

2023 BAWSCA AMI Survey

Survey results among BAWSCA agencies

June 2023



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1. Executive Summary

The Bay Area Water Supply and Conservation Agency (BAWSCA) has a long track record of assisting its agencies in advancing the use of technologies for water management. During recent discussions in the BAWSCA Water Management Representatives and Water Resources Committee meetings, member agencies expressed interest in knowing the status of Advanced Metering Infrastructure (AMI) implementation at each agency. Additionally, during Board discussions of BAWSCA's conservation work, the board also shared that interest. AMI is an integrated system of smart meters, communications networks, and data management systems that enables two-way communication between utilities and customers. This system provides various benefits, such as automated water measurement and leak detection.

Following these discussions, BAWSCA and its member agencies identified the need to develop baseline information about their existing metering infrastructure – its current status and management practices, as well as planned future implementation.

To address this need, BAWSCA developed a comprehensive survey consisting of 23 questions related to the current status of AMI implementation, readiness, and future interests. The survey was distributed using SurveyMonkey™, and all twenty-six BAWSCA agencies responded.

The survey results revealed nine key findings:

Finding 1. AMI is currently the predominant meter-reading method for BAWSCA agencies.

Finding 2. By 2035, 85% of BAWSCA agencies are projected to fully implement AMI.

Finding 3. Notification of leaks and high usage is the most important benefit of AMI to BAWSCA agencies.

Finding 4. Greatest challenge with AMI implementation is obtaining funding.

Finding 5. Majority of AMI meter management is done in-house.

Finding 6. Meter reading systems are mainly electronically integrated with billing and customer information systems, although they can be integrated with multiple other water data management systems.

Finding 7. Various vendors and network communication systems are utilized to enable the seamless flow of data between smart meters and the central data management system.

Finding 8. BAWSCA agencies receive most of their AMI information from vendors and colleagues.

Finding 9. BAWSCA agencies express interest in learning more about routine water consumption reports and presentations on AMI management.

Considering these findings, BAWSCA will better understand how to support member agency needs for AMI implementation in the coming years.

2. Introduction

BAWSCA is working to obtain information from member agencies' (Figure 1) current and planned work with AMI.

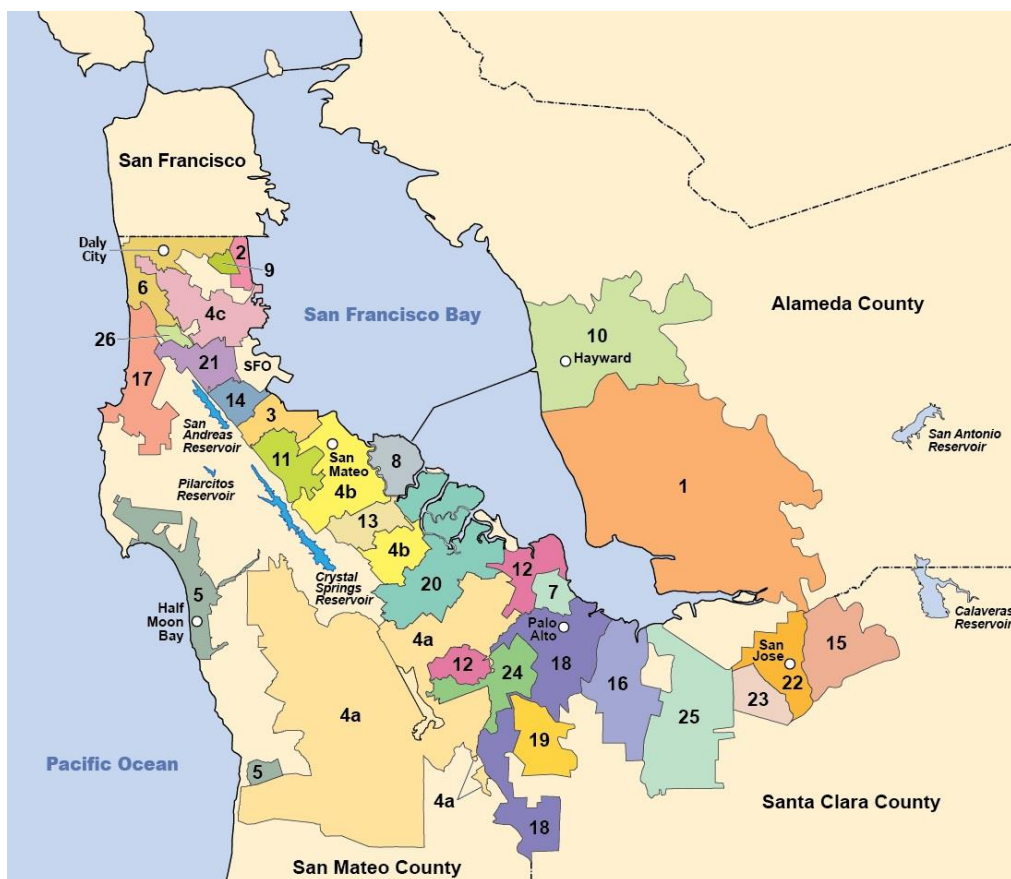
A comprehensive survey was prepared, and the responses analyzed, to achieve the following goals:

1. Assess AMI implementation- The survey allows for an assessment of the current status of AMI implementation among water agencies. It provides valuable insights into the extent of AMI adoption, identifying agencies that have already implemented it and those in the process of implementation.
2. Highlight benefits and challenges of AMI- By soliciting feedback from member agencies, the survey can identify the specific benefits agencies perceive in adopting AMI technology. This information can help prioritize and emphasize the advantages of AMI, such as leak detection and customer engagement. Additionally, the survey also highlights the challenges faced by agencies, such as funding limitations, providing insights for developing strategies to overcome these hurdles.
3. Identify future interests related to AMI- The survey helps gauge the readiness of water agencies to implement AMI technology and their future interests in AMI-related topics. It provides a comprehensive understanding of agencies' preparedness, allowing for strategic planning and resource allocation.
4. Establish baseline information on AMI implementation- The survey helps gather baseline information about the existing metering infrastructure and management practices. This information is important for member agencies to make informed decisions regarding AMI deployment.

The survey gauged agencies' present and near-future involvement in AMI and future interests as it relates to AMI. BAWSCA will use the results from the AMI survey to identify tangible opportunities to support its member agencies as they plan to implement AMI or manage their implemented AMI.

This report discusses the elements of the survey development, the responses, and analysis of results.

Figure 1. BAWSCA agencies and their location in the San Francisco Bay Area



Legend

- | | |
|---|--------------------------------------|
| 1 Alameda County Water District | 13 Mid-Peninsula Water District |
| 2 City of Brisbane* | 14 City of Millbrae |
| 3 City of Burlingame | 15 City of Milpitas |
| 4a CWS – Bear Gulch | 16 City of Mountain View |
| 4b CWS – Mid-Peninsula | 17 North Coast County Water District |
| 4c CWS – South San Francisco | 18 City of Palo Alto |
| 5 Coastside County Water District | 19 Purissima Hills Water District |
| 6 City of Daly City | 20 City of Redwood City |
| 7 City of East Palo Alto | 21 City of San Bruno |
| 8 Estero Municipal Improvement District | 22 San Jose Municipal Water System |
| 9 Guadalupe Valley MID* | 23 City of Santa Clara |
| 10 City of Hayward | 24 Stanford University |
| 11 Town of Hillsborough | 25 City of Sunnyvale |
| 12 City of Menlo Park | 26 Westborough Water District |

Sources: BAWSCA, San Mateo County General Plan

* The City of Brisbane operates both the City of Brisbane Water District and the Guadalupe Valley Municipal Improvement District (GVMID). In this survey, the City of Brisbane provided one set of responses for both agencies.

Background

The AMI Survey builds on BAWSCA's leadership in working with its agencies to advance the use of technology for managing water resources.

In fall of 2018, BAWSCA spearheaded: "Making Conservation a Way of Life" Strategic Plan – Phase 1 ⁽¹⁾ In BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy 2015), AMI technology was discussed as an important element to meeting California's mandate and implementing Executive Order B-37-16: "Making Conservation a California Way of Life". ⁽²⁾

In 2019, BAWSCA collaborated with Santa Clara Valley Water (Valley Water) on an Advanced Metering Infrastructure study that identified each water retailer's metering and related system, data gaps, and potential for collaborative procurement for AMI as an option for the region. This research helped identify potential AMI collaboration amongst BAWSCA and Valley Water agencies. ⁽³⁾

In the spring of 2021, BAWSCA organized a two-day AMI Workshop. The purpose of the workshop series was to support member agency efforts to advance the implementation of AMI within their respective service areas, provide guidance on using AMI data to improve water use efficiency, provide a forum for information sharing between agencies, and identify potential opportunities for AMI planning and implementation.

Two workshop sessions were held in 2021 with multiple topics on pre- and post- AMI implementation:

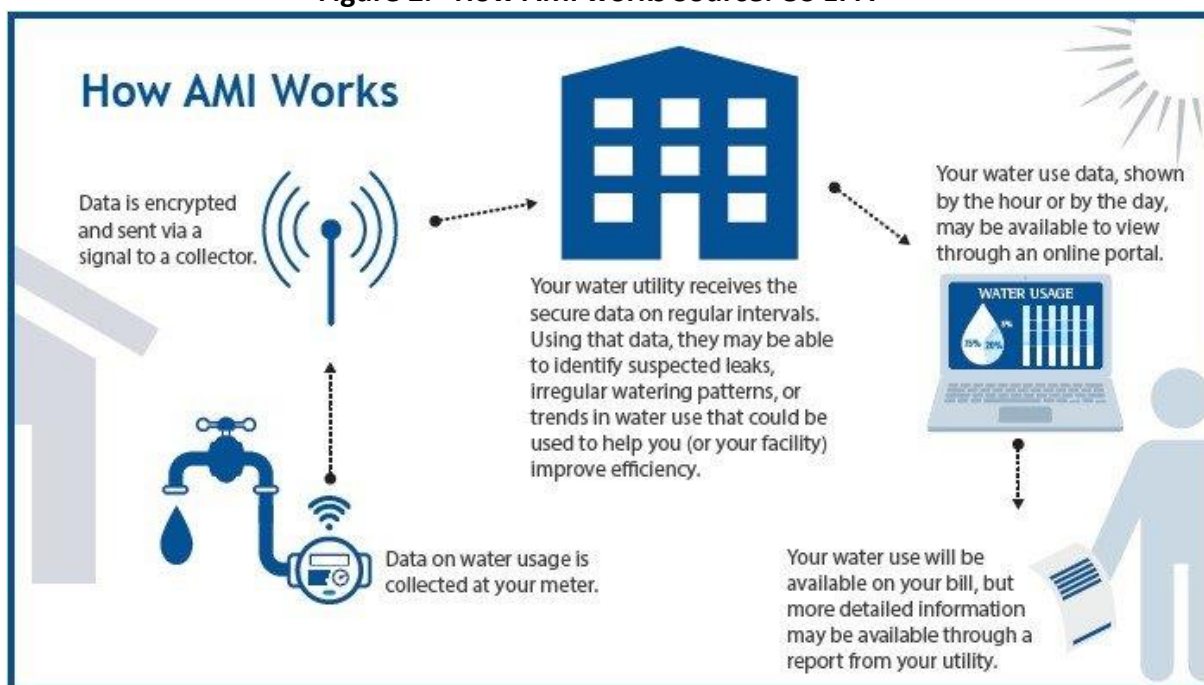
- June 10, 2021 – Pre-AMI Implementation Topics
- June 15, 2021 – Post-AMI Implementation Topics

Since the 2021 Workshop, BAWSCA saw the need to obtain updated information on AMI implementation from member agencies. BAWSCA developed the AMI Survey to serve as a tool to better understand the challenges and benefits of AMI and provides valuable insights into the extent of AMI adoption.

Advanced Metering Infrastructure

Automated Metering Infrastructure (AMI) refers to a system of interconnected devices and software used for automated meter reading, data collection, and management of utility services. In the context of water, AMI involves the integration of advanced metering technologies, communication networks, and data analytics to enable efficient monitoring and control of water consumption. AMI typically consists of smart water meters installed at customer premises, communication networks (such as cellular and radio frequency), and a central data management system (Figure 2). ⁽⁴⁾

Figure 2. How AMI works Source: US EPA ⁽⁴⁾



The smart water meters in an AMI system are equipped with sensors and communication capabilities that automatically record and transmit consumption data to the utility company. This eliminates the need for manual meter reading, reducing human error and associated costs. The data collected by the meters is transmitted through the communication networks to a central data management system, where it is processed, analyzed, and made available for billing, analysis, and decision-making purposes.

AMI enables utilities to access real-time or near real-time information on water consumption patterns, allowing for accurate and timely billing. It also facilitates the detection of leaks or abnormal usage, enabling utilities to promptly address issues and reduce water losses. Additionally, AMI empowers consumers by providing them with access to their own consumption data, enabling them to monitor and manage their water usage more effectively, leading to increased awareness and conservation efforts.⁽⁴⁾

Overall, automated metering infrastructure improves operational efficiency, reduces costs, enhances customer service, and supports effective water resource management.

3. Methodology

BAWSCA has been working with its member agencies to foster engagement with AMI technology. In 2023, BAWSCA determined that a survey would be the best tool to obtain

baseline information from the member agencies about current and near-term interests in AMI implementation. The baseline data will enable informed and meaningful discussions about AMI implementation and ways to support member agencies.

To meet the project goals, three main tasks were identified:

1. Develop survey questions to identify specific information about the current status of metering infrastructure and its management among BAWSCA agencies. The questions were intended to understand the current status of AMI within the BAWSCA member agency region and future interests as it relates to AMI.
2. Document the survey results and associated analysis in a report.
3. Identify next steps to better support member agencies' future interest in AMI.

Survey Structure and Format

The survey included 23 questions and the format facilitated grouping of responses to identify common interest areas.

The survey sections were mostly composed of multiple-choice questions with 'best-fit' answers. Space was provided for additional information for agencies to briefly elaborate if they chose to do so. A single representative from each member agency was asked to respond to the survey, even if information was obtained from multiple agency staff (Appendix A). The survey was conducted through SurveyMonkey™ in December 2022 to obtain responses from 26 member agencies. Examples of the type and format of questions on SurveyMonkey can be seen in Appendix B.

The multiple-choice responses targeted identification of specific metering systems, the technology in use, its management, and extent of data integration. In anticipation of agency representatives needing to obtain information from multiple internal sources, agencies were given two weeks to complete the survey. Follow up emails and phone calls with member agencies were done to answer questions agency representatives had regarding the survey questions.

4. Survey Results

The surveys were sent and completed by 26 BAWSCA agencies. The map of BAWSCA agencies is shown in Figure 1.

Key findings

This section summarizes nine main findings from the 23 survey responses.

Finding 1. AMI is currently the predominant meter-reading method for BAWSCA agencies.

Finding 2. By 2035, 85% of BAWSCA agencies are projected to fully implement AMI.

Finding 3. Notification of leaks and high usage is the most important benefit of AMI to BAWSCA agencies.

Finding 4. Greatest challenge with AMI implementation is obtaining funding.

Finding 5. Majority of AMI meter management is done in-house.

Finding 6. Meter reading systems are mainly electronically integrated with billing and customer information systems, although they can be integrated with multiple other water data management systems.

Finding 7. Various vendors and network communication systems are utilized to enable the seamless flow of data between smart meters and the central data management system.

Finding 8. BAWSCA agencies receive most of their AMI information from vendors and colleagues.

Finding 9. BAWSCA agencies express interest in learning more about routine water consumption reports and presentations on AMI management.

In the discussion below, each finding is discussed along with the information from survey responses that support that finding.

Finding 1. AMI is the predominant meter-reading method for BAWSCA agencies

There are several methods of water meter reading, which can be broadly categorized into manual reading methods and automated reading methods.⁽⁵⁾ Descriptions of the different water meter reading methods are provided below:

1. Manual Reading Methods:

- a)** Visual Reading: This method involves physically inspecting the water meter and recording the numbers displayed on the meter's dial or register. Meter readers visit customer premises periodically to manually read the meters.
- b)** Touchpad Reading: Some water meters have touchpad interfaces that allow meter readers to use a handheld device to record the meter readings. The device is placed on the meter, and the readings are captured electronically.

2. Automated Reading Methods:

- a)** Automatic Meter Reading (AMR): AMR systems use metering devices that automatically collect and transmit consumption data wirelessly or through power line communication. The data is typically collected by mobile or fixed network-based systems and sent to the utility company for billing and analysis purposes.

- b) Advanced Metering Infrastructure (AMI):** AMI combines smart meters with two-way communication networks. Smart meters record water consumption data at regular intervals and transmit it in real-time or near real-time to the utility company. AMI allows for remote monitoring, analysis, and control of water consumption, enabling features such as leak detection and demand response.

These different methods offer varying levels of convenience, accuracy, and efficiency. The choice of water meter reading method depends on factors such as the size of the utility, budget, customer density, and technological infrastructure.

To better understand the type of water meter reading method used at each BAWSCA agency, the first survey question asked:

What is your agency's predominant (>50%) meter reading method? Please select ONE answer that is most applicable and explain in space provided, if needed.

The results of the question can be seen in Table 1. The responses revealed that AMI is the predominant (44%) meter-reading method for BAWSCA agencies. Manual/visual meter reading is the next most common method (24%), followed by 16% using touchpad, and 16% mobile AMR.

Table 1. Predominant meter-reading methods by BAWSCA agency

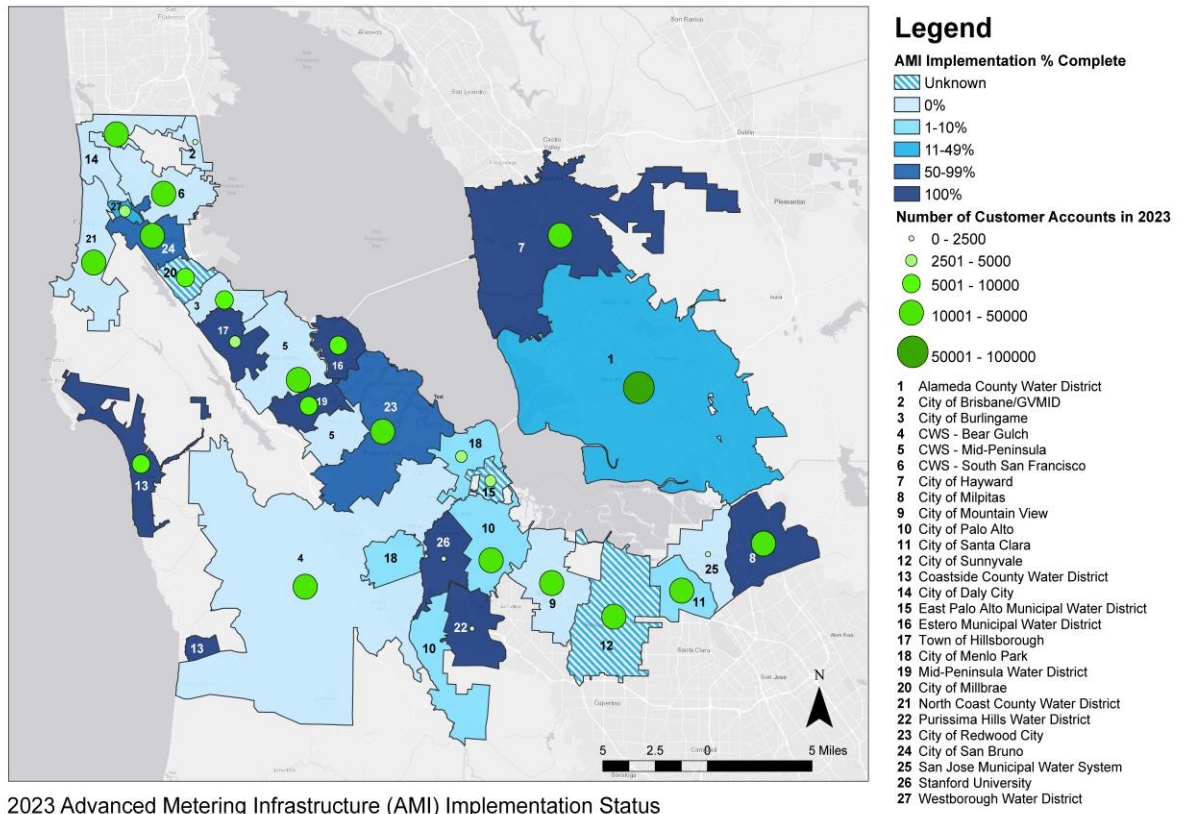
Agency	AMI 100%	AMI 50- 99%	Manual/ Visual >50%	Touch - pad >50%	Mobile AMR >50%
Alameda County Water District			X		
City of Brisbane/GVMID					X
City of Burlingame					X
Cal Water			X		
Coastside County Water District	X				
City of Daly City				X	
City of East Palo Alto			X		
Estero Municipal Water District	X				
City of Hayward	X				
Town of Hillsborough	X				
City of Menlo Park			X		
Mid-Peninsula Water District	X				
City of Millbrae				X	
City of Milpitas	X				
City of Mountain View			X		
North Coast County Water District				X	
City of Palo Alto			X		
Purissima Hills Water District	X				
City of Redwood City		X			
City of San Bruno		X			
City of San Jose					X
City of Santa Clara		X			
Stanford University	X				
City of Sunnyvale					X
Westborough County Water District				X	

Finding 2. By 2035, 85% of BAWSCA agencies are projected to fully implement AMI

In recent years there has been a significant increase in the implementation of AMI amongst BAWSCA agencies. ⁽³⁾ AMI is being used by water utilities and agencies due to its numerous benefits in water management and conservation efforts. ⁽⁶⁾ Due to this increase in interest in AMI, the survey asked agencies about their current status of AMI implementation.

As shown in Figure 3, eight agencies have fully implemented AMI in their service area. An additional six agencies are in the process of implementing AMI, six have deployed AMI for a portion of their metering system, and three are in the process of implementing an AMI pilot project. There are only three agencies with unknown plans for implementing AMI in 2023.

Figure 3. Current status of AMI implementation among BAWSCA agencies

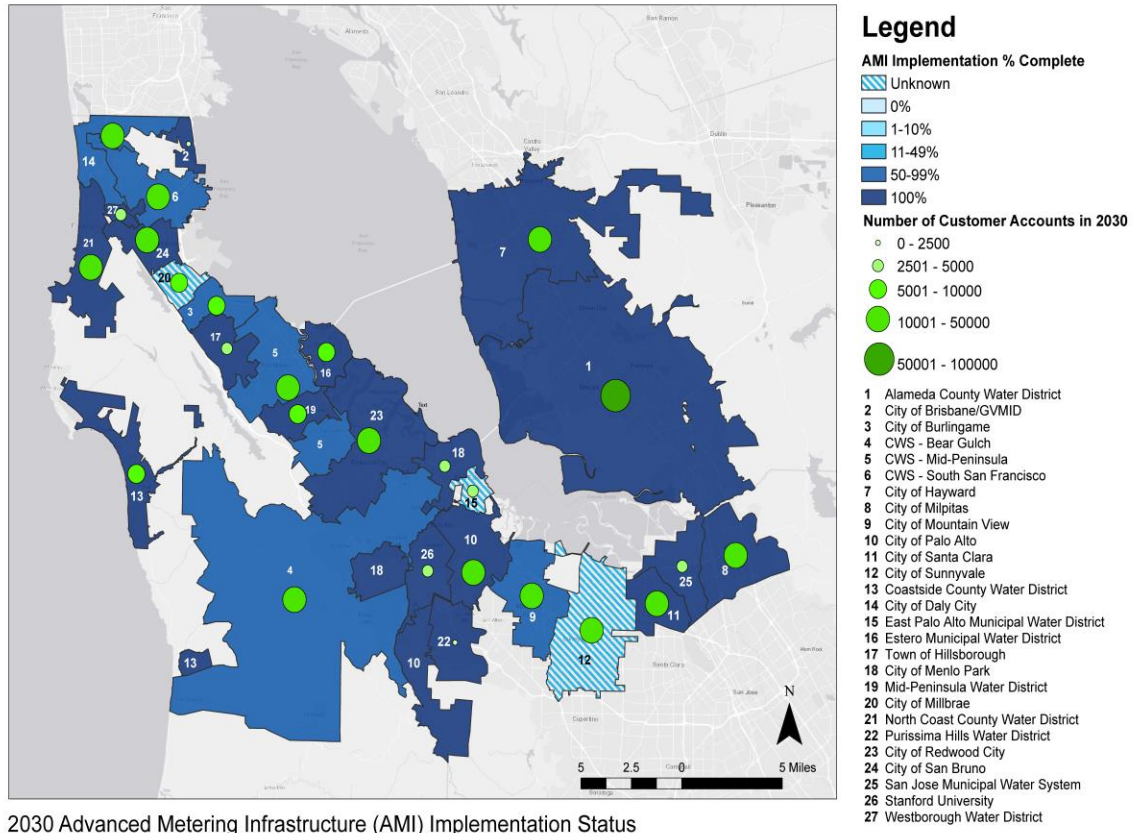


2023 Advanced Metering Infrastructure (AMI) Implementation Status

When agencies with fully deployed AMI were asked how many years it took to deploy the system, the answers ranged from 1 year to 11 years with a majority of the agencies completing deployment in 2 years.

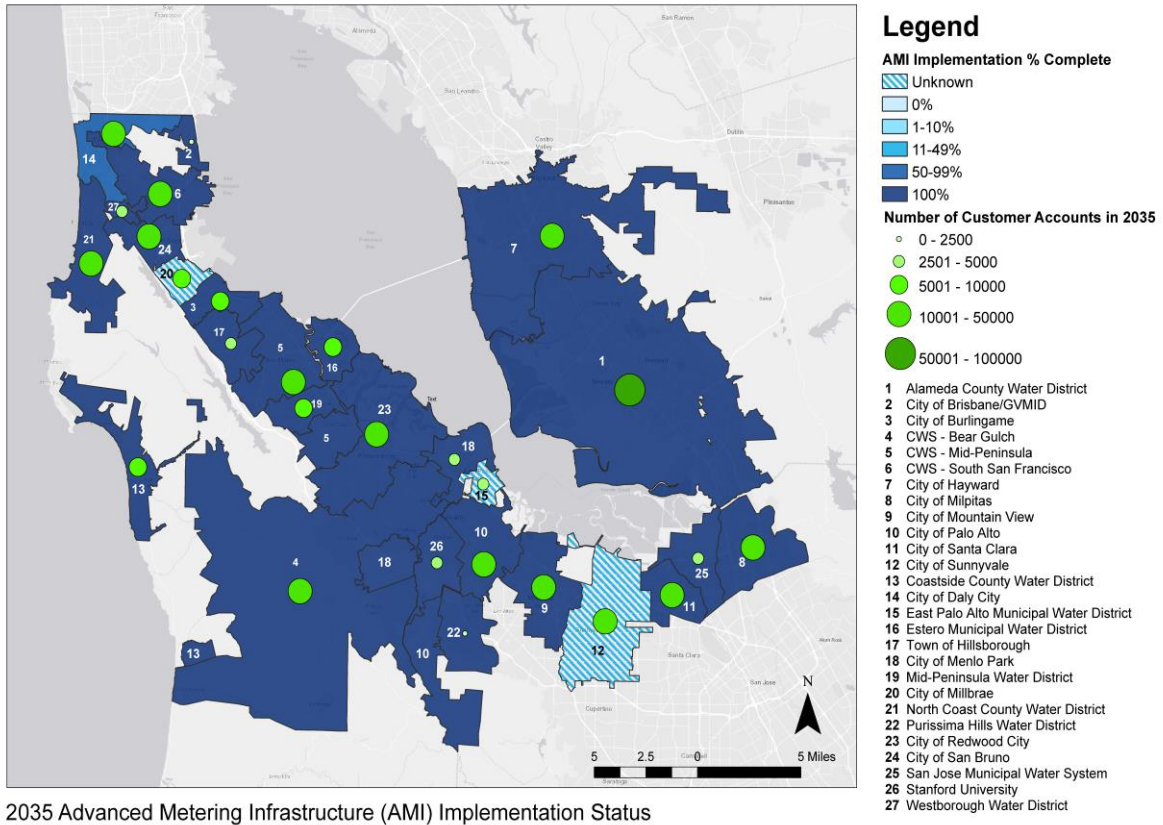
The AMI survey additionally asked about future AMI implementation as a majority of agencies are in the process of either implementing AMI or developing a pilot AMI project. Figure 4 shows that by the year 2030, 65% of agencies are projected to have 100% AMI implementation. This would be an increase of 112.5% in the number of agencies with full implementation from 2023.

Figure 4. Projected status of AMI implementation among BAWSCA agencies in 2030



When looking out to 2035, 22 out of 26 BAWSCA agencies are projected to have 100% AMI implementation, one agency would have 50-99% implementation, and the remaining three agencies do not have enough information at this time to make a decision regarding AMI implementation (Figure 5).

Figure 5. Projected status of AMI implementation amongst BAWSCA agencies in 2035



Finding 3. Notification of leaks and high usage is perceived to be the most important benefit of AMI by BAWSCA agencies

Member agencies have a variety of reasons for wanting to implement AMI. ⁽⁵⁾ Some of these reasons include:

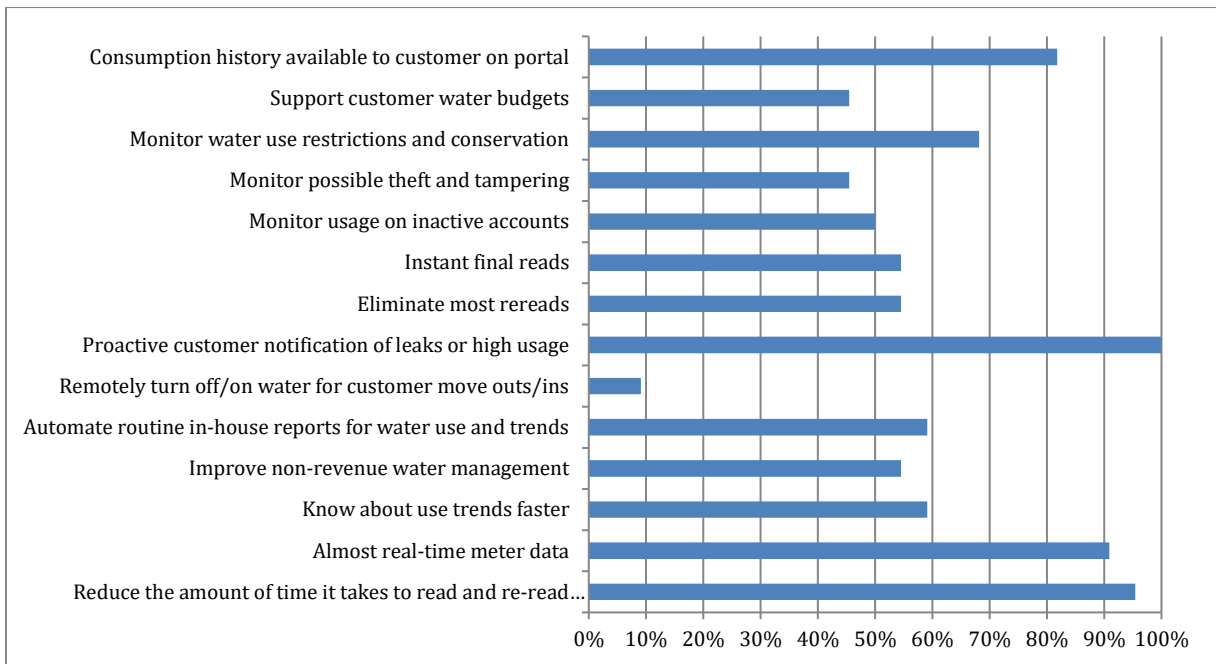
- **Accurate and timely data:** AMI allows for automated and remote meter reading, eliminating the need for manual data collection. This enables agencies to have up-to-date information on water usage, helping them make informed decisions about resource allocation and conservation efforts.
- **Leak detection and reduction:** AMI systems can detect and alert agencies to potential leaks in real-time. By promptly identifying leaks, water agencies can minimize water losses and take immediate action to rectify the issue.
- **Water conservation:** AMI systems often offer customer portals or mobile apps that provide access to near real-time consumption data, which allows customers

to monitor their water usage, identify wasteful practices, and make conscious efforts to conserve water.

- Operational efficiency and planning: Automated meter reading eliminates the need for manual visits to read meters, reducing labor costs and improving operational efficiency. The data collected through AMI offers valuable insights into water consumption patterns, allowing agencies to better understand customer behaviors and needs. This data can inform long-term planning, infrastructure investments, and resource allocation strategies.
- Demand management: By having access to detailed consumption data, water agencies can analyze usage patterns and identify peak demand periods. This information helps in implementing demand management strategies.
- Customer engagement and satisfaction: AMI systems enhance customer engagement by providing them with access to their water usage data and personalized insights. This involvement in water management contribute to improved customer satisfaction and trust in the water agency's operations.

As part of BAWSCA's AMI Survey, agencies were asked why they were interested in AMI and what are the largest benefits of AMI. The survey results illustrate a clear understanding by member agencies of the benefits of AMI technology. Based on responses, "Pro-active notification of leaks or high consumption" is the most important benefit of AMI with all agencies indicating it as an importance (100%). Other areas of identified benefits of AMI for member agencies include obtaining real-time meter data, reducing the amount of time it takes to read and re-read meters, and providing consumption history to customers on portal (Figure 6).

Figure 6. Ranked importance of AMI for BAWSCA agencies

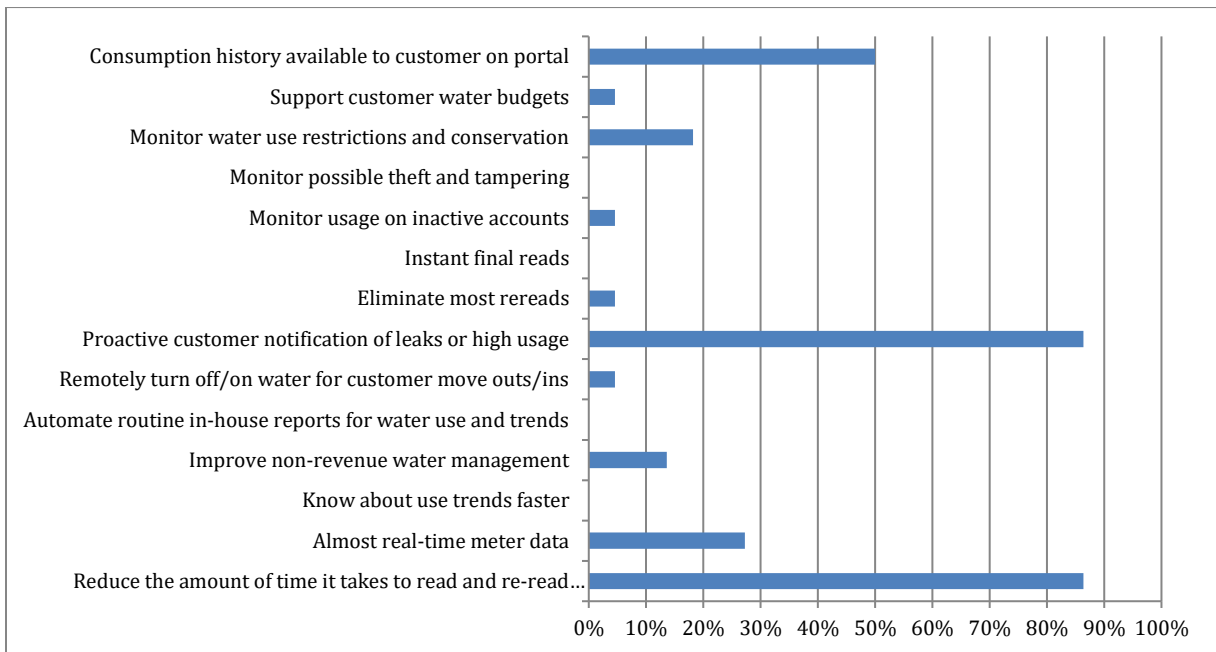


Other benefits mentioned by BAWSCA agencies were to:

- Improve understanding of consumption vs. production for state reporting, AWWA Report, BAWSCA reporting
- Improve customer understanding of water used during billing period
- Eliminate manual reads and reading errors
- Provide drought response
- Reduce winter irrigation
- Use Customer Service Portal to provide better customer service across all Divisions (including Water, Street, Sewer)
- Collect better customer contact information to provide better customer service

When agencies were asked to choose the three most important AMI features, “Pro-active notification of leaks or high consumption” was again identified as the most important benefit of AMI as well as reducing the amount of time it takes to read and re-read meters, and providing consumption history to customers on portal (Figure 7).

Figure 7. Three most important AMI features for BAWSCA agencies



Overall, the implementation of AMI was identified as enabling member agencies to enhance operational efficiency, reduce water losses, promote water conservation, improve customer service, and make data-driven decisions.

Finding 4. Greatest challenge with AMI implementation is obtaining funding

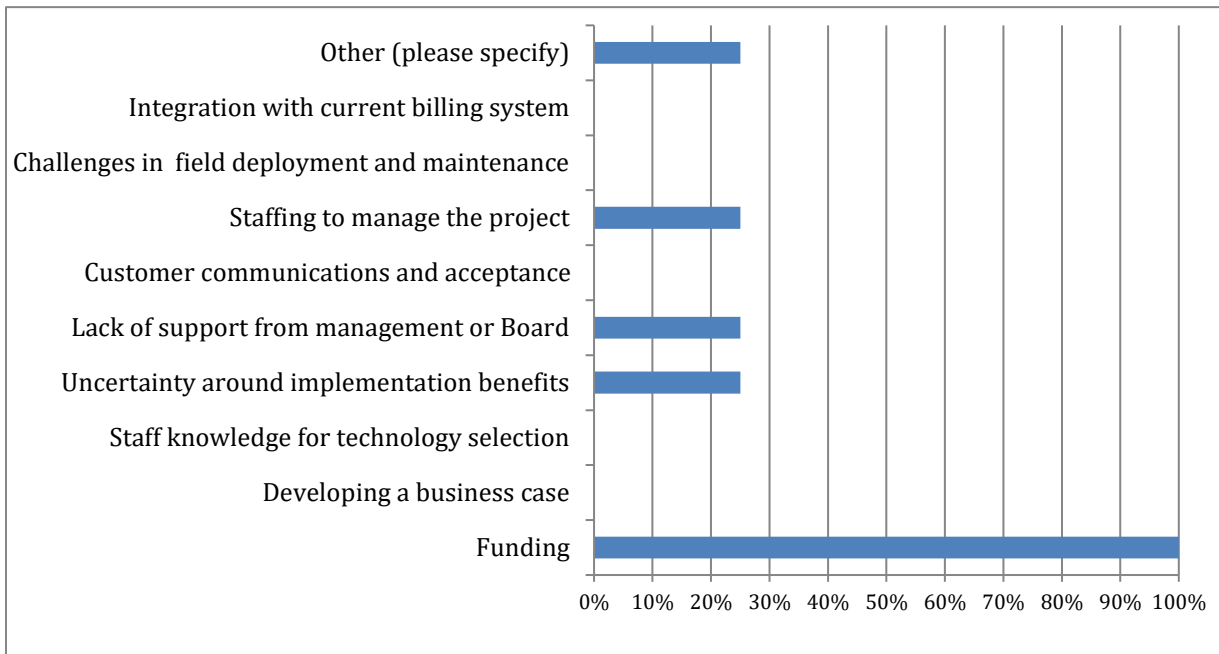
Some challenges and barriers may prevent agencies from seizing opportunities on AMI implementation. Some challenges to deploying AMI may include costs, technical complexity, data management and security, limited staffing to implement and manage data, and stakeholder engagement. ⁽³⁾

For the three agencies that stated they are not implementing AMI (or planning not to implement AMI) at this time, BAWSCA asked:

What are key challenges your agency faced, or expects to face, when implementing AMI?

Figure 8 shows that funding was identified as the main reason agencies are not prioritizing the implementation of AMI. AMI implementation requires a significant upfront investment in smart meters, communication infrastructure, data management systems, and software. Utilities, particularly smaller ones with limited budgets, may find it challenging to allocate the necessary funds for the deployment of AMI. For the one agency that selected *Other (please specify)* they discussed that the agency's current priorities are pipeline replacement instead of investing resources on AMI.

Figure 8. Key challenges when implementing AMI



Addressing the challenges require careful planning and sufficient resources. Utilities must conduct thorough feasibility studies, develop implementation strategies, and engage with vendors, regulators, and customers to ensure a successful and beneficial deployment of AMI. ⁽⁷⁾ The identification of grants and resources can potentially provide financial assistance to further allow these agencies to implement AMI.

Finding 5. Majority of meter management is done in-house

Meter replacement programs can be executed in various ways, and the approach can differ depending on the specific circumstances and resources of the water agency. Both in-house management and contracted out approaches are common for meter replacement programs.

In-House Management:

In some cases, water agencies have the necessary resources, expertise, and capacity to manage meter replacement programs internally. This involves utilizing agency staff, including field technicians and metering personnel, to carry out the replacement process. In-house execution offers direct control over the program, allowing agencies to maintain quality standards, timelines, and customer relationships. It may also provide cost savings if the agency has the necessary personnel and equipment readily available.

Contracted Out:

Water agencies often opt to contract out meter replacement programs to external vendors or specialized service providers. This approach allows agencies to leverage the expertise, experience, and resources of companies that specialize in meter replacement projects. These vendors often have dedicated teams, equipment, and streamlined processes to efficiently execute large-scale meter replacement programs. Contracting out can be particularly beneficial for smaller agencies or those without in-house expertise and resources.

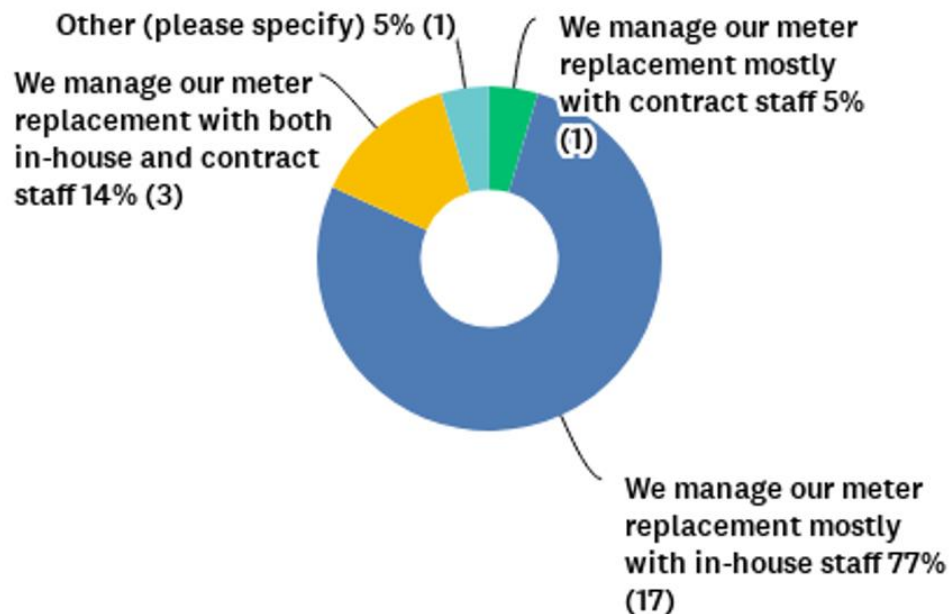
Ultimately, the choice between in-house management and contracted out meter replacement programs depends on factors such as the agency's capacity, expertise, resources, and specific project requirements. Some agencies may opt for a hybrid approach, combining in-house management with outsourced services for specific aspects of the program.

The BAWSCA AMI Survey therefore asked agencies:

Typically, is your agency's meter replacement program work done in-house or contracted?

Responses about meter management practices showed that 77% of the agencies mainly manage meters in-house, while 14% of the agencies manage meter replacement with both in-house and contract staff. The agency selecting *Other (please specify)* indicated that their AMI meter deployment was done by a contractor, but day-to-day management of meter replacement is done in-house.

Figure 9. Meter management practices



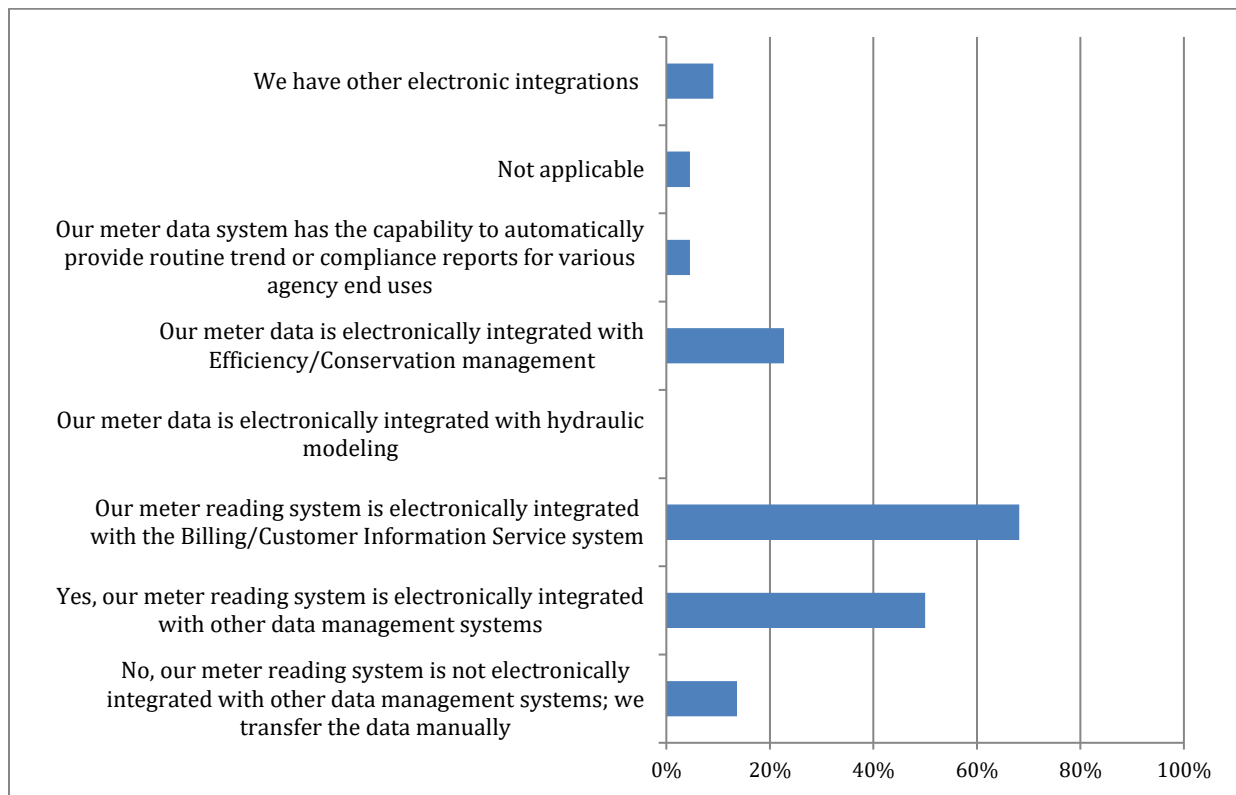
Finding 6. Meter reading systems are mainly electronically integrated with billing and customer information systems, although they can be integrated to multiple other water data management systems

Water agencies' meter reading systems can be used with various other management systems, including billing and customer information, hydraulic modeling, conservation management, and other data management systems. To better understand the integration and utilization of meter data amongst BAWSCA agencies, the survey asked:

Is your agency's meter reading system electronically integrated (data transfers directly from meter) with related water data management systems?

As shown in Figure 10, 68% of member agencies use their data within the billing and customer information service system.

Figure 10. Integration of meter reading system



Responses to survey questions asking about automated vs. manual transfer of meter data for routine uses, show that only 14% of the responses state that data is manually input. The responses suggest that agencies have automated transfer of most data electronically but are limited with its uses.

It is apparent from the responses that meter data is fundamental for many agencies and provide information for various uses within each member agency. Enabling access to timely, reliable, and accurate meter data provides many core benefits for utility operations.

In spite of the many benefits of AMI, agencies do not utilize all of the capabilities of their AMI systems and the technology is primarily used for meter reading and/or billing. Key reasons why the technology is underutilized could stem from the need to dedicate staff time and resources to set up integration of the AMI systems, work with the vendors, and test the integrations.

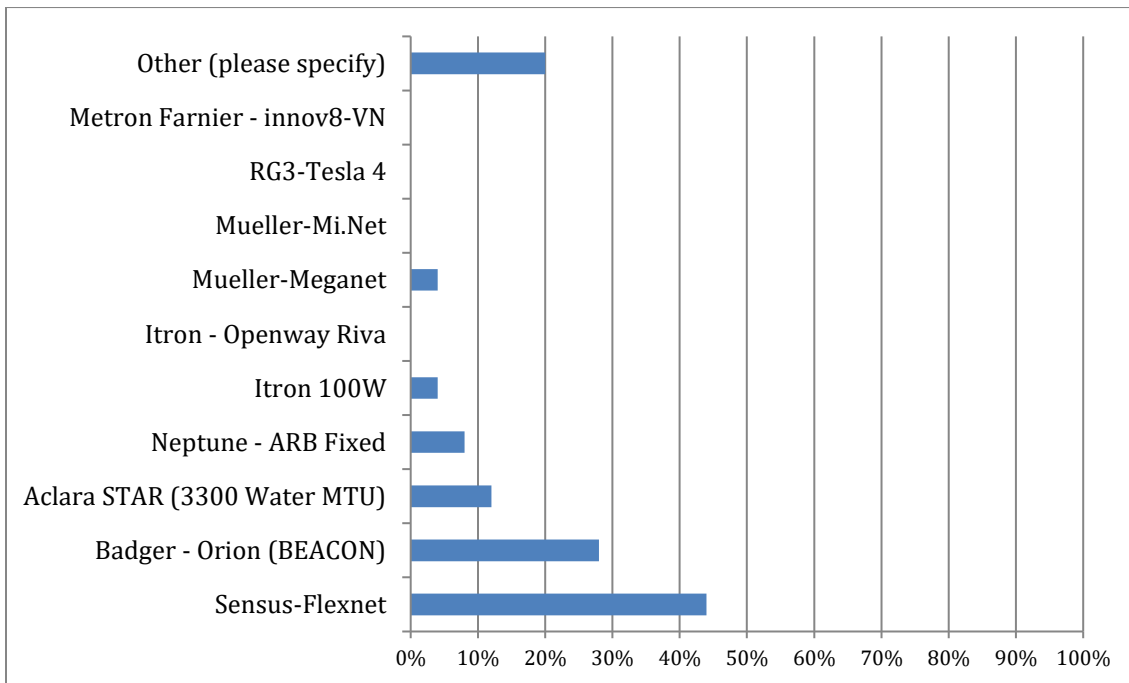
Overall, these integrations can enable water agencies to leverage consumption data for comprehensive water management, efficient customer service, and water conservation.

Finding 7. Various vendors and network communication systems are utilized to enable the seamless flow of data between smart meters and the central data management system

There are several major vendors that provide AMI solutions tailored for water utilities. These vendors offer a range of products and services encompassing smart meters, communication networks, data management systems, and analytics platforms.

The Survey asked BAWSCA agencies what vendors(s)/system(s) are part of their program or are being considered to be part of their program. Figure 11 shows that Sensus-Flexnet and Badger-Orion are the most common brands used by BAWSCA agencies, with eleven agencies (44%), and seven agencies (28%) respectively. Under the “Other (please specify)” option, two agencies are exploring vendor options and three are unsure about AMI implementation at this time.

Figure 11. Dominant meter brands in use by BAWSCA agencies



Network Communication System

AMI relies on robust network communication systems to enable the seamless flow of data between smart meters and the central data management system. There are five different network communication systems used in AMI. ⁽⁸⁾:

1. **Fixed Network Systems:** In fixed network systems, dedicated communication infrastructure is established using technologies such as power line carrier (PLC) or wired connections. Smart meters are connected through wired networks, such as Ethernet or fiber optic cables, to a communication gateway. The gateway collects data from the meters and transmits it to the central data management system through a wired network.
2. **Cellular Networks:** Cellular networks, such as 2G, 3G, 4G, and now emerging 5G, are widely used for AMI communication. Smart meters equipped with cellular communication modules connect to the cellular network to transmit consumption data
3. **Radio Frequency (RF) Systems:** RF communication systems use radio waves to transmit data between smart meters and the central data management system.

4. Power Line Communication (PLC): PLC utilizes the existing power line infrastructure to transmit data between smart meters and the central system. The data is carried over the power lines using specific modulation techniques.
5. Hybrid Networks: Hybrid networks combine multiple communication technologies to leverage their strengths. For example, a hybrid network may use a combination of fixed network systems, cellular networks, and RF systems to optimize coverage, reliability, and cost-efficiency.

The choice of network communication system depends on various factors, including geographical coverage, infrastructure availability, regulatory considerations, cost-effectiveness, and performance requirements. Utilities assess these factors to determine the most suitable network communication system for their AMI implementation, aiming for reliable and efficient data transmission for effective water management.

For the BAWSCA agencies, the survey asked:

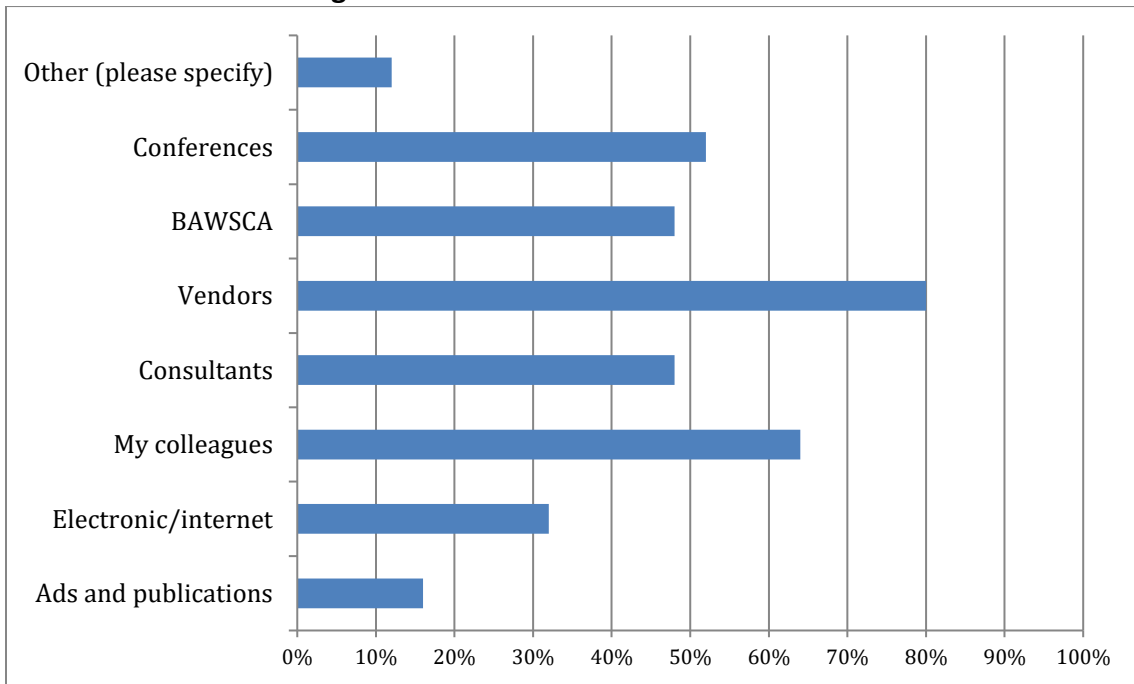
What network communication system(s) is your agency using (or planning to use) for AMI?

The results showed that seven agencies use a hybrid network with a combination of fixed network systems, cellular networks, and radio frequency systems. Seven other agencies specifically use a radio frequency system while another three use a cellular network, and one agency uses a fixed network system. Seven agencies did not answer the question as they have not started implementing AMI within their service areas and are unsure of what network communication system they would be using.

Finding 8. Agencies receive most of their information about AMI from vendors and colleagues

Agencies obtain information about AMI from numerous sources. When asked where most of the information comes from, agencies identified vendors (80%) and colleagues (63%) as the main sources for AMI information. Agencies also identified BAWSCA (48%) and Conferences (52%) as a source of information.

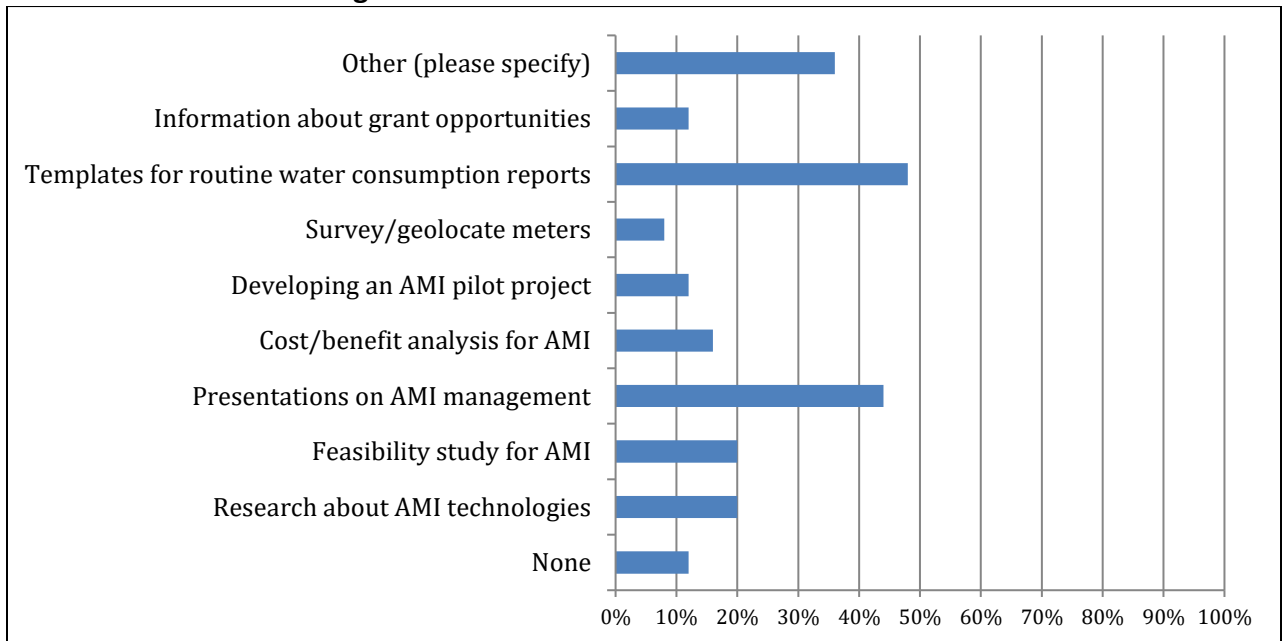
Figure 12. Sources for AMI information



Finding 9. BAWSCA agencies express interest in learning more about routine water consumption reports and presentations on AMI management

Agencies were asked to select AMI related areas they are interested in learning more about. The highest interest (48%) is in learning more about templates for routine water consumption reports, followed by presentations on AMI management (44%).

Figure 13. Areas of future interest for AMI



Other responses include:

- The last AMI Workshop that BAWSCA hosted was a very helpful resource for agencies at all stages of implementation.
- Connecting member agencies to learn best practices. Gathering information on setting leak alerts for different customer types.
- Software for real time analysis of water use by customer class, pressure zone, district metered areas, for non-revenue and efficiency management.
- How to get customized reports/increased responsiveness from our AMI vendor.
- New developments in AMI and innovative uses of the hourly consumption data.
- SaaS for AMI data analytics.

The final question of the BAWSCA AMI Survey asked member agencies what other steps BAWSCA should consider to support AMI efforts across its member agencies. Answers to the question included:

- Provide consistent and unified AMI on SFPUC meters.
- Provide details about unsuccessful pilots and equipment.
- Identify potential funding sources.

- Provide guidance and information on setting leak thresholds for different meter classes to enable leak alerts.
- Present on different ways to use AMI meters.
- Host discussions regarding how to use data to analyze end uses for targeting programs and ensuring compliance with water use restrictions.
- Joint contracting or consultants that can compile cost-benefit assessments and/or issuing RFPs for vendors.
- Development of an AMI RFP and assistance with navigating the process
- Understanding the differences between vendors and experiences.
- Data management.
- Analytics of AMI for rate studies, conservation compliance, service and meter sizing.

5. Summary and Next Steps

The BAWSCA AMI Survey of its member agencies has assessed the member agencies' readiness and understanding of challenges and benefits of AMI implementation through the following nine findings:

1. AMI is the predominant meter-reading method for BAWSCA agencies. This indicates that the majority of agencies within BAWSCA have already implemented or are in the process of implementing AMI technology for meter reading.
2. By 2035, 85% of BAWSCA agencies are projected to fully implement AMI. This highlights the strong commitment of BAWSCA agencies to transitioning to AMI technology, with a significant majority expected to have fully implemented it within the next decade.
3. Notification of leaks and high usage is the most important benefit of AMI to BAWSCA agencies. Agencies prioritize the ability of AMI systems to proactively identify and notify customers about leaks and abnormally high water usage, as this helps conserve water and prevent costly damage.
4. The greatest challenge with AMI implementation is obtaining funding. Securing adequate funding is crucial for agencies to invest in the necessary infrastructure and equipment for AMI deployment.
5. The majority of meter management is done in-house. BAWSCA agencies primarily handle meter management internally, suggesting that they have dedicated staff and processes to monitor and maintain their metering infrastructure.

6. Meter reading systems are mainly electronically integrated with billing and customer information systems, although they can be integrated to multiple other water data management systems. This finding highlights the integration capabilities of AMI meter reading systems. Additionally, AMI systems can also integrate with other water data management systems, enabling agencies to leverage data for multiple applications.
7. Various vendors and network communication systems are utilized to enable the seamless flow of data between smart meters and the central data management system. BAWSCA agencies rely on different vendors and communication systems to establish effective data transfer between smart meters and the central data management system. This indicates a diverse vendor landscape and the need for interoperability among different components of the AMI system.
8. Agencies rely on vendors and colleagues for information and updates regarding AMI technology. This suggests the importance of vendor relationships and peer-to-peer knowledge sharing within the industry.
9. BAWSCA agencies are interested in learning more about routine water consumption reports and presentations on AMI management. This indicates a need for further education and training to maximize the benefits of AMI implementation.

Considering these findings, BAWSCA may consider the following actions to support member agency needs for AMI implementation in the coming years:

- Host additional AMI workshops, webinars or training about AMI, meter data management, RFPs for AMI deployment, onboarding best practices, case studies, AMI technology improvements, and AMI BMPs.
- Seek grant-funding opportunities to support further AMI implementation.
- Research potential opportunities for regional programs to support AMI data management.
- Develop an AMI Request for Proposal (RFP) template and provide assistance with navigating the process of obtaining a consultant to implement AMI.
- Provide resources to better understand the differences between vendors and experiences.

6. Selected References

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APPENDIX A. BAWSCA Member Agency Representative Completing AMI Survey

BAWSCA Member Agency	Representative Completing AMI Survey
Alameda CWD	Megan Maurino
Brisbane / GVMID	Jerry Flanagan
Burlingame	Jennifer Lee
Coastside CWD	Cathleen Brennan
Cal Water	Darin Duncan
Daly City	Gregory Krauss
East Palo Alto	Batool Zaro
Estero MID	Zaheed Danish
Hayward	Kait Byrne
Hillsborough	Ed Cooney
Menlo Park	Pam Lowe
Mid-Peninsula WD	Kat Wuelfing
Millbrae	Andrea Pappajohn
Milpitas	Samantha Vergara
Mountain View	Elizabeth Flegel
North Coast CWD	Adrianne Carr
Palo Alto	Linda Grand
Purissima Hills WD	Phil Witt
Redwood City	Justin Chapel
San Bruno	Steven Salazar
San Jose	Derek Hentschke
Santa Clara	Gary Welling
Stanford	Erica Kudyba
Sunnyvale	Joseph De la Cruz
Westborough WD	Patricia Mairena

APPENDIX B. SurveyMonkey Sample of AMI Survey

* 2. What is the status of AMI implementation at your agency? Please select ONE answer that fits best and explain in space provided, if needed.

- | | |
|---|---|
| ☐ We do not plan to implement AMI at this time | ☐ We are in the process of implementing AMI |
| ☐ We plan to start implementing AMI within the next few years | ☐ We have deployed AMI for a portion of our metering system at our agency |
| ☐ We are in the process of implementing an AMI pilot project | ☐ We have fully deployed (100%) AMI for our agency |
| ☐ Other (please specify) | |

* 6. What are the reasons why your agency wants or wanted to implement AMI?

- | | |
|---|--|
| ☐ Reduce the amount of time it takes to read and re-read meters | ☐ Eliminate most rereads |
| ☐ Almost real-time meter data | ☐ Instant final reads |
| ☐ Know about use trends faster | ☐ Monitor usage on inactive accounts |
| ☐ Improve non-revenue water management | ☐ Monitor possible theft and tampering |
| ☐ Automate routine in-house reports for water use and trends | ☐ Monitor water use restrictions and conservation |
| ☐ Remotely turn off/on water for customer move outs/ins | ☐ Support customer water budgets |
| ☐ Proactive notification of leaks or high consumption to customers | ☐ Consumption history available to customer on portal |

Other (please specify)