading, data acquisition, demand response, distribution automation, home area networking and outdoor lighting control. Customers worldwide trust the innovation, quality and reliability of Sensus solutions for the intelligent use and conservation of energy and water. Learn more at www.sensus.com.

ADDITIONAL RESOURCES

Case Study Hyperlinks:

- Energy Services of Pensacola Bolsters Customer Service with FlexNet Deployment
- The Energy Cooperative Finds Sensus Sonix Ultrasonic Meters Measure Up

Product Information Hyperlinks:

- FlexNet
- Remote Gas Shutoff (RGS)
- Sonix Commercial/Industrial Gas Meters

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