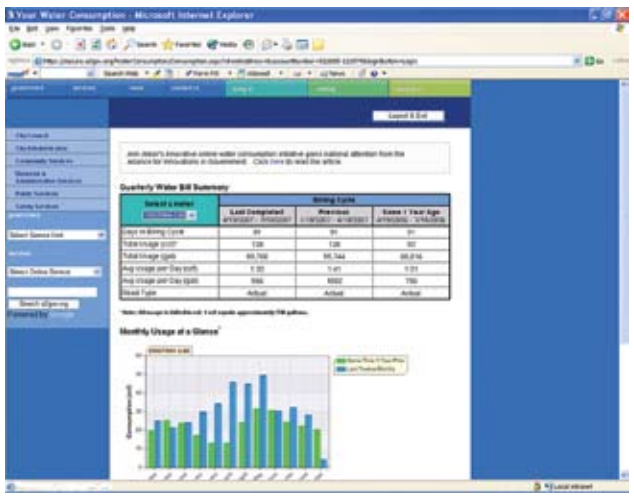
# two-way street

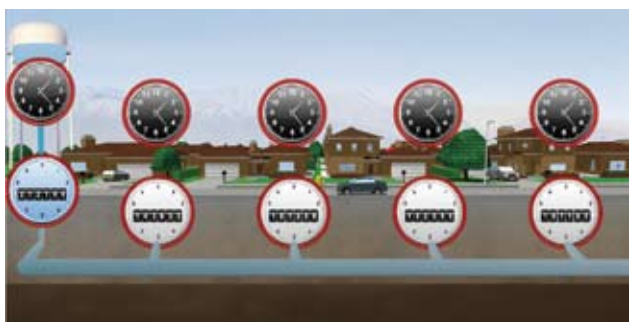
*Delivering fresh, clean water to customers is becoming more challenging. As part and parcel of operating the water system, modern utilities must deal with aging infrastructure, the regulatory environment, increased service requirements that push the limits of capacity and a customer base demanding more information than ever.*

**By Dean Slejko**

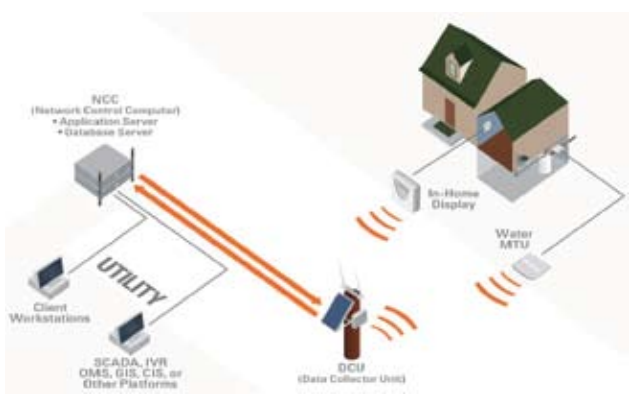
## Utilities embrace new kind of automated metering infrastructure



**Utilities are finding ways to present the meter data collected by AMI systems to customers, encouraging them to monitor their water usage.**



**Two-way water AMI lets utilities synchronize the clocks in specific meters, allowing system meter reads that can be used to determine how much water being pumped into the system is getting to the meter.**




**A fixed-network AMI such as the STAR Network system, diagrammed above, provides two-way communications to meters and captures data that is used by other utility applications.**

In its 2009 Report Card for America's Infrastructure, for example, the American Society of Civil Engineers (ASCE) estimated that aging water infrastructure in the U.S. is not being replaced quickly enough to comply with existing and future water regulations. The shift of population from areas of the country with older infrastructure to growth areas has complicated the trend further by requiring municipalities to rely on smaller rate bases to maintain aging systems.

Water utilities also are striving to reduce use, primarily to combat water shortages. The Natural Resources Defense Council has speculated that one-third of U.S. counties will experience water shortages by mid-century, and in 400 counties the shortages will be severe.

### Less is More

In response to concerns about resource conservation, for instance, California plans to reduce yearly water use by 20%, or approximately 1.7 million acre-ft (more than 550 million gal), over the next two decades. Although shortages may be concentrated in western states that experience low amounts of rainfall and the draining of aquifers, it appears some areas east of the Mississippi River will be affected as well.

While utilities would like to make improvements to the water infrastructure to combat leaks and improve service quality, in today's economic environment utilities are confronting a funding shortfall of at least $11 billion per year for needed repairs, according to ASCE. Two-way, fixed-network automated metering infrastructure (AMI) systems and software that present real information to customers can help utilities cost-effectively face their challenges.

Automated meter-reading (AMR) systems that collect hourly data and transmit it on a regular schedule to a utility are not new. The Boston Water and Sewer District, for example, has read its 90,000 water meters using an AMR system for almost a decade. AMR systems of the past, however, were one-way only. Systems sent readings to the utility, but the utility could not communicate with meters. These systems saved money for utilities by reducing the number of meter readers needed as well as by eliminating estimated readings.

### New & Improved

New smart metering systems that provide two-way communications allow utilities to get a better grasp of aging pipes, valves and underground infrastructure, potentially detecting underground leaks before a major water break. Two-way AMI systems—because they can communicate with meters and collect data from them—can send signals that set all system meter clocks to the same time. With all clocks synchronized, the utility can then take networkwide meter reads that can be used in a system water balance to determine how much water actually gets to customers.

Typically, water utilities must review a year's worth of data in order to perform a systemwide balance—a time-consuming process. By offering an accurate, time-synchronized snapshot of the entire water system, the latest fixed-network solutions make it easier and more efficient to perform balances and reconciliations.

These regular system balances offer a number of benefits. Most notably, they allow utilities to reduce nonrevenue water losses caused by leaks or abnormal water consumption. Using the time-synchronization capabilities of fixed-network solutions, utilities can isolate areas of the system that may have leaks and determine whether these are occurring before or after the water meter.

Once the data is analyzed, utilities can employ measures such as acoustic leak detection to accurately pinpoint the location of the leak before major service disruptions occur, or check specific accounts where abnormal consumption is occurring for tampering or other problems with the meter.

### Enhancing Conservation Efforts

More than three-quarters of all water consumers are concerned about water conservation, and 71% say they would reduce their usage if they had detailed information on their water consumption to motivate them, according to a report from Oracle titled "Testing the Water: Smart Metering for Water Utilities." Meter data-management systems can help utilities provide information that will allow customers to make wise usage decisions. For example, utilities can use the hourly data from two-way systems to develop flexible rate structures that more fairly distribute the costs of water. Providing customers with detailed information about water usage makes it easier for them to monitor water use and make intelligent, real-time decisions that encourage conservation.

Two-way AMI systems also provide the detailed data necessary to enforce water-restriction rules, simplifying the process of managing government-mandated conservation efforts. Without this data, which is necessary to analyze consumption patterns and find problems, it is difficult to enforce these measures. Usually utilities must actually see the consumer breaking the water ban before enforcement measures are taken.

### Customer Service

By proving more information, two-way AMI systems help utilities increase outreach and deliver more personalized service to customers. For example, instead of waiting for calls about high water bills, the two-way AMI system allows a utility to identify customers whose usage patterns might indicate continuous consumption. Once identified, customers might receive a communication—either by phone, e-mail, postcard or

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eventually in-home display—alerting them to possible problems with their systems.

The opposite also might hold true. Some utilities, such as the village of Norridge, Ill., have been using reports from their STAR Network system to identify locations with zero consumption. The Norridge utility, with about 5,000 meters, researches locations showing zero consumption and requests that police check on the resident if no viable reason for the low consumption is identified. Two-way AMI systems make it easier for customers that have larger service areas to provide the same type of service.

All in all, two-way AMI systems allow utilities to better understand how their systems are operating and offer the data they need to improve customer service. WWD

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