CASE STUDY

AMI solution enhances efficiency and boosts customer engagement

City of Santa Barbara uses Hubbell's comprehensive water utility solutions to enhance customer service

Introduction

California water providers have been hit hard by climate change. As the state gets hotter and drier, its Department of Water Resources predicts a 10% reduction in water supplies by 2040.

To adapt to evolving risks and challenges, the City of Santa Barbara has developed a diverse water supply portfolio and has been a leader in water conservation since launching its first program in the 1970s. Currently, community water usage has dropped to the same level it was in the 1950s, even though the city's population has more than doubled in the past 60 years.

Santa Barbara residents already have a conservation consciousness. As part of an ongoing commitment to enhance customer service, the City of Santa Barbara invested in advanced metering infrastructure (AMI). This system, which is comprised of automated meters, communication networks, and software, collects hourly water use data over a secure, wireless network and delivers this information to customers much quicker than before, providing enhanced customer control. AMI is another tool the city has implemented for its residents to empower water-wise consumption and to improve operations to deliver water more efficiently.

Business Challenge

Before July of 2023, reading water meters for monthly billing was a daily routine for the City of Santa Barbara's 10-person meter-reading staff. Four team members were full-time, and the rest worked half-time. "They'd walk six to eight miles and read 1,200 to 1,300 meters a day, every single day," says the city's water services supervisor.

All but about 2,000 of the city's nearly 28,000 water meters had to be read manually with eyes on the register. The rest were read through a drive-by meter reading system that delivered meter readings once per month.

The process was labor intensive. "If we put the reads into the billing system and the billing system indicated it was a high reading, we'd need to have someone go back out and verify the read in person for a second time," the water services supervisor explains. "Usually, when a file was sent to the billing department, they'd kick back 50 or 60 reads for verification."

On top of that, reaching a meter didn't always mean the reader could get its consumption data. "If readers opened up meter boxes that were full of dirt, they'd need to mark them with a code in their handheld computers to come back and clean out the meter box," he continues. "After we transported the day's readings into computers back at our home office, we'd make an exception report, and then the readers would go back out with shovels to dig out those meter boxes and get the readings."

Meter readers rarely got a "float" day, a day when they didn't need to read meters. The water services supervisor says they might have gotten a day with different work once every two months or so. This led to limited cross training opportunities or time to contribute to other system needs such as proactive maintenance.

The water services supervisor and the meter readers weren't the only ones inconvenienced by the manual reading approach. Customers who had leaks that cropped up soon after the meter reader had come could wind up paying for wasted water that remained undetected for days or weeks.

Often, customers didn't realize there was a problem until high bills showed up in their mailboxes.

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>
> - Water Services Supervisor, City of Santa Barbara

Another group impacted by the manual processes was the city's water resources specialists, who work on the conservation team. Often, high-bill complaints would be escalated to these workers. "They had these old-school data loggers that they would put on the water meter. It would get us interval water usage data, but only for a period of a couple weeks," the water services supervisor says. They added, "Managing the data loggers was very time intensive. Each data logger had to be processed individually, which included rolling a truck to pick up the data logger, downloading data to a computer, processing the data into a form the customer could understand, and returning the information to the customer. Even then, the water resources specialists wouldn't always be able to identify the issue—because the data loggers could only be deployed for a limited time, they wouldn't always catch the water usage jumps that prompted the customer request."

Santa Barbara's water utility management knew they had to give consumers a way to track their water consumption more effectively—AMI was the right solution.

Solution Overview

Santa Barbara has been planning to adopt AMI technology for over a decade, and even implemented a meter change out program to replace all the city's water meters with AMI-compatible meters to prepare for it. In 2020, the city issued a request for proposals, and nearly a dozen vendors answered the call, with Hubbell Utility Solutions offering a comprehensive approach that included:

Aclara advanced metering infrastructure for improved data collection

Aclara, a Hubbell brand, deployed their RF network across the city's service area. The network includes meter transmission units (MTUs) to collect and record up to nine digits of water consumption every hour, then transmit to data collection units (DCUs) via an efficient, low-power, high-performance radio frequency network once daily. Hourly data reads and quick transfer of those readings to the utility helps identify anomalies such as potential leaks and meter tampering within hours.

Important characteristics of the Aclara network include:

1. A utility-owned, 450 to 470 MHz FCC-licensed radio frequency

Along with being low-cost, this band of frequencies for meter data traffic gives water utilities a low-channel-noise solution with no competition for airwaves, and it has greater penetration through building structures than higher frequency unlicensed solutions.

2. Network reliability and redundancy

The network is designed to ensure field devices have more than one path back to the DCUs and head-end AclaraONE® software, hosted in the cloud. All devices are battery-powered, meaning collectors secure readings even during power outages and report the consumption when power is restored.

3. Meter-agnostic solution

Unlike other water AMI solutions, the Aclara system works with any water meter, making it meter-agnostic. "Having a system that could work with any manufacturer's meters was huge for us because we have both Sensus and Badger meters in the field," the water services supervisor says. "We didn't have to change all the meters to one specific type, and we could use what we already had in the ground."

The water services supervisor says the terms of the purchase and licensed network were winning points. "We like that we can own the DCUs and have our own dedicated RF network as opposed to the cellular-based ones," he notes. "We also like having the MTUs under the meter lid." Such features add security to the system and reduced the need to modify or replace existing meter lids.

Armorcast enclosure lids for better RF propagation

Aclara's team completed a pre-installation RF propagation study to determine how many DCUs Santa Barbara would need. Concord did an audit of meter-pit lids to determine how many lids needed to be replaced. Cast iron lids can interfere with signal propagation, so the Concord team surveyed the entire system to get a proper count on the necessary replacements.

Due to the under-the lid MTU design, many existing meter box lids were able to remain in place, reducing project implementation time and costs.

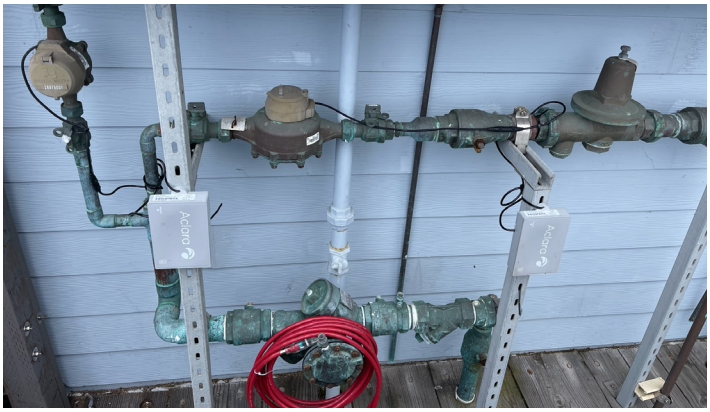
Armorcast, a Hubbell brand, provided custom-sized enclosure solutions for the project in instances where lids did need to be replaced. With access to a variety of enclosure lid sizes, the city was able to replace only the lids and avoid the extra project costs associated with changing out the entire meter box. The enclosure lids the city used were constructed of an RF-friendly material with load ratings of 10,000 pounds for yards and sidewalks and 20,000 pounds to accommodate plazas and driveways.

Professional installation to ensure project timelines

As part of its RFP response, the Aclara team covered installation through Concord Utility Services, a long-standing partner with more than three million meter and endpoint installations completed. Alongside the Aclara project management team, the Concord team provided comprehensive meter installation services, including pre-deployment workshops for various departments throughout the utility and progress reporting throughout the installation. The company had uniformed employees in well-marked trucks and even hired local technicians with long-term opportunities to support local job creation. The full deployment phase of the meter transmission unit installation was complete in just seven months.

Aclara MTU positioned on the underside of an Armorcast lid

Custom-sized enclosure lid made for the City of Santa Barbara by Armorcast



Completed installation of Aclara MTUs

City of Santa Barbara employees receive hands-on product training from the Aclara team

Aclara provides DCU antenna installation training for the Santa Barbara team

Business Justification

Santa Barbara's new AMI system delivers multiple value streams. Among them are:

Enhanced efficiency and support for distribution assets

The water meter reading team has gone from four full-time employees and six half-time workers to four full-time employees and one hourly worker whose time is divided up among several duties. None of these workers spend much time reading meters.

"The team can now focus on doing preventative maintenance and things like changing out stuck meters that are under-registering," the water services supervisor says.

The team is also able to provide high quality customer service and support the water conservation team by calling customers whose AMI data shows they have large leaks. The new responsibilities help the utility do more without adding new people and give the team more variety in their workdays, increasing cross training opportunities and building a team with more diverse skill sets that are able to help cover organizational needs.

In the future, the city plans to utilize their meter technicians to be first responders to customer calls that need a quick turn around time, such as customer water shut off requests, or water in the street notifications. With meter technicians taking over these duties, water distribution operators will not have to be called away from their assignment to respond to these requests.

Customer empowerment

California has some of the highest water rates in the country, topped only by West Virginia, according to the nonpartisan research site WiseVoter.com. With average bills of $77 monthly, residents of the Golden State pay nearly twice the national average of $39.16, and Santa Barbara has rate increases ahead for the next four years. Given the cost of water, the water services supervisor says, "We want to help people use it wisely and save money when they can."

AMI makes that possible. Through an easy-to-use online consumer engagement portal, the city provides hourly consumption data. This allows customers to see how yesterday's activities impacted the amount of water they used. The data also enables customers to spot anomalies, such as unusual usage that could indicate a problem like a sprinkler system leak. This helps customers to take more control of their water consumption and bills.

Enhanced customer service

The city's water metering team proactively notifies customers when they see abnormal usage, and leaks don't go unnoticed for weeks on end anymore. "We have customers who own vacation homes, and they're not here all the time," the water services supervisor says. "When we call them, and they say, 'nobody's home,' we know it's time to shut the water off. Now they're paying for a few days of water leaking instead of 30 days. We've had really positive responses from customers who get these calls."

The data also allows the team to troubleshoot problems when they call customers about abnormal usage patterns. "The data tells a story. We can often tell by the timing of the usage what might have happened. Maybe there was a power outage, and the irrigation system timer defaulted back to factory settings. Or maybe somebody has a toilet flapper that gets stuck," says the water services supervisor. A stuck toilet flapper could waste as much as 200 gallons a day, so catching these small leaks can bring big savings for customers.

Reduced non-revenue water

After the city replaced all its meters with AMI-compatible meters, it tested more than 2,500 water meters to determine accuracy trends. According to the 2020 Water Conservation Strategic Plan, "The improved accuracy of the new meters has effectively reduced the city's apparent losses." In addition, AMI

data can help identify stuck and under-registering meters, yet another way the system helps reduce apparent losses.

AMI helps reduce real losses, too. Real losses occur when water is physically lost from the system through leaks and water-line breaks.

The city's Water Conservation Strategic Plan included using data from AMI "to better monitor customer consumption within specific areas of the system and compare that against water delivered to those areas," said the plan write-up. "These kinds of analyses will help identify leaks in the distribution system."

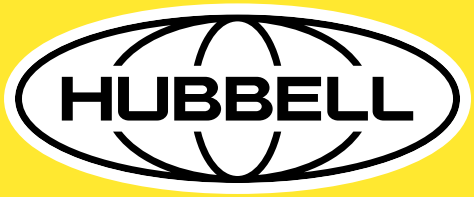
A foundation for acoustic leak detection

Currently, Santa Barbara sees 80 main breaks each year and more if you add in laterals. This is why the City of Santa Barbara plans to replace 2% of its water mains – six miles of line – each year. Unfortunately, the cost of replacing a mile of water main has gone from $1.15 million in 2020 to an estimated $2.7 million in 2025. It's crucial to ensure the year's replacements target the leakiest water lines. The city's Aclara AMI system can enable staff to do that by facilitating the addition of acoustic analysis.

Timely, accurate, reliable meter reads and service

Before AMI, meter reading took seven full-time equivalent staffers and was an everyday task Santa Barbara's employees undertook. Now, the water services supervisor says they can have the readings downloaded to the head-end computer in 10 minutes.

To learn more about the products in this case study, explore the full line of water industry solutions from Hubbell, including Aclara AMI and Armorcast enclosures.



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