American Water Works Association

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2015 Establishing the Level of Progress in Utility Asset Management Survey Results

What are the benefits of asset management? Implementing the concepts of asset management means making more informed, better decisions in order to sustain the desired level of customer service in the most efficient and effective way possible. Beginning or implementing an asset management program involves many different concepts, which can be daunting for a utility. In order to provide assistance to utilities at any stage in the development of an asset management program, AWWA has developed a number of resources available on the Asset Management Resource Community web page and presented at various conferences and webinars throughout the year.

In order to better understand the need for additional resources to better serve those wanting to begin or advance their implementation of asset management programs, AWWA conducted a survey in early 2015 to collect information on the level of progress in utility asset management. This survey covers general asset management, current state of assets, levels of service, risk management, maintenance and reliability, and asset planning.

Readers will find this report on the survey findings a useful source of information when trying to understand the current state of the industry for asset management best practices and how asset management programs help utilities. AWWA received complete responses to the survey from 545 utilities (i.e., respondents answered all or most of the survey questions). This report includes aggregated summaries and analyses of the reported utility practices and policies as collected through this survey from those 545 utilities.

The American Water Works Association (AWWA) Asset Management Survey Subcommittee, which developed this survey and results, included the following personnel:

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ABOUT AWWA

The American Water Works Association (AWWA) is an international, nonprofit, scientific and educational society dedicated to providing total water solutions assuring the effective management of water. Founded in 1881, the Association is the largest organization of water professionals in the world. Our membership includes over 3,900 utilities that supply roughly 80 percent of the nation's drinking water and treat almost half of the nation's wastewater. Our nearly 50,000 members represent the full spectrum of the water community: public water and wastewater systems, environmental advocates, scientists, academicians, engineers, manufacturers, and others who hold a genuine interest in water, our most important resource. AWWA unites the diverse water community to advance public health, safety, the economy, and the environment.

BACKGROUND

Increasingly, utilities around the world are adopting asset management approaches to more effectively and affordably manage their infrastructure. Many funding agencies incentivize or require components of asset management because they understand that applying advanced asset management principles at a water utility will provide a degree of confidence to the lending agency that the investment of funds will be properly managed over time. Some states go further, allowing some SRF loans to be applied to the development of asset management plans, not just their implementation, and some states are providing grant funds for asset management plan development. Additionally, utilities across the United States applying for Clean Water Act State Revolving Fund (SRF) loans (for wastewater projects) in many cases are required to provide evidence that elements of an asset management program are in place to qualify.

To support utilities seeking to advance their asset management practices, AWWA collected data and information from utility personnel through a survey to establish the level of progress in asset management. The survey covered a broad range of asset management practices and policies, including overall asset management planning, asset knowledge, service levels, capital project review, risk management, maintenance and reliability planning, and replacement planning. This report summarizes those results and presents findings based on subsequent analyses. *It should be recognized upfront that there is no one-size-fits-all solution for water suppliers when it comes to managing their individual water infrastructure systems, and ultimately it is important to develop an asset management approach that fits with each utility's available resources, priorities, and relevant challenges.*

METHODOLOGY

Throughout the survey collection process, AWWA made deliberate efforts to anticipate and minimize errors; however, respondents ultimately self-selected to participate in this survey. Survey participation was requested of all AWWA utility members as well as individuals who specifically expressed an interest in asset management. Because the bulk of AWWA contacts reside in North America, the survey generally reflects the policies and practices of water professionals in the United States, Canada, and Mexico.

On April 28, 2015 through May 4th, email invitations were delivered to approximately 30,000 email addresses in the AWWA network. Additional survey invitation messages were independently delivered through multiple channels, including notably large email pushes from the Environmental Finance Center Network and Pure Technologies. AWWA issued reminder emails at the end of May. The open period for the survey closed on May 28, 2015.

After removing wholly incomplete and overlapping responses from employees of the same utility, 545 utilities completed the “Level of Progress in Asset Management” survey. A summary of the number of responses by utility location is provided in Appendix 1. The results presented in the following sections have not been weighted to reflect the demographic composition of any target population. Because the amount of self-selection bias is unknown, no estimates of error have been determined. The full survey questionnaire is presented in Appendix 2.

RESULTS

Survey responses were received from utilities of all sizes. In the figures presented in this section, the number of responses received for a given question is referred to as "n". Results are shown in terms of the percentage of utilities that chose a given response.

Figure 1 shows the breakdown of respondents based on the size of population served by the reporting utility. The largest group of utility respondents is serving 50,000-499,999 people (36%), while the smallest group of utility respondents (7%) are those serving 500,000-999,999 people.

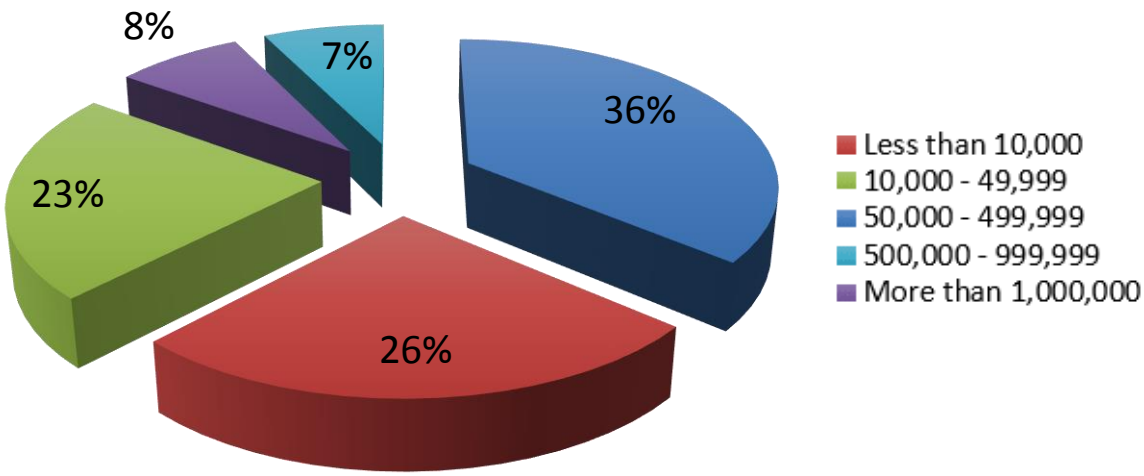


Figure 1. (Q6 2015) Survey respondents grouped by size of population served (n=543)

As shown in Figure 2, 91% of the utilities that responded are public utilities, while 9% are private utilities.

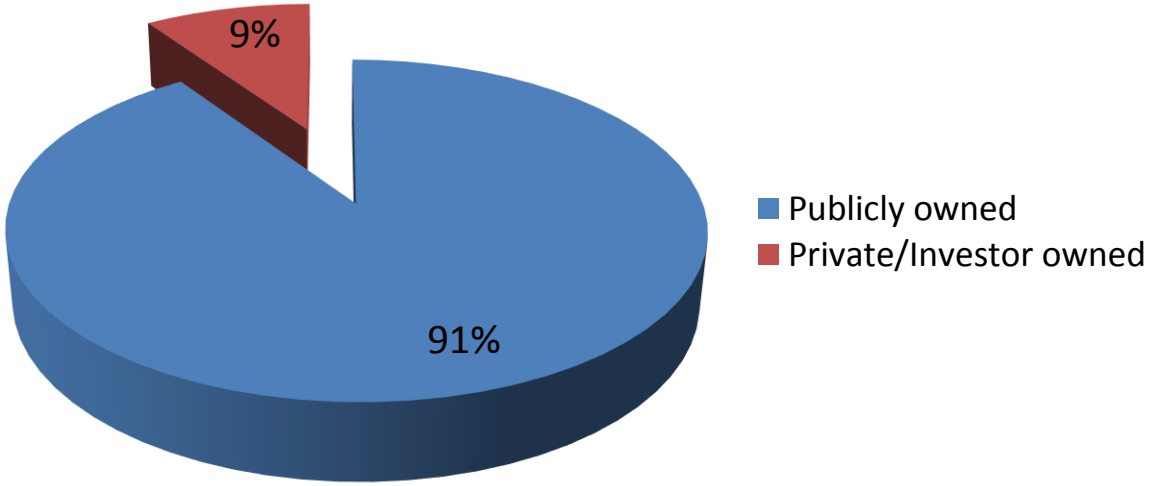


Figure 2. (Q3 2015) Survey respondents grouped by utility ownership. (n=537)

Similar to the breakdown of systems by population, responses were received from systems providing all demand levels, with the largest group of respondents (38%) having a system demand of less than 5 million gallons per day (MGD). Figure 3 provides an overview of the utility respondents based on their average system demand.

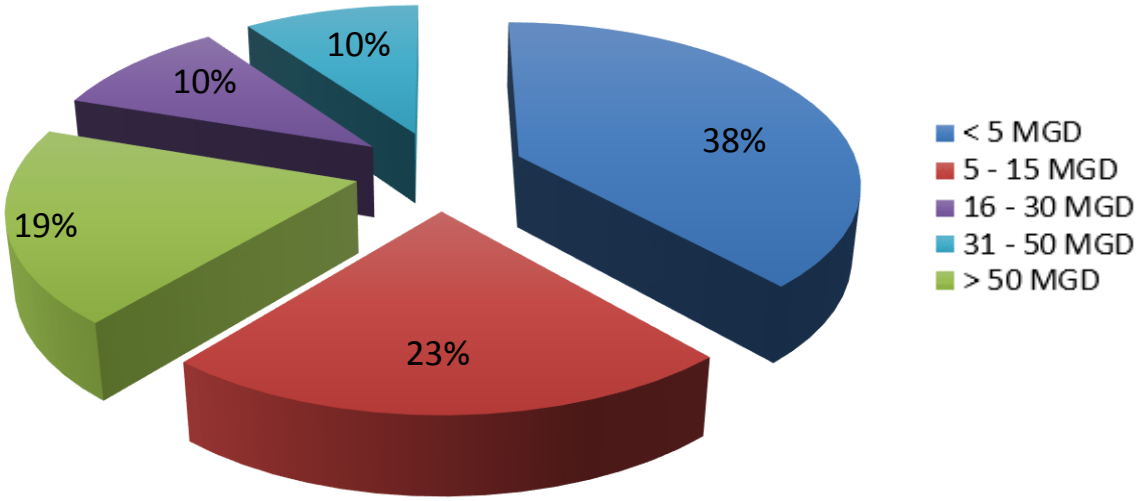


Figure 3. (Q5 2015) Survey respondents grouped by average daily system demand (n=541)

The majority of responding utilities provide retail potable water services (86%), with 94% providing either water retail or wholesale water service. The remaining 6% had wastewater service in some combination with water reuse and stormwater without water service. Overall, 65% of respondents provided wastewater services. Figure 4 presents the various services provided by the respondents, who could choose all the services that applied. Based on the responses, 2% provide all 5 services, 15% provide 4 services, 3% provide 3 services, 29% provide 2 services, and 26% provide only 1 service.

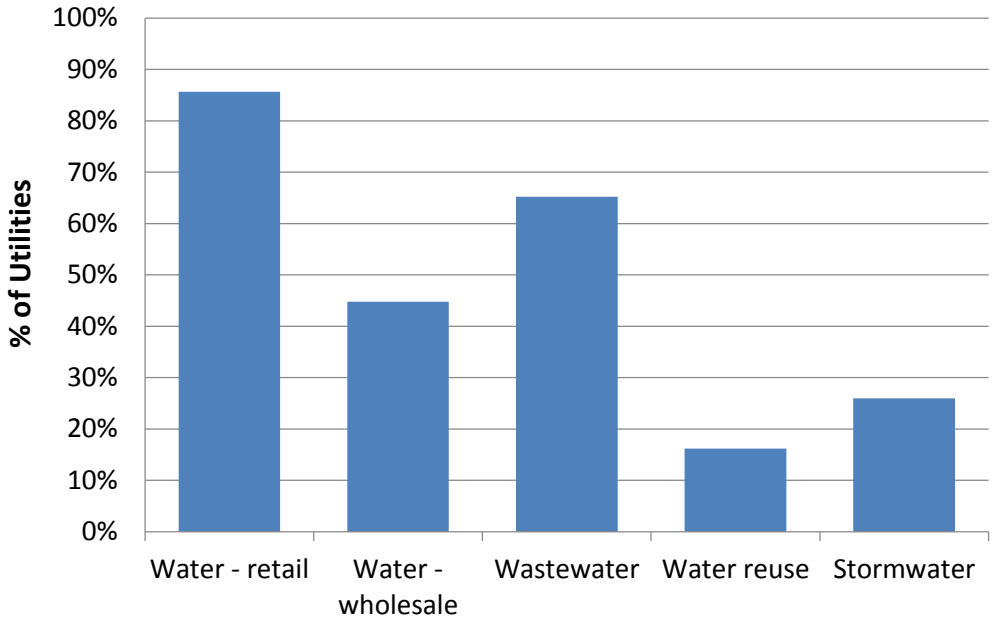


Figure 4. (Q4 2015) Types of services provided by the Survey respondents; 74% of utilities provide multiple services (n=543)

The first question regarding asset management progress is whether a utility has dedicated staff to the effort. The results (Figure 5) indicate that a majority of utilities do not have a dedicated coordinator and staff (71%), although many of those recognize the need for it. 29% have full or part time staff dedicated to asset management, and 15% do have full time staff dedicated to this effort.

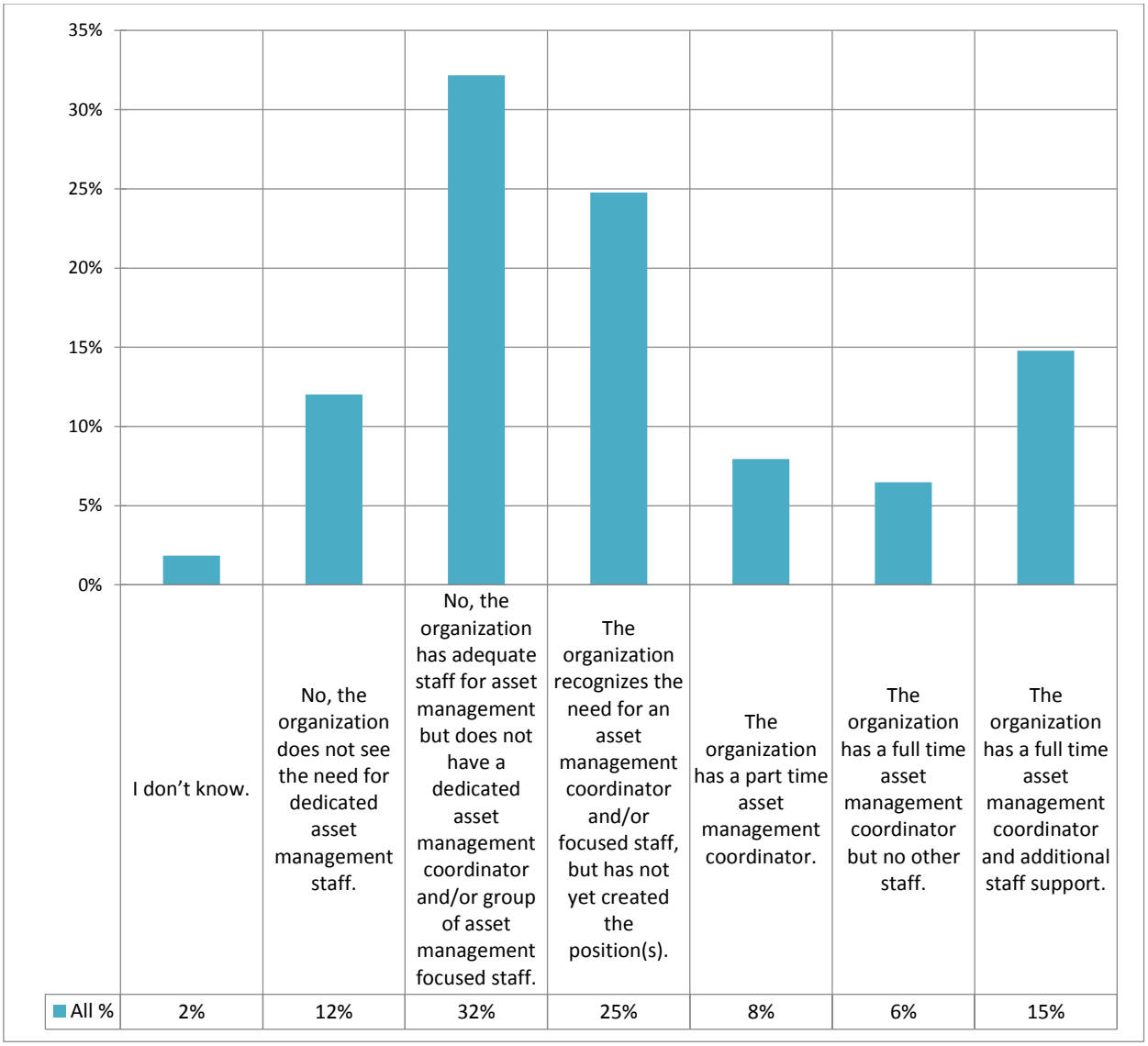


Figure 5. (Q8 2015) Does the organization have a dedicated asset management coordinator or asset manager and/or group of asset management focused staff? (n=541)

Although there may not be staff specifically dedicated for asset management at the majority of utilities, a much higher percentage of utilities have a work plan for doing asset management (Figure 6). Half of the responses indicate there is a work plan to implement Asset Management, but with only 12% of the responses reported having most of the work plan tasks implemented. This suggests that while progress is being made, there is much yet to be done.

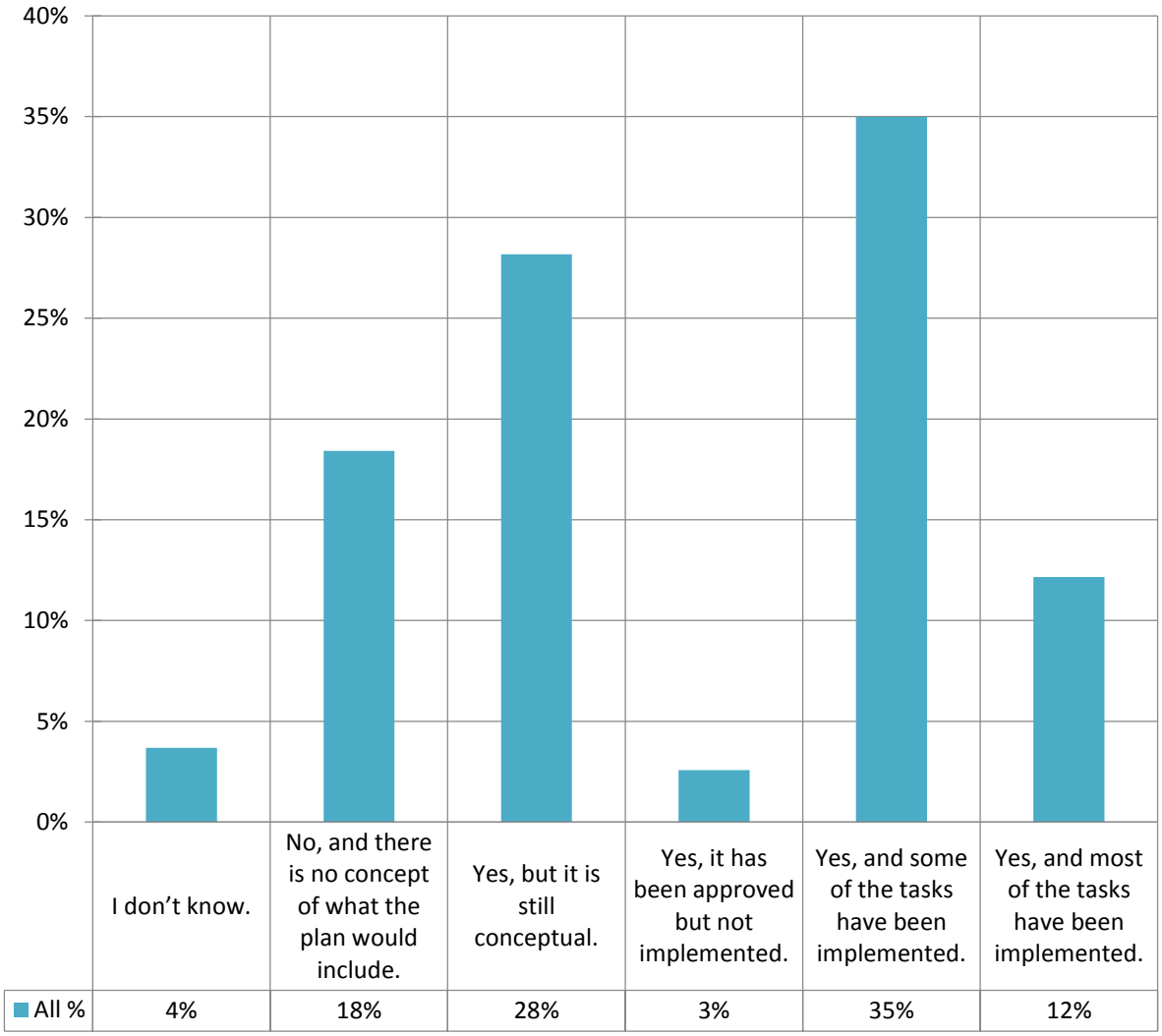


Figure 6. (Q9 2015) Is there a formal work plan to implement Asset Management within the organization? (n=543)

There seems to be support within the utility staff and management for advancing asset management practice, with 76% indicating some level of support (Figure 7). Over half of the responses indicate both management and staff support for asset management, which is a good sign for continued progress.

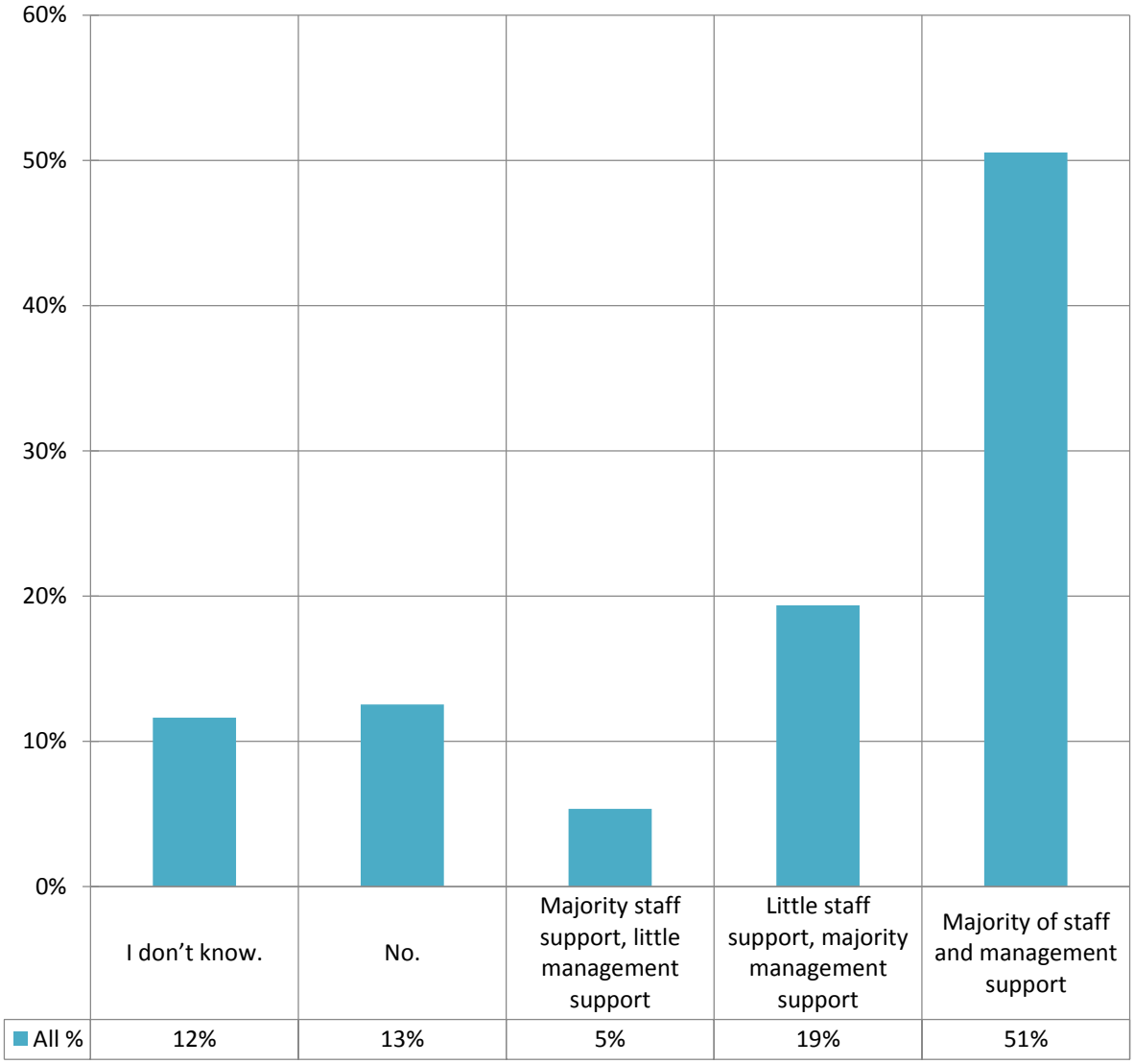


Figure 7. (Q10 2015) Is asset management embraced by staff throughout the organization? (n=542)

Is it worthwhile to pursue asset management, as defined by the practices in this survey? One way to interpret that question is to consider whether organizations can, or have, realized benefits from asset management (Figure 8). Over two thirds of the respondents either expect benefits or believe they have already achieved them. Of the nearly half of the responses that support the conclusion that benefits have been achieved, 34% state that benefits have been achieved, although they are not well documented, while another 13% have stated that benefits are well documented. The remaining 22% of utilities are expecting benefits in the future.

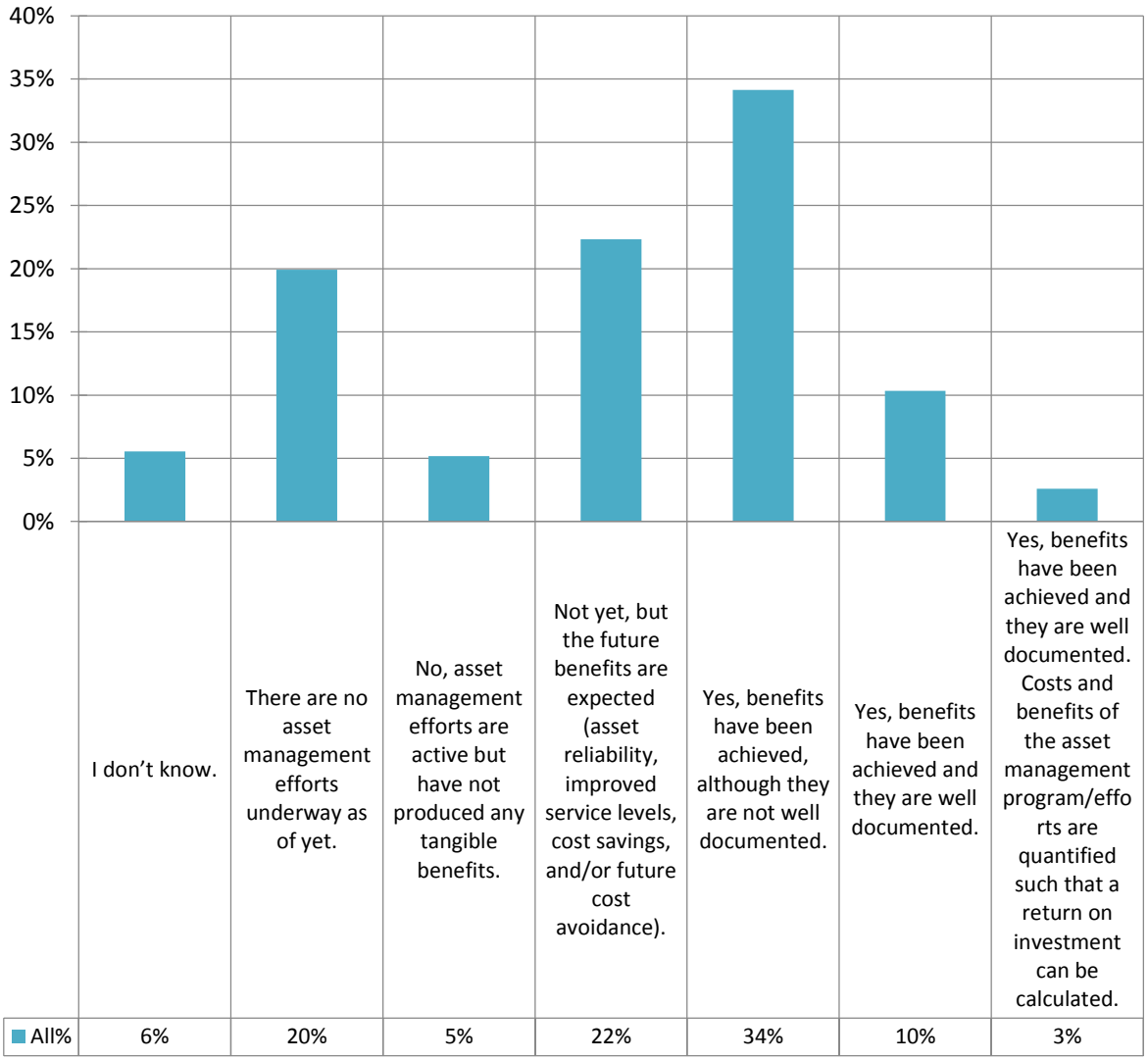


Figure 8. (Q11 2015) Has the organization realized a benefit from its asset management program and/or efforts? (n= 542)

One of the first places to start with managing assets is to know what assets are owned by the utility. Eventually, information about the assets should be placed within an asset register, as an asset inventory, and organized in an asset hierarchy. Key asset data such as material type, install date or asset condition are included. This question asked the respondents to indicate progress in these areas (Figure 9). Half of responses (49%) indicated that at least basic asset and attribute data were being stored. It was not yet common to see advanced data recorded, such as condition (12%), or a well-defined asset hierarchy (10%).

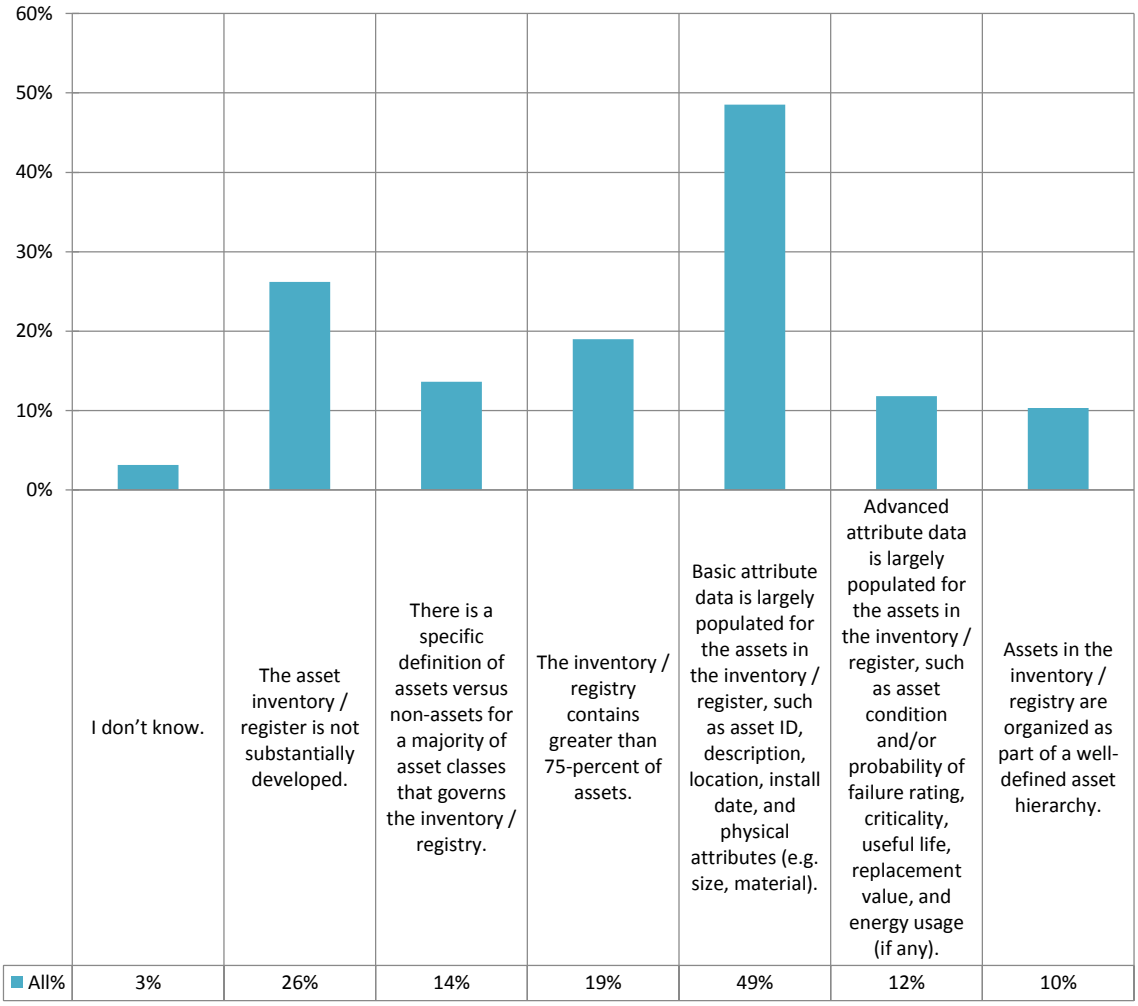


Figure 9. (Q12 2015) Which of the following describes your organization's asset inventory / asset register? (Choose all that apply) (n=542)

Assets can be mapped or included in a Geographic Information System (GIS) to facilitate asset management. There are both linear assets, especially pipes, to be tracked, as well as the distribution of vertical assets, such as pump stations and treatment facilities. The next question asked about the level of progress with mapping or use of GIS for linear and vertical assets (Figure 10). 90% of responses indicated that some mapping has occurred, with all mapping completed for the majority of utilities (58%). This is clearly one area where much progress has been made.

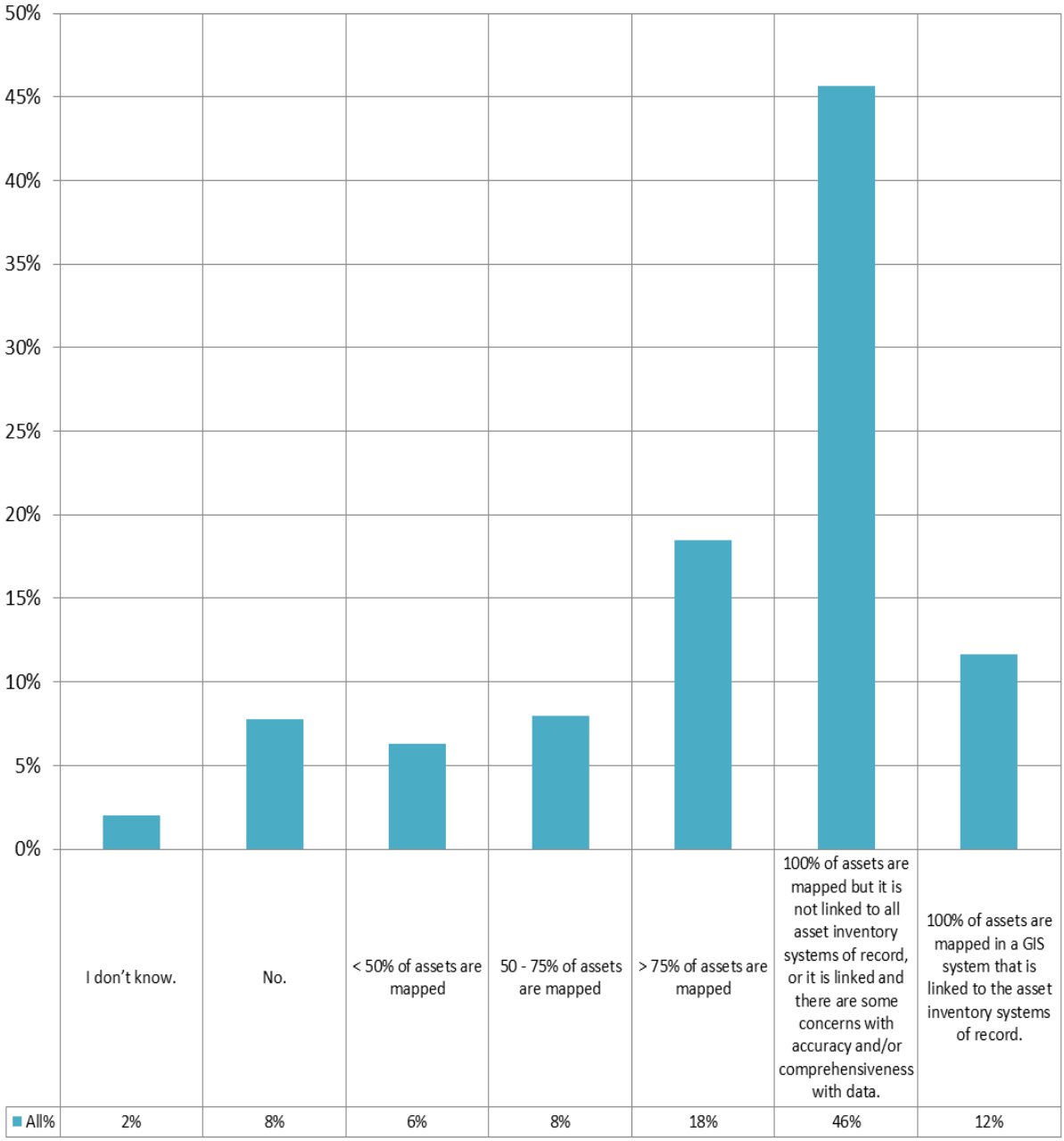


Figure 10. (Q13 2015) Does the organization have a map or a geographic information system (GIS) with both linear assets (pipes) and vertical asset locations (e.g., booster station and tank locations)? (n=541)

One of the best practices in asset management is the collection of asset condition data to help with decision making on asset renewals and replacement. Two questions were asked about a process to assess condition and maintain data on condition; one for linear assets (distribution system pipes) and one on vertical assets (Figures 11 and 12). When it comes to assessing pipe condition (Figure 11), 63% of utilities are at least somewhat engaged in the practices, about half of those are using historic break data as their basis (33%), but only 13% are to the point where they are using advanced condition assessment techniques on their critical pipes.

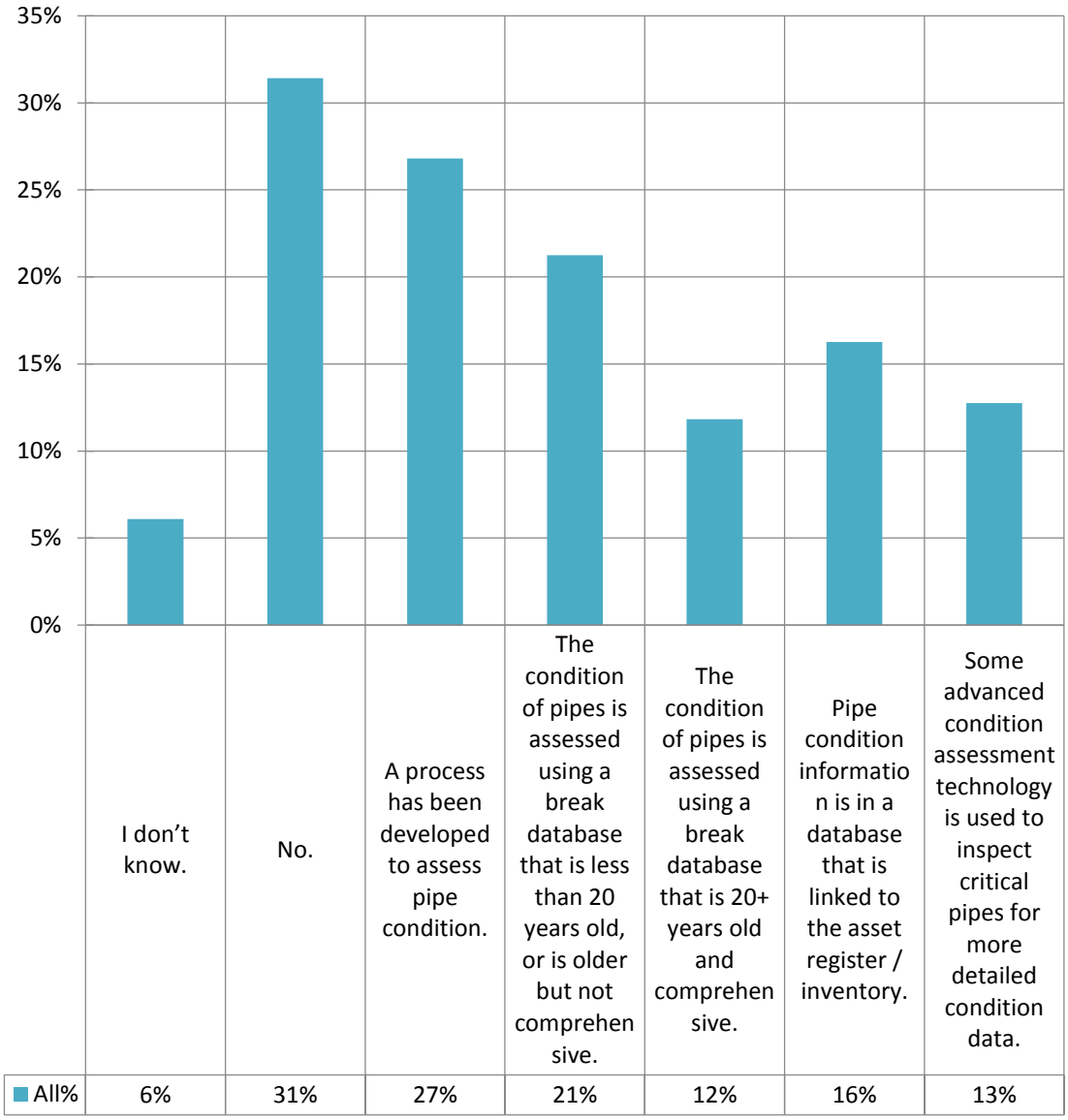


Figure 11. (Q14 2015) Does the organization have a process in place to assess the condition of linear assets (distribution system pipes) and store the condition data in a spreadsheet or database? (Choose all that apply) (n=541)

Just about half (49%) of utilities are doing something for vertical asset condition assessment (Figure 12). 21% of utilities report the practice of assessing critical vertical assets for intervention.

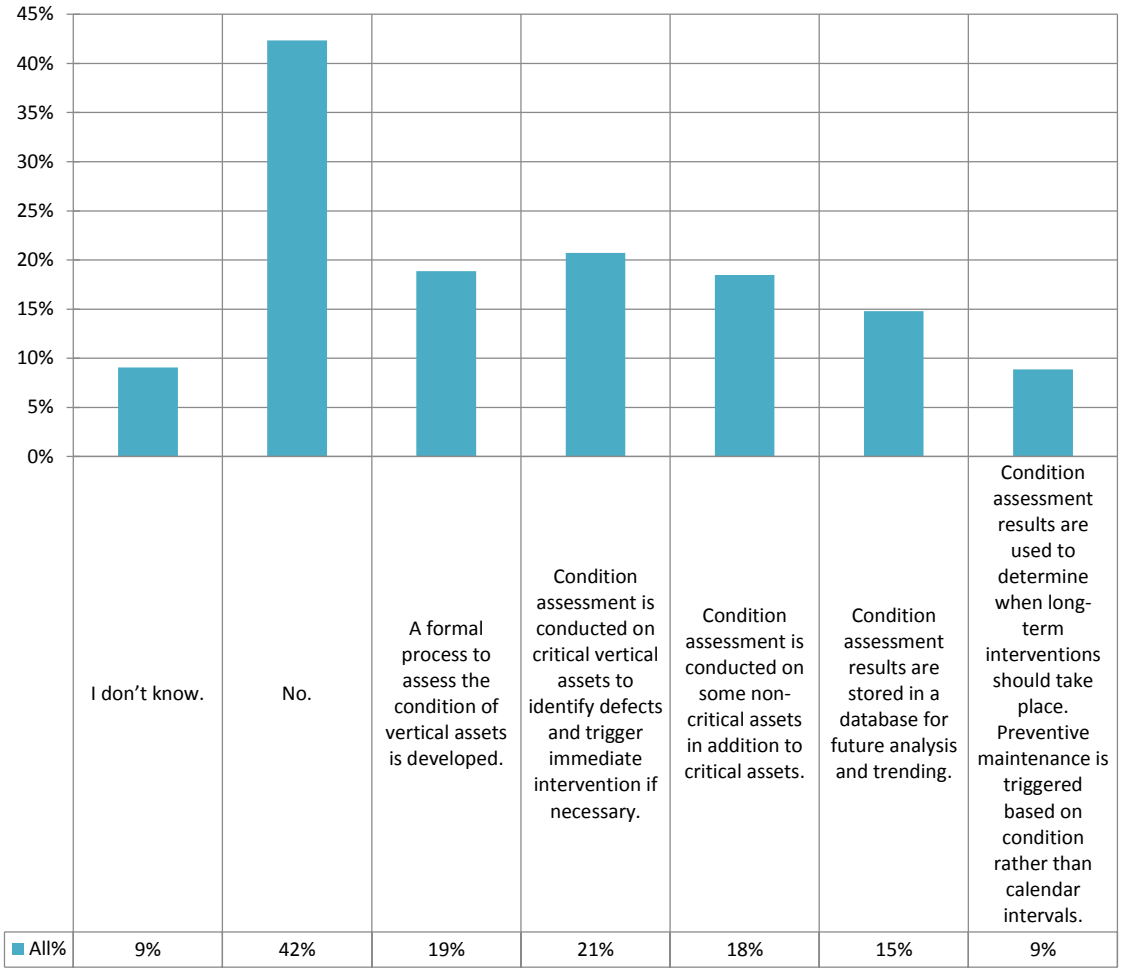


Figure 12. (Q15 2015) Does the organization have a process in place to assess the condition of vertical assets (mechanical, electrical, HVAC, and other asset types associated with facilities) and store the condition data in a spreadsheet or database? (Choose all that apply) (n=541)

At about the same time this survey was being developed, members of the AWWA Asset Management Committee were asked to identify key concepts that could help advance asset management practice throughout the water industry. The Committee ranked certain concepts as most important, and many of the following questions in the survey fit those concepts:

- Establishing and monitoring levels of service (Figures 13, 14; questions 16, and 17)
- Assessing the risks of asset failure (Figures 16, 17 and 18; questions 19, 20 and 21)
- Developing asset management plans (Figure 23; question 26)
- Using business case analysis for investments, considering total life cycle costs and the triple bottom line (Figure 24; question 27)

Because the mission of the water utility is to provide service to the customers, asset management includes the practice of setting service level goals and monitoring performance. Two questions (Figures 13 and 14) cover the topic. As shown in Figure 13, levels of service have been developed for most utilities (57%), but are considered well documented in only 32% of them.

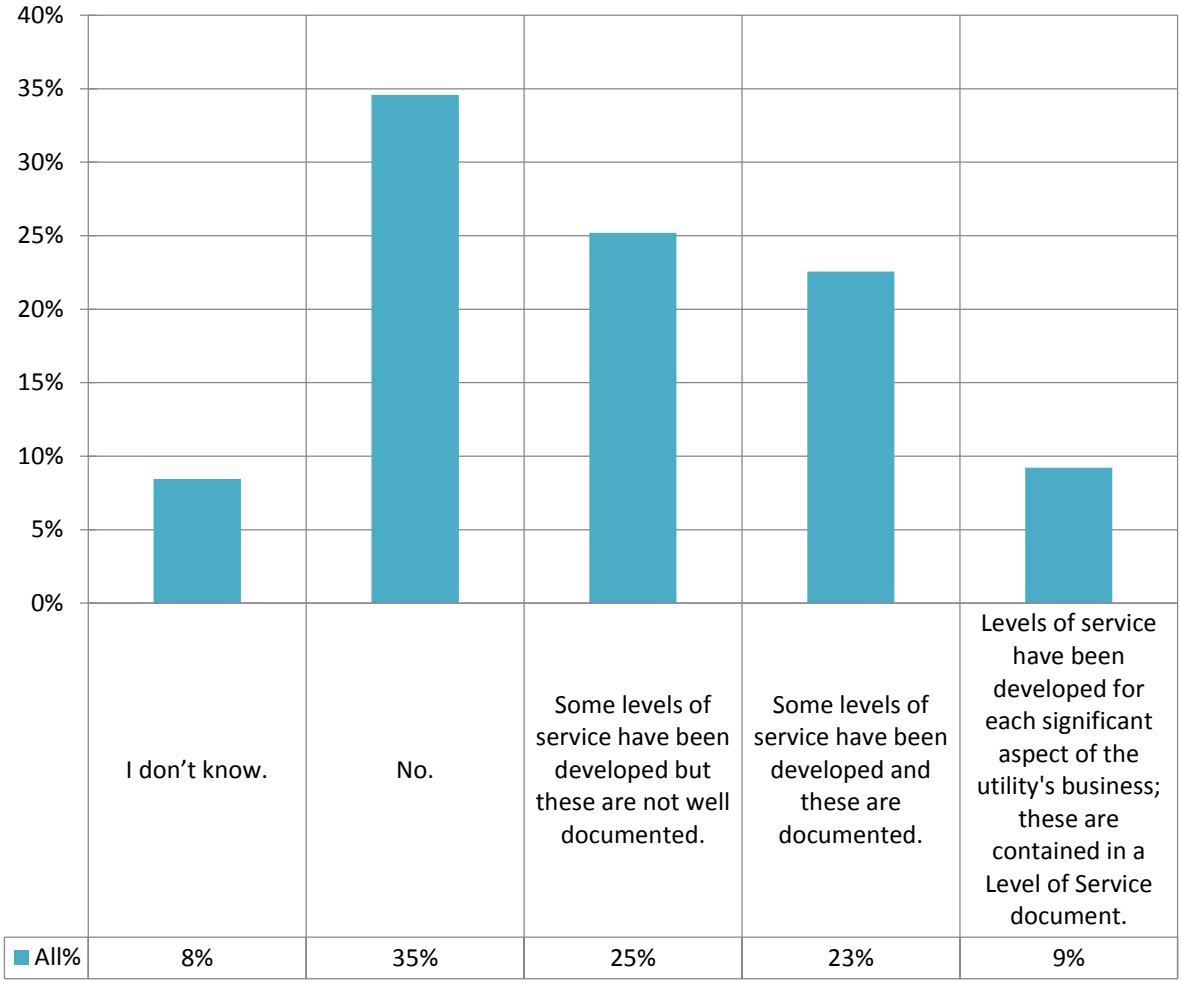
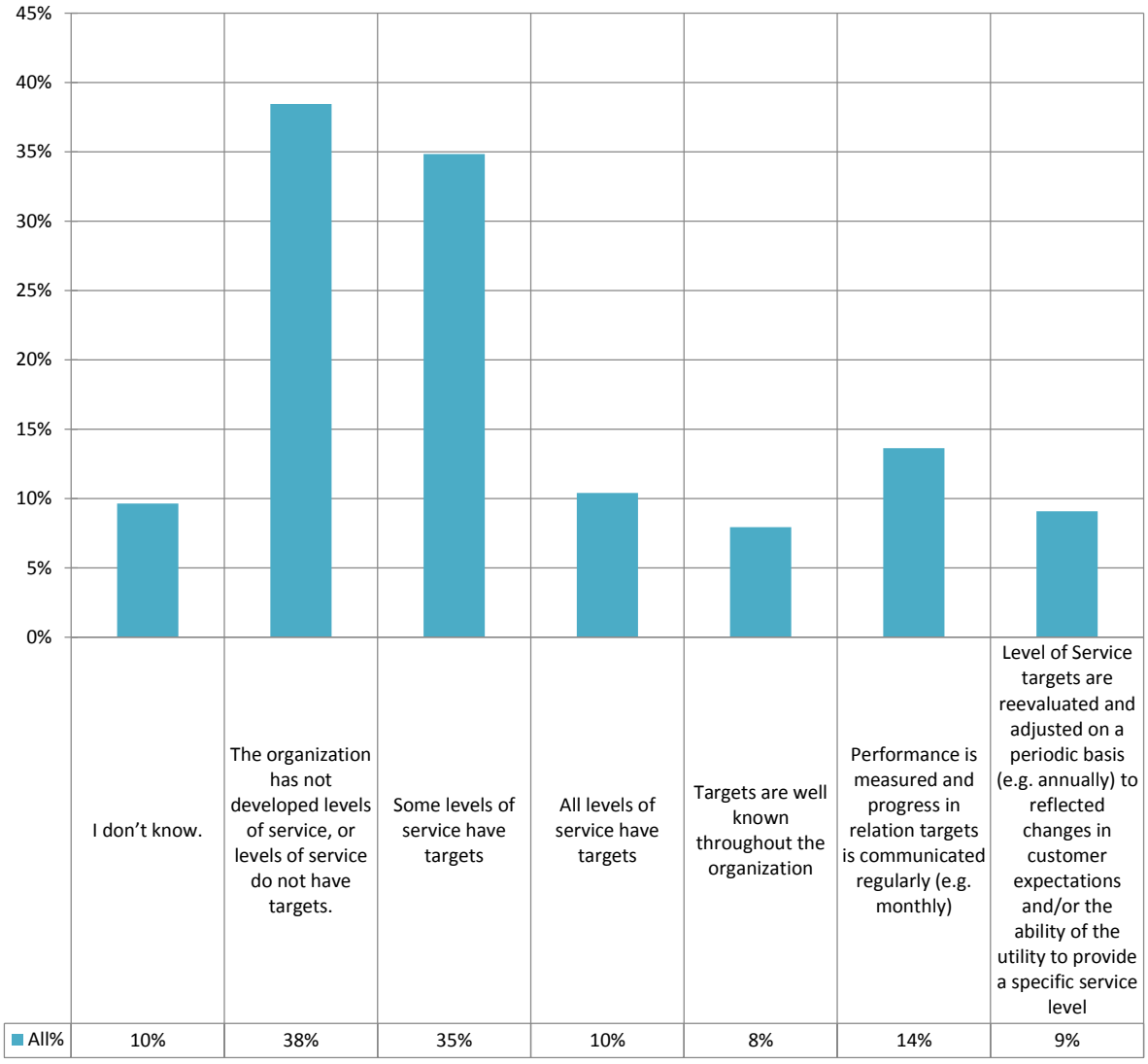


Figure 13. (Q16 2015) Has the organization documented Levels of Service across the organization and are they contained in a Level of Service agreement or other similar document? (n=532)

Roughly half of utilities (52%) have service level targets, but only 14% of utilities reported that they are measuring and communicating their progress regularly in relation to those targets (Figure 14), indicating that there is room for progression in this regard.



	I don't know.	The organization has not developed levels of service, or levels of service do not have targets.	Some levels of service have targets	All levels of service have targets	Targets are well known throughout the organization	Performance is measured and progress in relation targets is communicated regularly (e.g. monthly)	Level of Service targets are reevaluated and adjusted on a periodic basis (e.g. annually) to reflected changes in customer expectations and/or the ability of the utility to provide a specific service level
All%	10%	38%	35%	10%	8%	14%	9%

Figure 14. (Q17 2015) Which of the following apply to the organization's clearly defined Level of Service targets? (Choose all that apply) (n=528)

In addition to addressing customer service level expectations, utilities must also anticipate and address any future changes in system demands, such that the capacity of their infrastructure is sufficient. The results from Question 18, shown in Figure 15 below, focus on the planning horizon for investment decisions aimed at addressing future demands. 45% of utilities have a planning horizon for addressing system demands of 10 years or more; 37% reported planning horizon of less than 10 years.

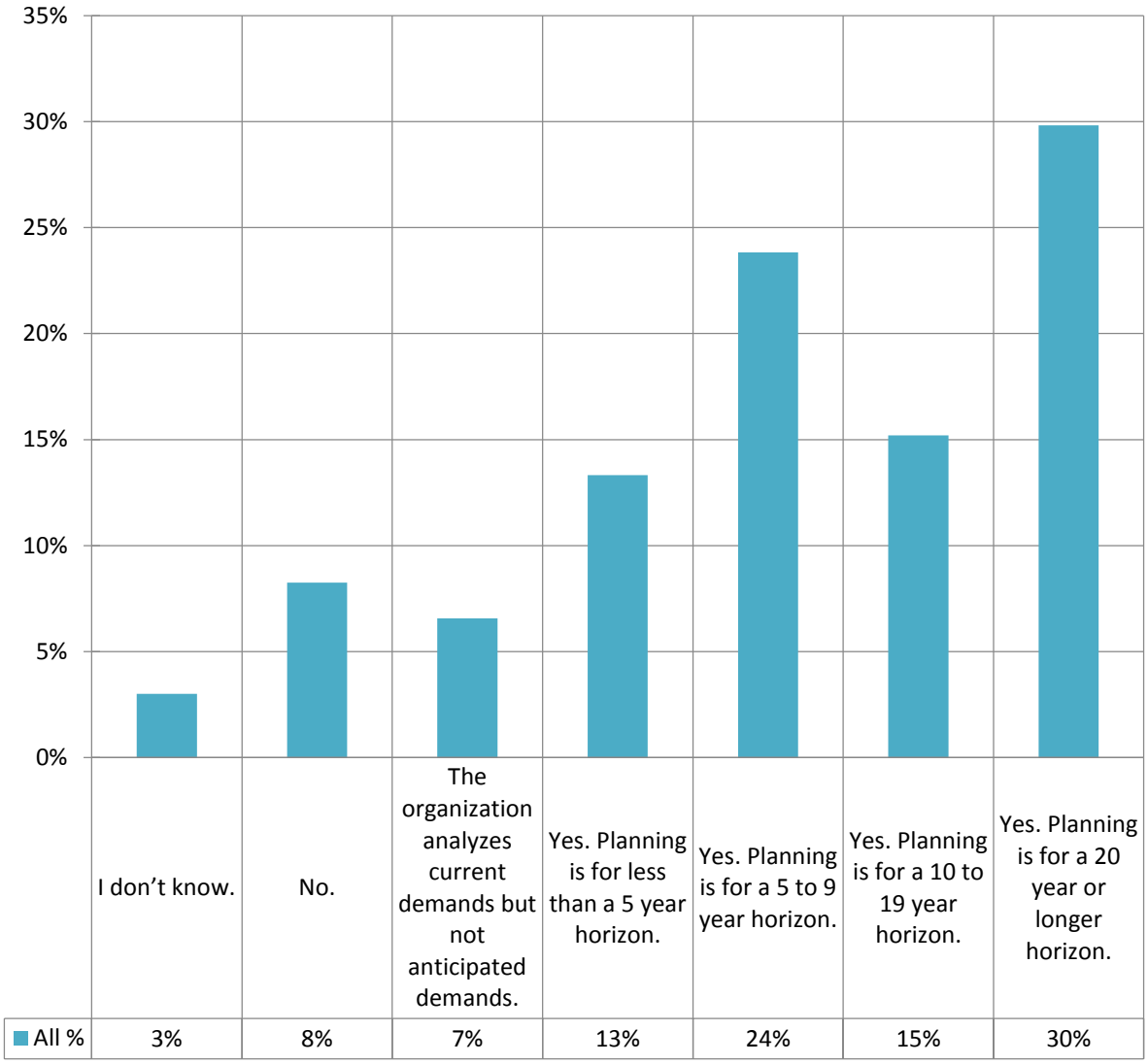


Figure 15. (Q18 2015) Does the organization analyze current and anticipated customer demands, including planning for future growth or population decline, and plan infrastructure investments to meet future demands? (n=533)

Risk management has been considered, by many, as the most important concept related to the management of water utility assets. Risk is made up of two parts: the probability, or likelihood, of failure of assets, and the consequence of asset failure. The survey asked about the approach to evaluating both probability and consequence of failure, as well as the ranking of assets based on overall risk.

The evaluation of probability and consequence of failure is not yet common, with about two thirds of utilities indicating that they were not doing either, or not yet significantly implementing it (see Figures 16 and 17). Of the third of utilities that are applying this practice, less than 10% have reached a very advanced practice of using failure data or asset condition to estimate the probability of failure of the most critical assets, and 11% of utilities report developing monetary or triple bottom line estimates of the consequences of failure for some critical assets; also, a very advanced practice.

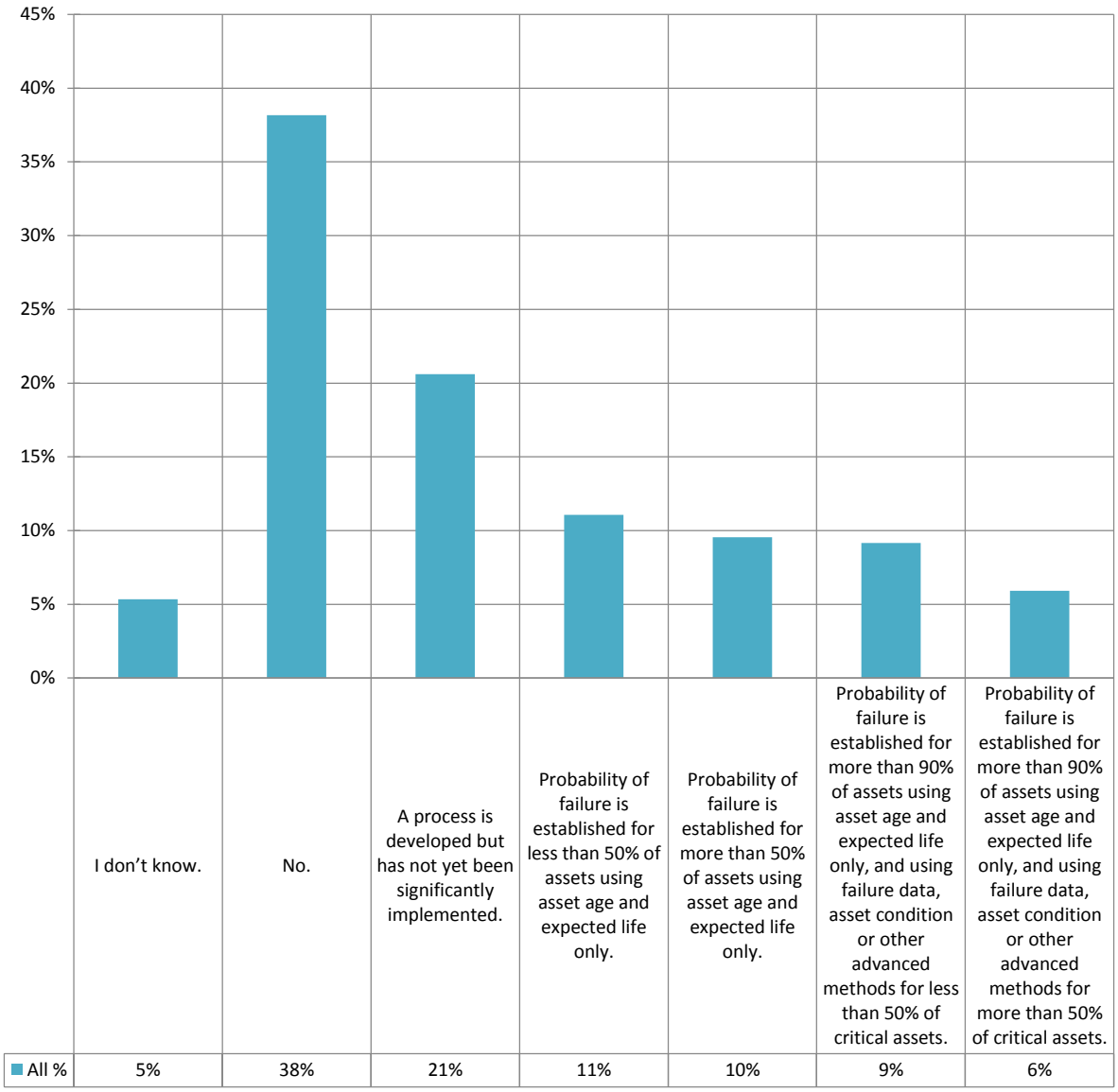
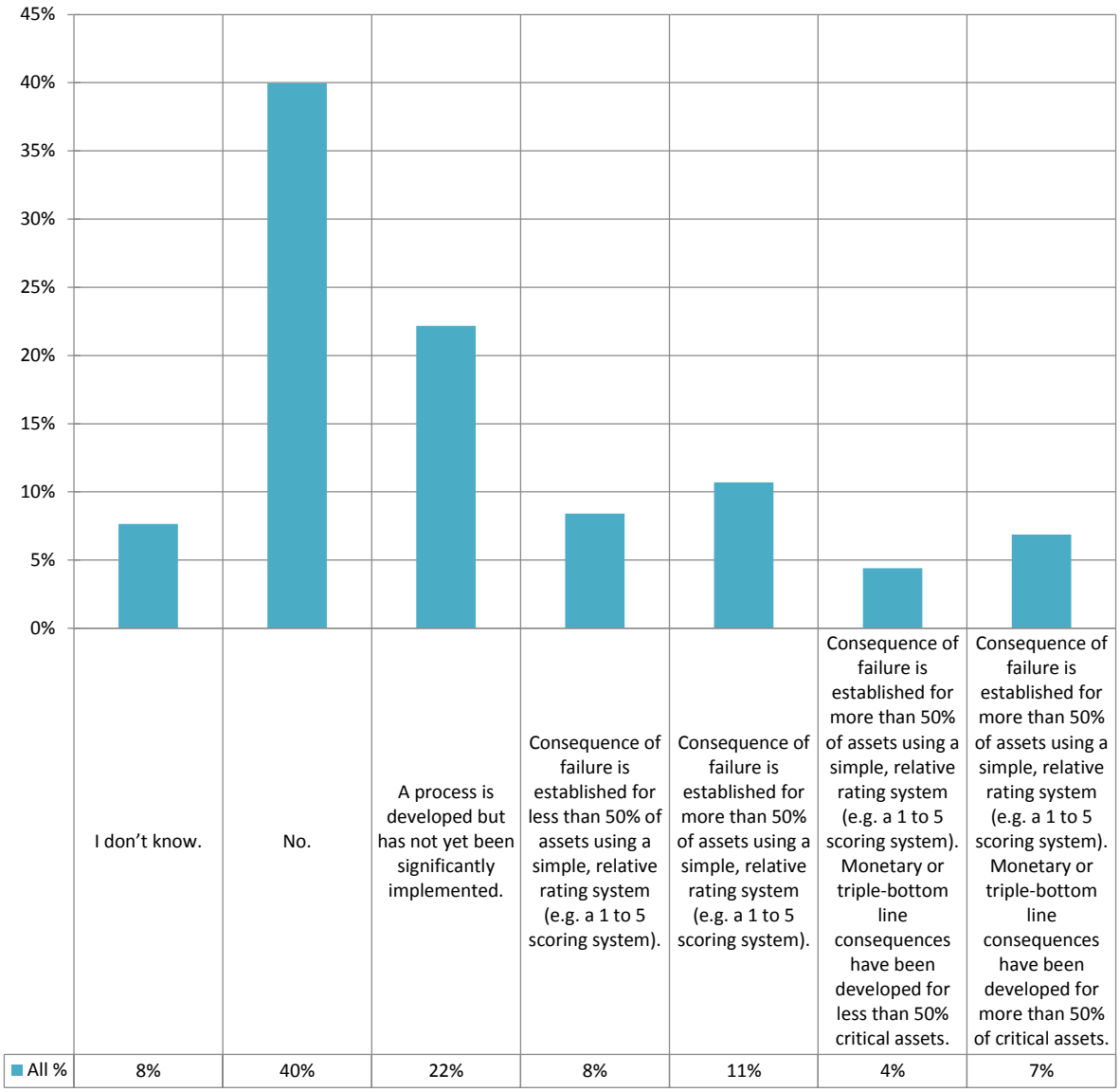


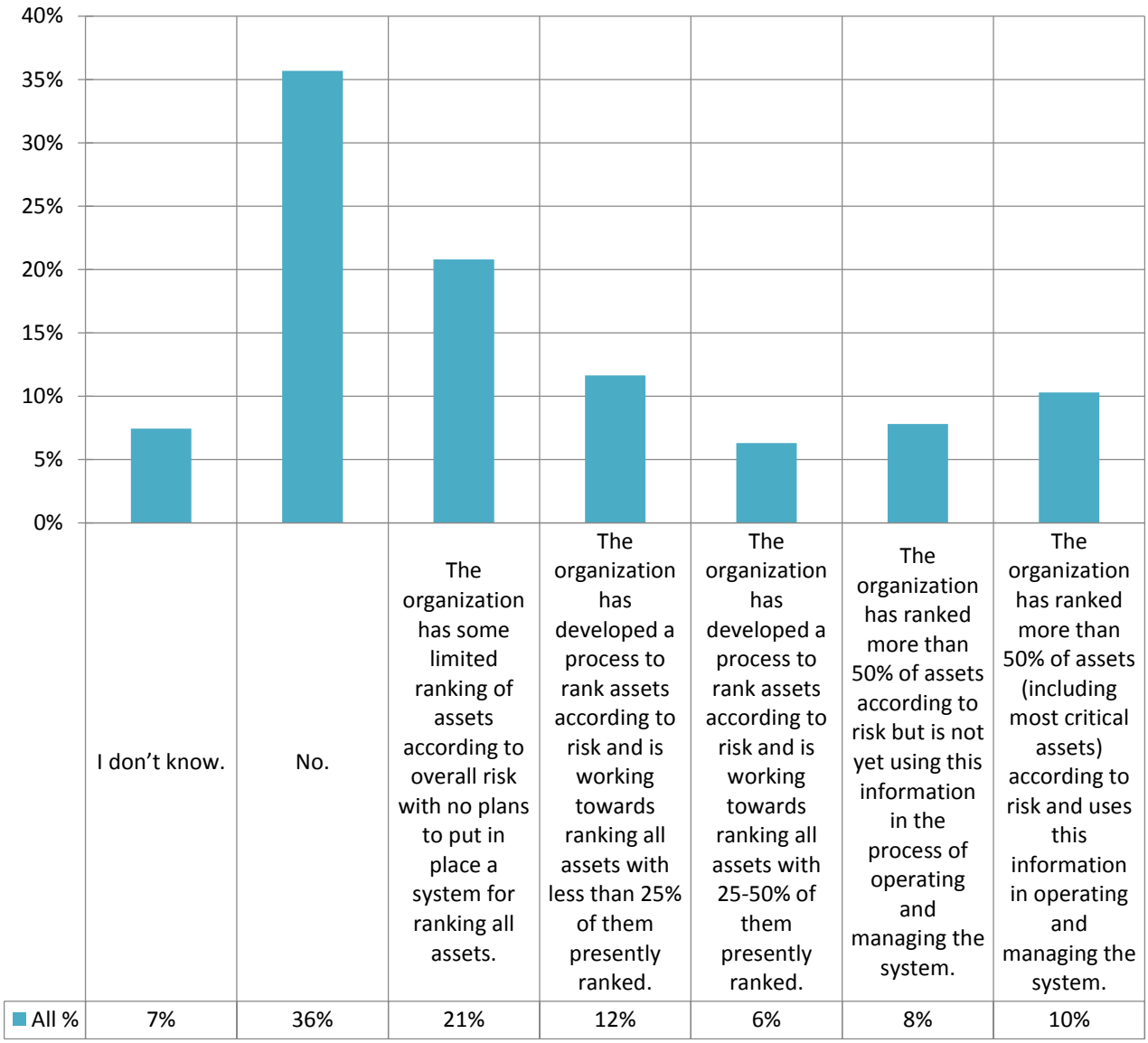
Figure 16. (Q19 2015) Does the organization have a process to assess the probability (or likelihood) of failure of assets? (n=524)



	I don't know.	No.	A process is developed but has not yet been significantly implemented.	Consequence of failure is established for less than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system).	Consequence of failure is established for more than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system).	Consequence of failure is established for more than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system). Monetary or triple-bottom line consequences have been developed for less than 50% critical assets.	Consequence of failure is established for more than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system). Monetary or triple-bottom line consequences have been developed for more than 50% of critical assets.
All %	8%	40%	22%	8%	11%	4%	7%

Figure 17. (Q20 2015) Does the organization have a process to assess the consequence of asset failure? (n=523)

Although the progress on evaluating the likelihood and consequence of failure is limited, more utilities report positive steps on risk ranking, as shown in Figure 18. More than half of utilities have some risk ranking process in place. Still, only 10% of utilities have ranked more than 50% of their assets, including most of their critical assets, according to risk, and are using this information in operating and managing the system. This illustrates that there are advancement opportunities in asset risk management.



	I don't know.	No.	The organization has some limited ranking of assets according to overall risk with no plans to put in place a system for ranking all assets.	The organization has developed a process to rank assets according to risk and is working towards ranking all assets with less than 25% of them presently ranked.	The organization has developed a process to rank assets according to risk and is working towards ranking all assets with 25-50% of them presently ranked.	The organization has ranked more than 50% of assets according to risk but is not yet using this information in the process of operating and managing the system.	The organization has ranked more than 50% of assets (including most critical assets) according to risk and uses this information in operating and managing the system.
All %	7%	36%	21%	12%	6%	8%	10%

Figure 18. (Q21 2015) Does the organization have a process to rank assets according to overall risk (the product of likelihood and consequences of asset failure)? (n=524)

Proactive replacement of water distribution pipes is slowly becoming a more commonly instituted practice. Among the issues are understanding which pipes to replace and when, such that the replacement program is cost-effective, keeping healthy pipe in the ground while replacing deteriorating pipe prior to it causing extensive consequences as the result of significant or repeated breaks. Survey question 22 focused on pipe replacement methods (Figure 19). The most advanced methods are practiced by 7 to 10% of the utilities (replacement to stabilize the break rate, or meet a level of service goal), and about one-third of utilities are proactively replacing water mains based on data related to break history, also an advance practice.

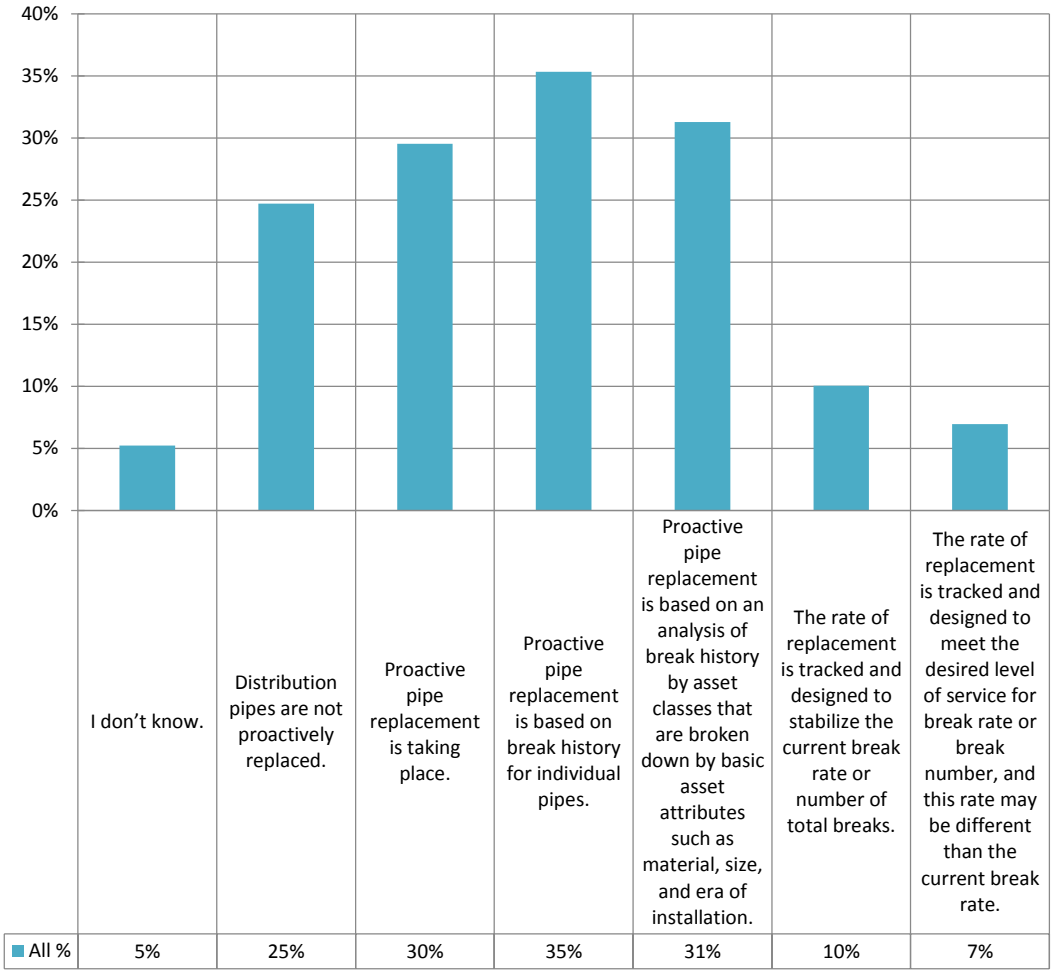


Figure 19. (Q22 2015) How advanced is the organization in predicting when water distribution pipe assets should be proactively replaced? (Choose all that apply) (n=518)

Advanced maintenance practices include finding the right balance between the amount of planned versus reactive maintenance, and conducting more predictive maintenance on vertical or facility assets. Because the ability to detect defects and/or predict asset failures based on experience, data, and the use of predictive technologies has improved with time, improved maintenance for many utilities means becoming more proactive and less reactive. Many utilities are still developing the ability to track planned and reactive maintenance, but 37% are to a point now of tracking these maintenance activities, and 9% report being in line with industry best practice guidelines of approximately 65% planned and 35% reactive maintenance (Figure 20). According to the survey results, predictive maintenance is performed on vertical assets by 65% of the utilities, with 31% stating that a considerable amount of predictive maintenance is occurring (Figure 21).

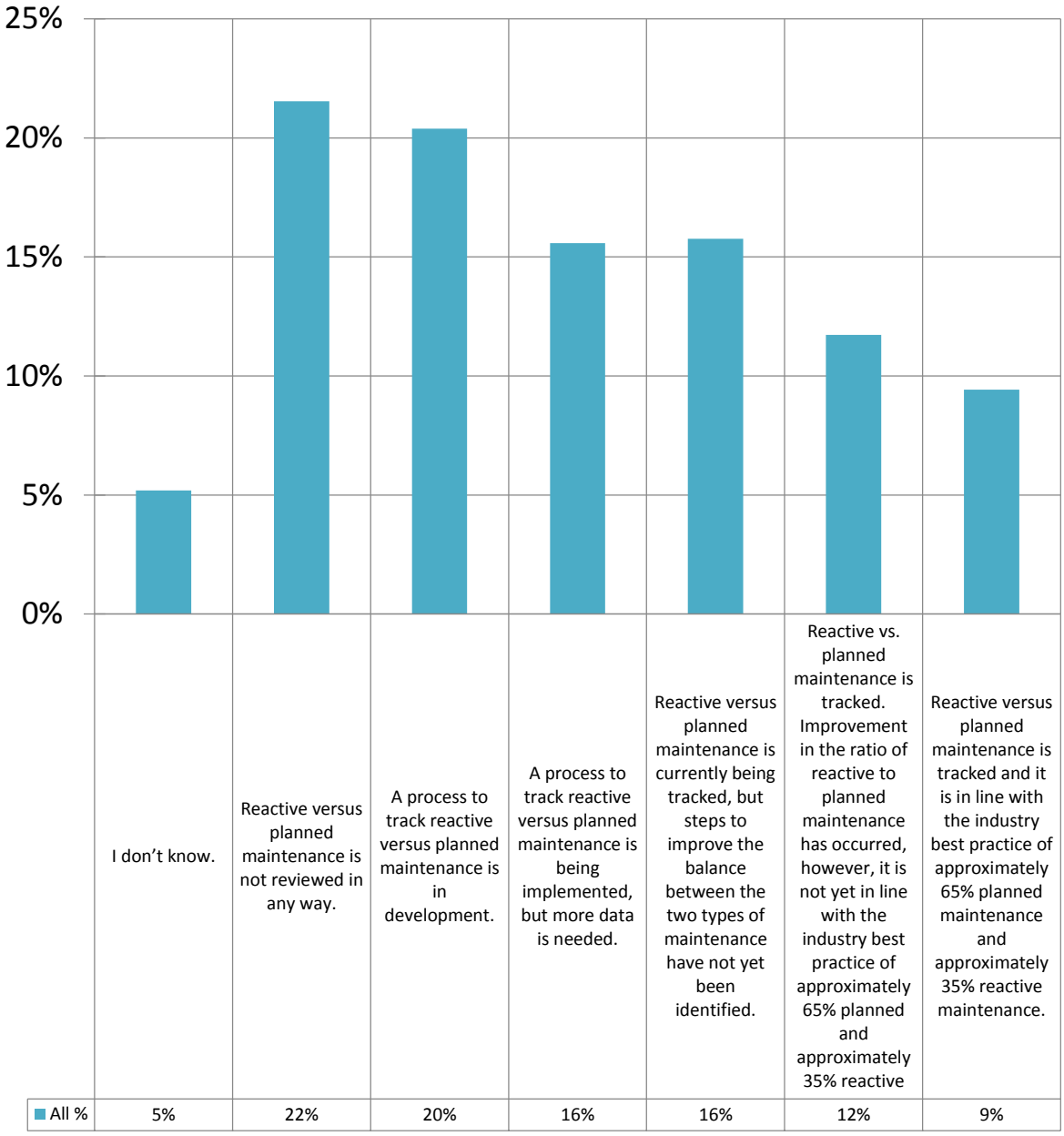


Figure 20. (Q23 2015) Is the organization moving from reactive (corrective and emergency) maintenance to planned (predictive and preventive) maintenance? (n=520)

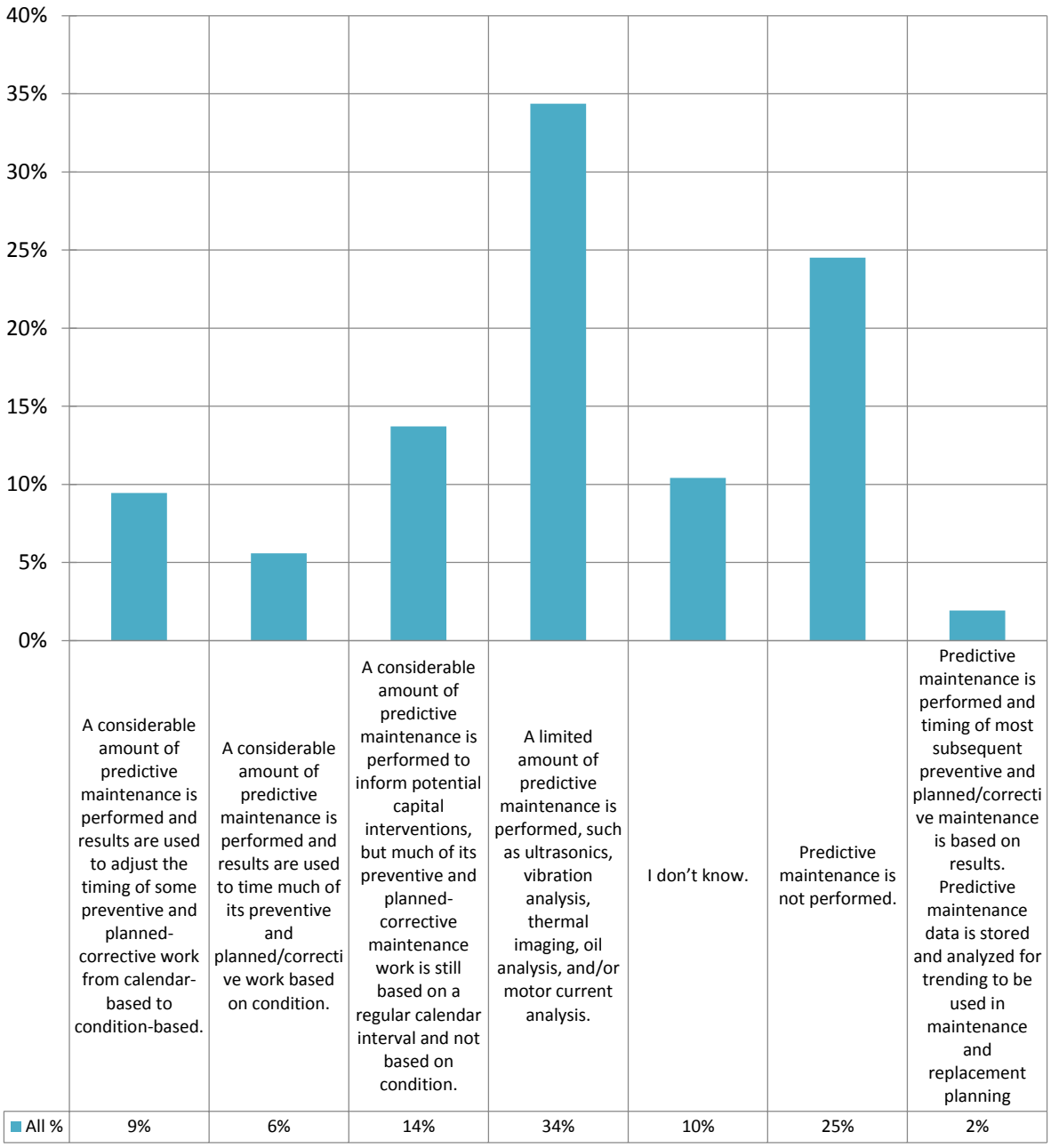


Figure 21. (Q24 2015) How advanced has the organization become in applying predictive maintenance to its vertical assets (mechanical, electrical, HVAC, and other asset types associated with facilities)? (n=518)

For many utilities, utilizing a computerized maintenance management system (CMMS) is a helpful, foundational tool supporting asset management practices by storing and organizing information to support data-driven decision making. Even though many other business practices are key to asset management, the CMMS can play an important role in planning and tracking maintenance activity and understanding asset performance and reliability. In response to the survey question relating to CMMS, a majority of utilities have developed a CMMS (54%) with another 11% currently developing one. 21% of utilities report using the CMMS beyond its basic functionality (Figure 22).

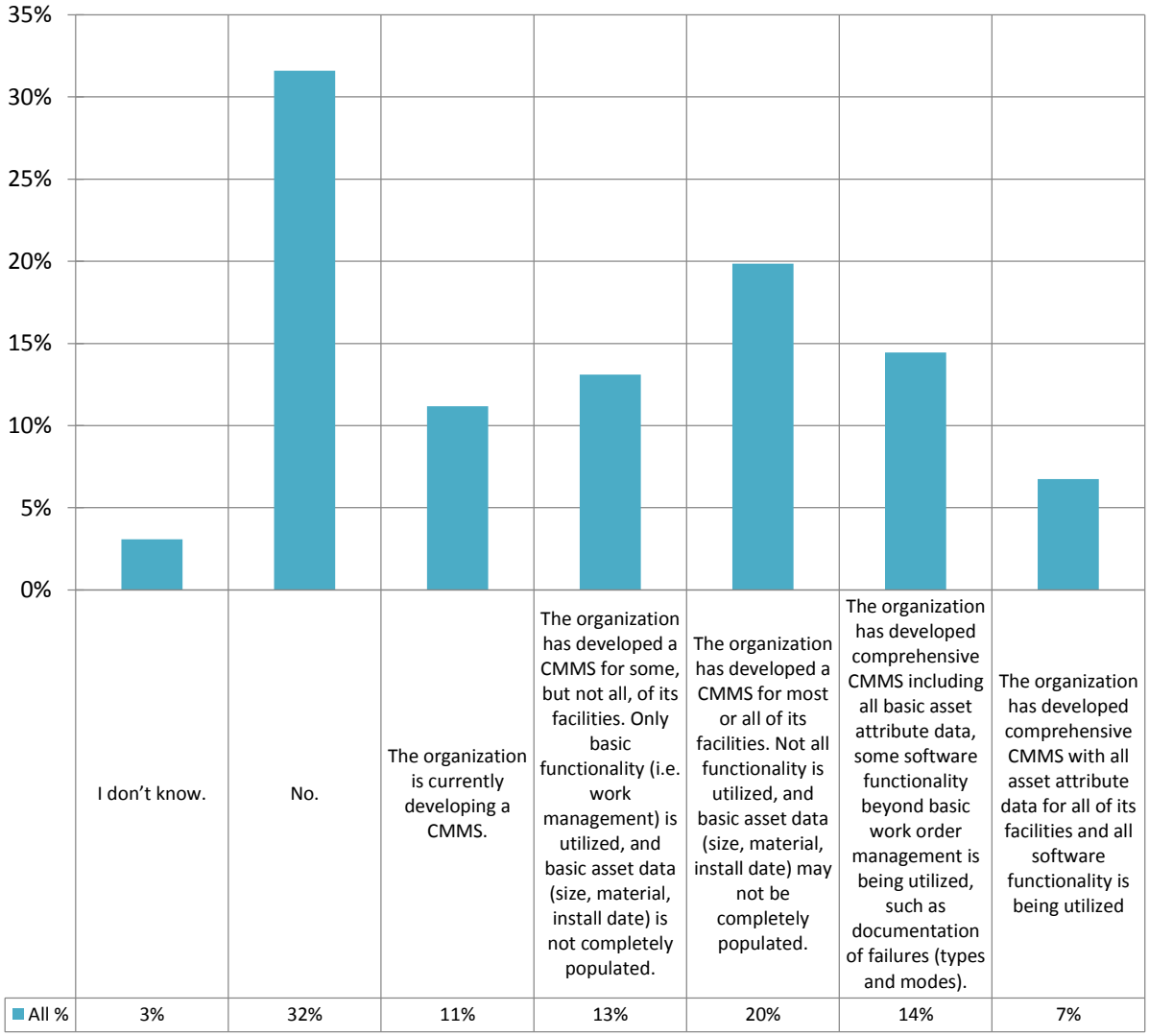


Figure 22. (Q25 2015) Does the organization utilize a computerized maintenance management system (CMMS)? (n=519)

Two advanced asset management practices, developing asset management plans and requiring formal business case evaluations (BCE) for major investments, were identified by the AWWA Asset Management Committee as important asset management concepts. 24% of utilities responded that they have completed asset management plans with basic information such as inventory and condition of the asset class, while 12% of utilities have completed asset management plans with documented risks, maintenance and replacement strategies, and budget forecasts (Figure 23).

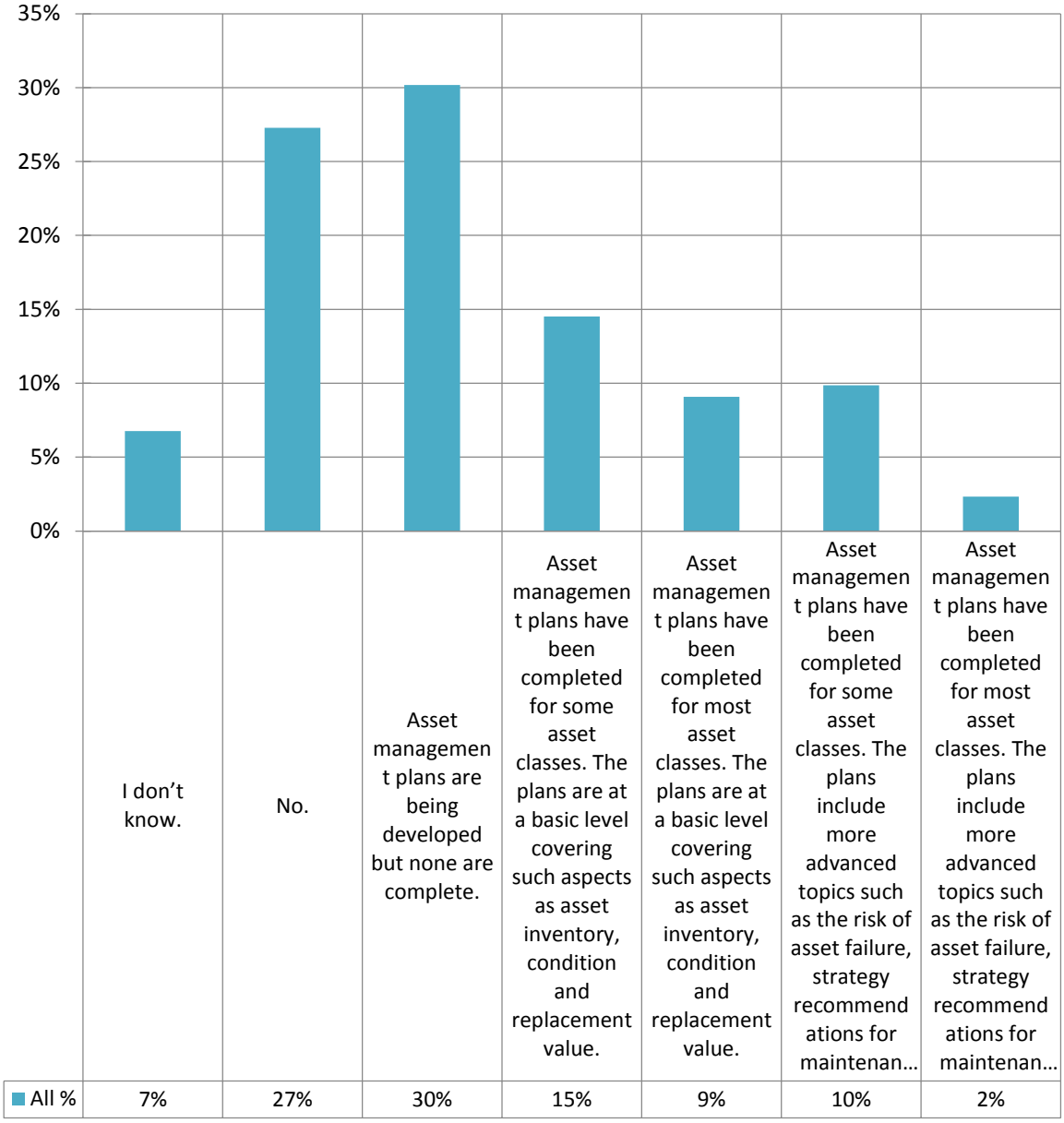
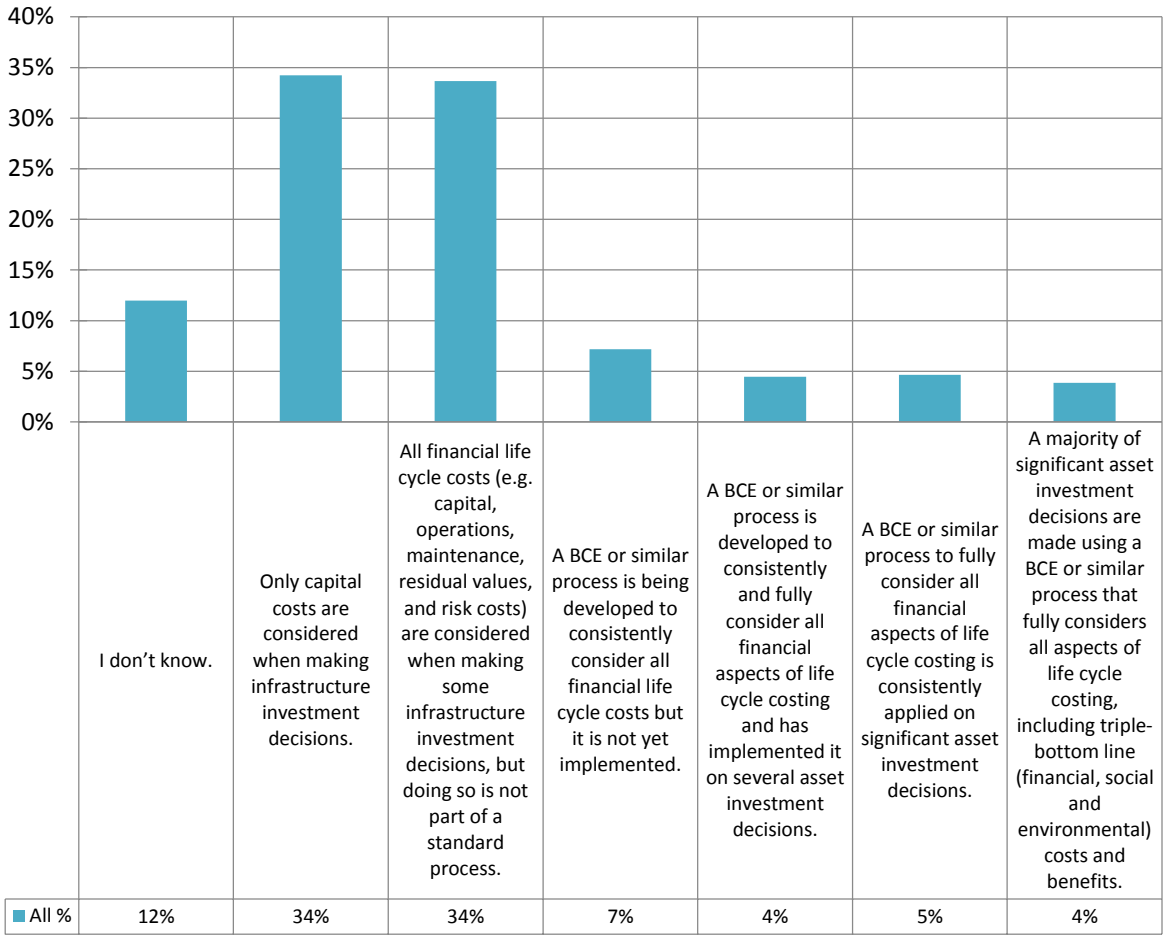


Figure 23. (Q26 2015) Has the organization developed management plans for its various asset classes (e.g., water distribution valve management plan), sometimes known as Asset Management Plans, or AMP's? (n=517)

Regarding the processes used to make major investment decisions, 34% of utilities are basing them on a comparison of capital costs only. Another 34% responded that they are basing investment decisions on a consideration of all financial costs, but it is not a standardized process. A standardized process with all financial costs is applied by 16% of utilities. Less than 5% of utilities have advanced to the point of also including the triple bottom line of social and environmental costs that have been monetized.



	I don't know.	Only capital costs are considered when making infrastructure investment decisions.	All financial life cycle costs (e.g. capital, operations, maintenance, residual values, and risk costs) are considered when making some infrastructure investment decisions, but doing so is not part of a standard process.	A BCE or similar process is being developed to consistently consider all financial life cycle costs but it is not yet implemented.	A BCE or similar process is developed to consistently and fully consider all financial aspects of life cycle costing and has implemented it on several asset investment decisions.	A BCE or similar process to fully consider all financial aspects of life cycle costing is consistently applied on significant asset investment decisions.	A majority of significant asset investment decisions are made using a BCE or similar process that fully considers all aspects of life cycle costing, including triple-bottom line (financial, social and environmental) costs and benefits.
All %	12%	34%	34%	7%	4%	5%	4%

Figure 24. (Q27 2015) Does the organization require business case evaluations (BCE's) or have a program to fully consider all aspects of life cycle costing when making infrastructure investment decisions? (n=517)

CONCLUSIONS

Several aspects of this survey demonstrate the prominence of asset management in the water industry. There was a large response to the survey even though it was a long survey that included many detailed responses. Respondents came from all states but one (Vermont) and covered a wide range of system sizes. Because this survey was not a random sampling of all water utilities, it is possible that the respondents were weighted towards systems already engaged in asset management or at least knowledgeable in asset management. However, when the request to complete the survey was sent out, systems not engaged in asset management practice were still encouraged to complete the survey as well. In particular, a request sent out by the Environmental Finance Center Network urged all systems, including those not engaged in asset management, to complete the survey. There was a base level of the responses "I don't know" and "No" of between 10 and 47% on every question, so it is possible that there was a base level within these responses that included utilities not currently engaged in asset management.

The survey did include water utilities of all sizes. However, the proportion of systems in the small size range (less than 10,000 in population) was much lower than the national percentage. In the U.S., 97% of water utilities serve less than 10,000, but these utilities represented only 26% of the respondents. Therefore these survey results are skewed towards larger utilities. This factor may be reflective of the fact that AWWA members tend to be larger utilities or that larger utilities had more staff time to complete the survey. Additionally, larger utilities may be more likely to be engaged in asset management than smaller utilities.

The responses that could be selected by respondents can be placed into three broad categories: no practice or lack of understanding ("I don't know" or "No" responses), limited practice (all responses in the middle) or high level of practice (the final response in each question.) If the responses are placed into these categories, it is evident that there is a high level of at least some asset management practice over all the questions. The percentage of utilities implementing some level of asset management approach as part of their practices (though not highly advanced) ranged from 22 to 64% with an average of 46% across all questions. No practice/lack of understanding was generally lower than limited practice across the categories of questions, ranging from 10 to 47% with an average of 32% across all questions. However, the no practice/lack of understanding response was almost always higher than the high level of practice response. The high level of practice ranged from 2 to 57% with an average of 22%.

The highest levels of practice were seen in the following areas: a formal asset management work plan with full implementation, asset management embraced by a majority of staff with management support, benefits realized and documented, and 100% of the assets mapped. The lowest levels of practice were seen in the following areas: no documented levels of service across the organization, no process to assess the probability of failure or consequence of failure of assets, no process to rank assets according to risk, and no business case evaluations required.

It is encouraging to see that systems are attempting to implement asset management across all categories but it is clear that additional work is needed to assist systems in understanding risk and in developing levels of service in order to advance the practice and increase the benefits achieved.

The survey was able to point out strengths and weakness in asset management practice across the U.S. which will be extremely beneficial in designing additional resources and training to assist systems in advancing their practice.

APPENDIX 1: Responses by Location

Location	Responses	% of Total Response
United States & Territories		
AK	3	0.6%
AL	2	0.4%
AR	7	1.3%
AZ	12	2.2%
CA	57	10.5%
CO	22	4.0%
CT	5	0.9%
DC	1	0.2%
DE	1	0.2%
FL	26	4.8%
GA	15	2.8%
Guam	1	0.2%
HI	2	0.4%
IA	6	1.1%
ID	4	0.7%
IL	12	2.2%
IN	10	1.8%
KS	6	1.1%
KY	4	0.7%
LA	4	0.7%
MA	9	1.7%
Mariana Islands	1	0.2%
MD	4	0.7%
ME	3	0.6%
MI	20	3.7%
MN	9	1.7%
MO	4	0.7%
MS	1	0.2%
MT	1	0.2%
NC	11	2.0%
ND	1	0.2%
NE	4	0.7%
NH	2	0.4%
NJ	10	1.8%
NM	14	2.6%
NV	9	1.7%
NY	12	2.2%
OH	16	2.9%
OK	5	0.9%
OR	10	1.8%
PA	15	2.8%
RI	1	0.2%
SC	11	2.0%
SD	1	0.2%
TN	12	2.2%
TX	35	6.4%
UT	10	1.8%
VA	22	4.0%
VT	0	0.0%
WA	19	3.5%
WI	39	7.2%
WV	5	0.9%
WY	1	0.2%
Canada, Provinces &Territories		
Alberta	7	1.3%
British Columbia	9	1.7%
Manitoba	0	0.0%
New Brunswick	0	0.0%
Newfoundland & Labrador	0	0.0%
Northwest Territories	0	0.0%
Nova Scotia	2	0.4%
Nunavut	0	0.0%
Ontario	4	0.7%
Prince Edward Island	0	0.0%
Quebec	0	0.0%
Saskatchewan	2	0.4%
Yukon	0	0.0%
Other International		
Bermuda	1	0.2%
Mexico	0	0.0%
Taiwan	1	0.2%
United Arab Emirates	2	0.4%
TOTAL	**545**	**100.0%**

APPENDIX 2: 2015 Establishing the Level of Progress in Utility Asset Management Survey Questions

AWWA is committed to helping water utilities effectively manage their infrastructure and provide safe, reliable drinking water to customers at the lowest possible cost. A growing number of utilities are implementing asset management solutions to address that goal.

One way AWWA supports utilities in this and other endeavors is to provide information to its members through conferences, webinars, publications, and the AWWA website and resource pages. To support its members with their asset management implementations, AWWA wants to keep its shared content on the leading edge. To that end, the AWWA Asset Management Committee is issuing this survey to collect information on the current state of asset management progress in the industry.

The survey is 28 questions, and should take ~ 30 minutes to complete; thanks in advance for your contribution to this collective effort.

SECTION 1: GENERAL UTILITY INFORMATION

1. **Respondent Information**
   Name: *Fill in Box*
   Position/Title: *Fill in Box*
   Email: *Fill in Box*

2. **Utility Information**
   Name: *Fill in Box*
   Address: *Fill in Box*
   City: *Fill in Box*
   State/Province: *Fill in Box*
   Zip Code: *Fill in Box*

3. Utility ownership

Publicly owned
Private/Investor owned

4. *Services provided (check all that apply)

Water – retail
Water – wholesale
Wastewater
Water reuse
Stormwater

5. **Average system demand**

< 5 MGD
5-15 MGD
16-30 MGD
31-50 MGD
> 50 MGD

6. **What size of population do you serve?**

Less than 10,000
10,000-49,999
50,000-499,999
500,000-999,999
More than 1,000,000

7. **What is the size of your overall utility? (Number of full time equivalent staff)**
Fill in Box

SECTION 2: GENERAL ASSET MANAGEMENT

8. **Does the organization have a dedicated asset management manager and/or a group of asset management focused staff?**

I don't know.
No, the organization has adequate staff for asset management but does not have a dedicated asset management coordinator and/or group of asset management focused staff.
No, the organization does not see the need for dedicated asset management staff.
The organization recognizes the need for an asset coordinator and/or focused staff, but has not yet created the position(s).
The organization has a part time asset management coordinator.
The organization has a full time asset management coordinator but no other staff.
The organization has a full time asset management coordinator and additional staff support.

9. Is there a formal work plan to implement Asset Management within the organization?

I don't know.
No, and there is no concept of what the plan would include.
Yes, but it is still conceptual.
Yes, it has been approved but not implemented.
Yes, and some of the tasks have been implemented.
Yes, and most of the tasks have been implemented.

10. Is Asset Management embraced by staff (other than at the management level) throughout the organization?

I don't know.
No.
Majority staff support, little management support
Little staff support, majority management support
Majority of staff and management support

11. Has the organization realized a benefit from its asset management program and/or efforts?

I don't know.
There are no asset management efforts underway as of yet.
No, asset management efforts are active but have not produced any tangible benefits.
Not yet, but the future benefits are expected (asset reliability, improved service levels, and/or future cost avoidance).
Yes, benefits have been achieved, although they are not well documented.
Yes, benefits have been achieved and they are well documented.
Yes, benefits have been achieved and they are well documented. Costs and benefits of the asset management program/efforts are quantified such that a return on investment can be calculated.

SECTION 3: CURRENT STATE OF THE ASSETS

12. Which of the following describes your organization's asset inventory / asset register (Choose all that apply)?

I don't know.
The asset inventory / register is not substantially developed.
There is a specific definition of assets versus non-assets for a majority of asset classes that governs the inventory / registry.
The inventory / registry contains greater than 75-percent of assets.
Basic attribute data is largely populated for the assets in the inventory / register, such as asset ID, description, location, install date, and physical attributes (e.g. size, material)
Advanced attribute data is largely populated for the assets in the inventory / register, such as asset condition and/or probability of failure rating, criticality, useful life, replacement value, and energy usage (if any).
Assets in the inventory / registry are organized as part of a well-defined asset hierarchy.

13. Does the organization have a map or a geographic information system (GIS) with both linear assets (pipes) and vertical asset locations (e.g., booster station and tank locations)?

I don't know.
No.
<50 % of assets are mapped
50 - 75% of assets are mapped
> 75% of assets are mapped
100% of assets are mapped but it is not linked to all asset inventory systems of record, or it is linked and there are some concerns with accuracy and/or comprehensiveness with data.
100% of assets are mapped in a GIS system that is linked to the asset inventory systems of record.

14. Does the organization have a process in place to assess the condition of linear assets (distribution system pipes) and store the condition data in a spreadsheet or database? (check all that apply)

I don't know.
No.
A process has been developed to assess pipe condition.
The condition of pipes is assessed using a break database that is less than 20 years old, or is older but not comprehensive.
The condition of pipes is assessed using a break database that is 20+ years old and comprehensive.
Pipe condition information is in a database that is linked to the asset register / inventory.
Some advanced condition assessment technology is used to inspect critical pipes for more detailed condition data.

15. Does the organization have a process in place to assess the condition of vertical assets (mechanical, electrical, HVAC, and other asset types associated with facilities) and store the condition data in a spreadsheet or database? (check all that apply)

I don't know.
No.
A formal process to assess the condition of vertical assets is developed.
Condition assessment is conducted on critical vertical assets to identify defects and trigger immediate intervention if necessary.
Condition assessment is conducted on some non-critical assets in addition to critical assets.
Condition assessment results are stored in a database for future analysis and trending.
Condition assessment results are used to determine when long-term interventions should take place. Preventive maintenance is triggered based on condition rather than calendar intervals.

SECTION 4: LEVELS OF SERVICE

Levels of Service are measures of the quality of service received by customers. For water customers, they many include measures such as:

- The number of customers experiencing service disruptions due to water shut-offs
- The number of customers experiencing service disruptions due to water quality events
- The number of customers experiencing service disruptions due to low pressure events
- The number of non-disruption related water quality complains (taste, odor)

16. **Has the organization documented Levels of Service across the organization and are they contained in a Level of Service agreement or other similar document?**

I don't know.
No.
Some levels of service have been developed but these are not well documented.
Some levels of service have been developed and these are documented.
Levels of service have been developed for each significant aspect of its business; these are contained in a Level of Service document.

17. **Which of the following apply to the organization's clearly defined Level of Service targets (choose all that apply)?**

I don't know.
The organization has not developed levels of service or levels of service do not have targets.
Some levels of service have targets
All levels of service have targets
Targets are well known throughout the organization
Performance is measured and progress in relation targets is communicated regularly (e.g. monthly)
Level of Service targets are reevaluated and adjusted on a periodic basis (e.g. annually) to reflected changes in customer expectations and/or the ability of the utility to provide a specific service level

18. **Does the organization analyze current and anticipated customer demands, including planning for future growth or population decline, and plan infrastructure investments to meet future demands?**

I don't know.
No.
The organization analyzes current demands but not anticipated demands.
Yes. Planning is for less than a 5 year horizon.
Yes. Planning is for a 5 to 9 year horizon.
Yes. Planning is for a 10 to 19 year horizon.
Yes. Planning is for a 20 year or longer horizon.

SECTION 5: RISK MANAGEMENT

19. Does the organization have a process to assess the probability (or likelihood) of failure of assets?

I don't know.
No.
A process is developed but has not yet been significantly implemented.
Probability of failure is established for less than 50% of assets using asset age and expected life only.
Probability of failure is established for more than 50% of assets using asset age and expected life only.
Probability of failure is established for more than 90% of assets using asset age and expected life only, and using failure data, asset condition or other advanced methods for less than 50% of critical assets.
Probability of failure is established for more than 90% of assets using asset age and expected life only, and using failure data, asset condition or other advanced methods for more than 50% of critical assets.

20. Does the organization have a process to assess the consequence of asset failure?

I don't know.
No.
A process is developed but has not yet been significantly implemented.
Consequence of failure is established for less than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system).
Consequence of failure is established for more than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system).
Consequence of failure is established for more than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system). Monetary or triple-bottom line consequences, including asset replacement costs, have been developed for less than 50% of critical assets.
Consequence of failure is established for more than 50% of assets using a simple, relative rating system (e.g. a 1 to 5 scoring system). Monetary or triple-bottom line consequences, including asset replacement costs, have been developed for more than 50% of critical assets.

21. Does the organization have a process to rank assets according to overall risk (the product of likelihood and consequences of asset failure)?

I don't know.
No.
The organization has some limited ranking of assets according to overall risk with no plans to put in place a system for ranking all assets.
The organization has developed a process to rank assets according to risk and is working towards ranking all assets with less than 25% of them presently ranked.
The organization has developed a process to rank assets according to risk and is working towards ranking all assets with 25-50% of them presently ranked.
The organization has ranked more than 50% of assets according to risk but is not yet using this information in the process of operating and managing the system.
The organization has ranked more than 50% of assets (including most critical assets) according to risk and uses this information in operating and managing the system.

22. How advanced is the organization in predicting when water distribution pipe assets should be proactively replaced? (check all that apply)

I don't know.
Distribution pipes are not proactively replaced.
Proactive pipe replacement is taking place.
Proactive pipe replacement is based on break history for individual pipes.
Proactive pipe replacement is based on an analysis of break history by asset classes that are broken down by basic asset attributes such as material, size, and era of installation.
The rate of replacement is tracked and designed to stabilize the current break rate or number of total breaks.
The rate of replacement is tracked and designed to meet the desired level of service for break rate or break number, and this rate may be different than the current break rate.

SECTION 6: MAINTENANCE AND RELIABILITY

23. Is the organization moving from reactive (corrective and emergency) maintenance to planned (predictive and preventive) maintenance?

I don't know.
Reactive versus planned maintenance is not reviewed in any way.
A process to track reactive versus planned maintenance is in development.
A process to track reactive versus planned maintenance is being implemented, but more data is needed.
Reactive versus planned maintenance is currently being tracked, but steps to improve the balance between the two types of maintenance have not yet been identified.
Reactive versus planned maintenance is tracked. Improvement in the ratio of reactive to planned maintenance has occurred, however, it is not yet in line with the industry best practice of approximately 65% planned maintenance and approximately 35% reactive maintenance.
Reactive versus planned maintenance is tracked and it is in line with the industry best practice of approximately 65% planned maintenance and approximately 35% reactive maintenance.

24. How advanced has the organization become in applying predictive maintenance to its vertical assets (mechanical, electrical, HVAC, and other asset types associated with facilities)?

I don't know.
Predictive maintenance is not performed.
A limited amount of predictive maintenance is performed, such as ultrasonics, vibration analysis, thermal imaging, oil analysis, and/or motor current analysis.
A considerable amount of predictive maintenance is performed to inform potential capital interventions, but much of its preventive and planned-corrective maintenance work is still based on a regular calendar interval and not based on condition.
A considerable amount of predictive maintenance is performed and results are used to adjust the timing of some preventive and planned-corrective work from calendar-based to condition-based.
A considerable amount of predictive maintenance is performed and results are used to time much of its preventive and planned/corrective work based on condition.
Predictive maintenance is performed and the timing of most subsequent preventive and planned/corrective maintenance tasks is based on the results. Predictive maintenance data is stored and analyzed for asset condition trending to be used in maintenance and replacement planning.

25. Does the organization use a computerized maintenance management system (CMMS)?

I don't know.
No.
The organization is currently developing a CMMS.
The organization has developed a CMMS for some, but not all, of its facilities. Only basic functionality (i.e. work management) is utilized, and basic asset data (size, material, install date) is not completely populated.
The organization has developed a CMMS for most or all of its facilities. Not all functionality is utilized, and basic asset data (size, material, install date) may not be completely populated.
The organization has developed comprehensive CMMS including all basic asset attribute data, some software functionality beyond basic work order management is being utilized, such as documentation of failures (types and modes).
The organization has developed comprehensive CMMS with all basic asset attribute data for all of its facilities and all necessary software functionality is being utilized, such are ad-hoc and standard reporting, including failure documentation. Checks on completeness and quality of data result in a high degree of confidence in reporting outputs.

SECTION 7: ASSET PLANNING

26. Has the organization developed management plans for its various asset classes (e.g., water distribution valve management plan), sometimes known as Asset Management Plans, or AMP's?

I don't know.
No.
Asset management plans are being developed but none are complete.
Asset management plans have been completed for some asset classes. The plans are at a basic level covering such aspects as asset inventory, condition and replacement value.
Asset management plans have been completed for most asset classes. The plans are at a basic level covering such aspects as asset inventory, condition and replacement value.
Asset management plans have been completed for some asset classes. The plans include more advanced topics such as the risk of asset failure, strategy recommendations for maintenance, repair and replacement of assets, and forecasted budget needs.
Asset management plans have been completed for most asset classes. The plans include more advanced topics such as the risk of asset failure, strategy recommendations for maintenance, repair and replacement of assets, and forecasted budget needs.

27. Does the organization require business case evaluations (BCE's) or have a program to fully consider all aspects of life cycle costing when making infrastructure investment decisions?

I don't know.
Only capital costs are considered when making infrastructure investment decisions.
All financial life cycle costs (e.g. capital, operations, maintenance, residual values, and risk costs) are considered when making some infrastructure investment decisions, but doing so is not part of a standard process.
A BCE or similar process is being developed to consistently consider all financial life cycle costs but it is not yet implemented.
A BCE or similar process is developed to consistently and fully consider all financial aspects of life cycle costing and has implemented it on several asset investment decisions.
A BCE or similar process to fully consider all financial aspects of life cycle costing is consistently applied on significant asset investment decisions.
A majority of significant asset investment decisions are made using a BCE or similar process that fully considers all aspects of life cycle costing, including triple-bottom line (financial, social and environmental) costs and benefits.

SECTION 8. WRAP UP.

28. Do you have any final comments or requests for topics or information you would like to see from AWWA regarding asset management?

Fill in Blank

Thank you for participating in this survey; your results will be submitted to AWWA by clicking the submit button below. Results and analysis will be made available on AWWA's Asset Management Resource Community. If you have any questions or are in need of further information, please send a message to research@awwa.org.

Best regards and much obliged,
Jennifer Santini
Engineer, Technical & Research Programs
American Water Works Association

ACKNOWLEDGMENTS:
This survey is based on the Asset Management IQ Process developed at the Southwest Environmental Finance Center for the Kansas Department of Public Health and Environment in consultation with EPA. Modifications have been made by the AWWA Asset Management Committee.
To reference the original Asset Management IQ survey on-line, visit:
https://southwestefc.unm.edu/AssetManagementIQ/main.php