

## **AUTOMATIC METER READING (AMR)/ ADVANCED METERING INFRASTRUCTURE (AMI) OPPORTUNITIES IN WATER**

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Water utilities are facing a number of issues: droughts and climatic variations in water supply, rapidly rising operating costs, demands for increasingly expensive investments in treatment for fresh water and wastewater, heightened customer expectations in both service and environmental impacts, and the need to replace aging infrastructure. This has spurred interest among water suppliers in managing water demand, capturing all revenue, minimizing distribution system and customer water losses, and increasing customer support and information. A change in their metering systems is one of the primary tools to do this.

The traditional water meter is volumetric meter, which simply records the volume of water used by the customer. An offshoot of the major meter restructuring being done in the electric and natural gas industry, AMR (automated meter reading) is a technology which automatically collects metering data and transfers that data to a central database for analysis and billing purposes. These types of meters are generally called “smart meters”. Detailed water usage data can be collected continuously at regular intervals (for example, every 30 minutes) and can be read remotely via an automated process, with the usage data sent to the utility’s management and billing system. AMR can consist of a number of various methods, ranging from a simple drive-by meter (where the meter reader cruises down the street automatically downloading the meter data) to one way communications with the utility.

AMI (advanced metering infrastructure) starts with smart meters and adds two-way communication between the meter and utility, and between the meter and consumer. This means that in addition to providing readings, the meter can also receive (and often act on) instructions sent from the utility or consumer

Water utilities are realizing a host of benefits associated with switching their old, manual read meters to AMR/AMI systems. These benefits include:

### Increased revenue from previously unaccounted for water

As meter age, particularly the mechanical type meters, they lose accuracy as they start wearing out. One of the immediate benefits of meter replacement with newer meters is that water that previously was not being recorded by the older meters is now being captured by the newer meters, and billed to the customer.

### Reduced meter reading costs

Most water utilities still need meter readers who walk up to every meter pit, manually read the meter, and log the water use. By deploying AMR, costs can be reduced substantially, even from just electronic meter reading or offsite meter reading (a handheld equipped with a radio device to read meters from a distance). Other costs associated with manual meter reading that are all but eliminated with automation include salaries, benefits, vehicle costs, cellular phone expenses, handheld meter reading systems, maintenance and some general overhead expense, etc.

### Safety / Security Issues

The more crews on the road, the more opportunities exist for an accident to occur. Security for both employees and customers is crucial, especially given reading routes that require a two-person crew because of safety concerns, unfriendly dogs and physically hard to access meters. AMR will result in fewer employee injuries, especially in areas with fenced yards, dogs, intruding landscaping or long distances between meters (such as in rural areas)

### GHG emission reductions

With AMR fewer vehicles are necessary for the meter reading process, reducing dust and emissions, and reducing green house gas emissions.

### Help identify and pinpoint losses (customer and system)

Too often, leaks are determined months after they start, generally due to investigations in response to billing disputes. AMR can allow very rapid identification of leakage, on both the customers premises (by monitoring water usage when everything is turned off) and in the water distribution system (by comparing meter readings at various parts of the system).

### Monitor System Integrity

AMR/AMI systems can be used to monitor water distribution system integrity. Backflow monitoring may indicate a compromise in the integrity of the system, which might require disinfection and boil water orders. The ability to rapidly detect a system event where large and unexpected flows are occurring is crucial in rapid response to some sort of system breach.

### Conservation / Efficiency

AMI based consumption data has tremendous potential to support and augment utilities' water conservation programs, whether they are discouraging leaks, responding to short-term droughts or long-term water scarcity, or implementing innovative conservation programs.

Having interval water usage data allows a water utility to design much more sophisticated rates that can more closely track costs (such as increased pumping costs during peak periods), or encourage conservation and support customized rates. AMR allows the water utility to monitor compliance with local water restrictions against outdoor watering or non-essential water use during daylight hours or mandatory odd/even day outdoor water. It can also be used to check on compliance with mandatory reductions in water use during any time period.

AMR can have a significant impact on water conservation by enabling water consumption data to be determined on more frequent time intervals, which allows the utility and its customers access to consumption profile data for education or conservation program compliance monitoring/enforcement; detecting continuous flows which often

indicate leaks at a customers' premises; providing meter readings at precisely the beginning and end of certain periods (which would support seasonal or other time of use pricing or programs).

AMR can also be used in submetering: allowing the monitoring of industrial processes to detect wasteful practices or faulty equipment; provide individual metering to previously mass metered locations such as condominiums or apartment buildings, stores or offices, with its well documented conservation impact; and to system subcomponents such as irrigation systems, swimming pools, water cooled air conditioners, and commercial cooling systems to identify wastage or faulty equipment.

With the ever decreasing costs of such systems, water utilities are increasingly interested in hourly or even more frequent meter readings, as well as other capabilities of AMR/AMI systems, to reduce their expenditures, monitor their system, conserve water and keep customers informed.