Abstract
Automated meter reading (AMR) is the collection at a remote central location of data from meters and other devices at customers’ premises via telecommunications. The AMR industry has grown steadily over the past 30 years. Today, a few established players dominate the natural gas AMR sector, with many other smaller companies competing for sales as well. Technological, regulatory, and economic trends are driving the further evolution and adoption of AMR solutions.

Birth of AMR
Technology companies wax nostalgic over their humble origins, such as Hewlett-Packard and their red barn or Apple Computer and Steve Jobs’ garage. In the AMR industry, Itron looks back to December 1977 and the rented space behind Gator McCluskie’s Bar in Hauser Lake, Idaho. Two days after moving into their new offices, Itron received initial funding from Washington Water Power, today known as Avista Utilities.

By November 1978, WWP was field testing the first Itron portable computer to automate meter reading. It was named the Datameter and allowed utility meter readers to generate a bill on the spot once a meter reading was entered. The Datameter stored route information and meter readings on cassette tapes. WWP hoped it would increase billing accuracy, lower billing costs, improve cash flow, and greatly reduce postage costs. And it did.

Current state of gas AMR and utility AMR in general
Today, more than 80 million meters worldwide are read automatically, with nearly three-quarters of those in the United States. In the U.S. alone, more than 17 million natural gas meters are read automatically. RF communications carry the bulk of automated readings in the United States. AMR continues to grow in the gas industry as well, with consistent growth of approximately 13% per year since 1997.

Modern AMR solutions include the following components:
- Meter
- Meter Register or Index
- Meter Module
- Communication Network or System
- AMR Control Computer
- System Software
The driving forces behind gas AMR adoption have remained constant and continue to point to value gained from automating the meter reading process. Purchasers of AMR seek to:

- Reduce costs
- Increase operational efficiencies
- Improve revenue assurance
- Improve customer service
- Improve employee and customer safety

Itron dominates the gas AMR market, more so than other sectors of utility AMR, with approximately 80% market share. CellNet and Elster control nearly all the remaining market share for gas AMR. The gas AMR market is predominantly built on endpoint and collection system technology that work with multiple makes of meters. This contrasts with the water AMR market, where integrated metering and AMR systems from a single vendor predominate.

AMR in the residential gas market consists mainly of mobile and handheld data collectors gathering data from meters via radio frequency transmission. These well-established technologies deliver the traditional AMR benefits of employee and customer safety, more frequent and accurate billing, and increased operational efficiency.

**Trends and factors influencing gas AMR and utility AMR in general**

Several different trends and factors are buffeting the gas market, and AMR can help mitigate many of those.

Rising natural gas prices appeared prominently in the news over the past year, and will probably continue to experience volatility. Supply increases such as coal gasification, LNG capabilities, and new pipelines could help reduce price pressures, but increasing demand for electricity generated by natural gas could consume much of that new supply. As more gas is shipped across international borders either through pipelines or LNG shipping, international geopolitics will play a bigger role in shaping the natural gas market. As fuel costs rise, AMR helps keep down operational costs. It also allows utilities to more accurately track the distribution and usage of their valuable product.

Fixed network collection technology is commercially available and used throughout North America, but is not used much yet in gas utilities. Fixed network collection is ideal for delivering more frequent data. Additional, frequent data powers new applications such as revenue protection. These applications can have a direct and significant impact on the utility’s bottom line. Additional and competing communication technologies such as Power Line Communications, Broadband Cable, Internet, WiFi, Zigbee, and satellite networks increase the options for utilities considering AMR, and also work to hold down costs for data backhaul from the field. Global position systems can enhance AMR services, making for better, smarter, easier meter reading. All of these technologies increase a utility’s ease and options regarding AMR deployment.

As the volume and quality of meter data grows through the use of AMR, analytical software becomes more valuable.
The rising cost and volatility of natural gas prices places a premium on accurate forecasting of future gas usage. Forecasts are only as solid as the data they are built on; AMR can deliver solid data for the basis of forecasting. Removing estimated reads and manual data entry errors, along with potentially increasing the frequency of meter reads, mean that forecasters and the tools they use have a more accurate and complete base of data upon which to build.

Rising natural gas prices can also motivate some customers to try circumventing the metering and billing process. AMR provides accurate and timely data collection to help inform the investigation, reconciliation, and prosecution process of utility revenue protection.

Having accurate, automated meter data collection makes it easier for utilities to improve customer care by presenting customer data online in an Internet application. This allows customers to understand their consumption, anticipate their bills, and start modifying their behavior in order to save energy and money.

Utilities are starting to understand and apply the power of combining interval data and analytical software. Large, investor-owned utilities throughout North America are now joining frequent data collection with intelligent data analysis to deliver new and improved services to customer and operational efficiencies to stakeholders.

Regulators are exerting increasing influence in the gas market as more utilities bring rate cases before public and legislative bodies. In some cases, regulators are instituting performance-based rates. Deploying AMR shows a utility continues to improve its cost structure and operations, while also providing better quality data for building forecasts, price structures, and other aspects of rate cases.

Summary
As energy supplies become tighter, customers more demanding, and technology more advanced, AMR will increasingly become the standard for utility meter data collection.

Utilities are increasingly turning to data collection and analytics to deliver new and improved services at lower costs.

Economic and regulatory pressures continue to push natural gas utilities toward adoption of a meter data collection and application strategy that minimizes costs while maximizing efficiency and value. AMR is the foundation of such a strategy.

Author
Dan Kritz
Technical Manager, Natural Gas Systems
Itron Inc.
2818 N. Sullivan Rd.
Spokane Valley, WA 99216
Dan.Kritz@itron.com