

INSIGHT

Five Steps for Rural Water Systems When Installing AMI

Installing advanced metering infrastructure, or AMI, can bring many benefits to a rural water system. These include reduced billing cycles, field readings and billing costs, and improved leak detection and operational analytics. However, those benefits can only be realized if a system takes five important steps to make sure AMI fits the system's goals and goes through a process to set the system up for success.

Develop a plan and business case

First, a rural water system should create a business plan with a clear outline of the system's goals and mapping of the AMI process. It should include a business case that analyzes the costs and benefits to see if installing an AMI is viable. This step helps when a water system starts looking for funding and budgeting options. A strong business case also is valuable for public education and communications. Using that business case to engage and prepare key stakeholders is beneficial; these stakeholders could include system board members, employees and ultimately users.

Explore infrastructure options

During this step, a water system should request proposals from multiple AMI contractors. Doing so will help the system compare products and think about what option is the best fit for the system's goals.

There are several infrastructure options available. Each infrastructure type has its own pros and cons. It's important to consider the field conditions of each water system, or various conditions across one system. Options for infrastructure include:

Some water districts choose to use one type or brand of AMI system, while others may find that a combination provides the best fit for their needs. For example, Tripp County Water Users District (TCWUD), located in south central South Dakota, has 2,200 miles of pipeline stretching across five counties and diverse connectivity conditions. TCWUD installed AMI and has a drive-by radio system that is supplemented by satellite reads at remote locations.

- Radio System: Most amount of static infrastructure (towers/antenna) and familiar technology (think SCADA)
- Satellite: Very little to no static infrastructure, includes service agreement and monthly equipment fees
- Cellular: Very little to no static infrastructure, includes service agreement and monthly equipment fees

Plan for installation

Once a water system has decided what kind of AMI it is installing, the system should discuss the pros and cons of doing the installation/implementation as an in-house project or using a contractor. When making this decision, the system should consider whether in-house staff has the technical capabilities to handle installation (this type of work is very data intensive) and the speed with which the work needs to be completed.

A phased approach to the installation was beneficial to TCWUD. "Tripp utilizes a drive by radio system but invested in a technology that allows that same system to work with static infrastructure, so they can eventually upgrade to a full AMI system," said Lyle Schumack, from Bartlett & West, which is the engineering firm for TCWUD. "Water systems also have to consider where their funding is coming from. For example, another one of our client, Mid-Dakota Rural Water System in east-central South Dakota, received their money from the SD DENR and had to bid a portion of the work."

If a system decides to use a contractor for the installation/implementation, it should strengthen the specifications so that the payment to the contractor is determined by the labor and the accuracy of the data collected at each site. Prior to work beginning, meticulously define the contractor's scope and be sure to specify the responsibilities of all involved. This is especially important when data gathering is involved. Everyone involved should be clear if it is a full contract or a labor-only contract.

Collect information prior to installation

Another critical step to keep installation/implementation moving smoothly is to collect important information up front. Typical information that needs to be provided by the installer (whether that is in-house or a contractor) includes:

The system should know the meter serial numbers and at minimum the size of meter at each site. This would also be good information to include in the GIS Water Network.

It is also beneficial to get the water system's engineer involved with the implementation of the AMI from start to finish. Even if the water system owner is taking the lead on coordination, getting the system engineer involved can help avoid issues later in the process.

- Meter transmitting unit identification number and serial number
- Meter reading at the time of the installation to accurately bill the customer
- Meter type, which allows the meter reading system to accurately read the meter

Create data consistency during installation

Once installation has begun, a laptop computer is required for the AMI installer to re-program meters to read in single gallon increments. Single gallon increments are a requirement to get the full value of the AMI, including leak detection. That measurement is not required for the system to run, but all the meters need to be set to the same setting or there will be billing issues.

The data gathering portion of an AMI project is by far the most important. "Mid-Dakota selected an AMI company to act as the installation contractor. That contractor used up to six crews to do the installation. Each crew could get 20 to 50 sites completed per day depending on the distance between each meter in their area. Not surprisingly with that volume of activity, there were issues. The crews had problems checking the connectivity of the meters, and the water system's office staff struggled to check the accuracy of all the data as it came in," said Schumack.

A way to make the data gathering more consistent and therefore accurate is by utilizing a GIS system. Then when information is entered into the AMI control system, it should be matched to an existing customer. The GIS system will throw an error when the wrong information is provided.

Making sure consistent meter readings are collected during the changeover is also critical for the next billing period. When replacing a self-read system, the meter transmitting unit (MTU) is installed by removing the remote read. Therefore, a customer can no longer read the meter and the AMI system must be operating correctly to bill that customer. If this is the case, a water system should establish consistency in how the current meter reading is taken. For example, reading taken by installers during a changeover may not be truncated, but other meters remotely read are often truncated to the thousands. Again, a GIS system can help force consistency during the data collection process and avoid this issue.