Taking the Next Step: Findings of the Effective Utility Management Review Steering Group

A final report submitted by the Effective Utility Management Review Steering Group to the Collaborating Organizations

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EXECUTIVE SUMMARY

As the Effective Utility Management Steering Group, we are pleased to submit this report on the findings of our review of the current EUM Attributes to the leadership of the Collaborating Organizations. These organizations include the Association of Clean Water Administrators (ACWA), the Association of Metropolitan Water Agencies (AMWA), the American Public Works Association (APWA), the Association of State Drinking Water Administrators (ASDWA), the American Water Works Association (AWWA), the U.S. Environmental Protection Agency (EPA), the National Association of Clean Water Agencies (NACWA), the National Association of Water Companies (NAWC), and the Water Environment Federation (WEF).

In 2015, these organizations asked a Steering Group of utility and state leaders to review the Effective Utility Management framework, originally developed by water industry leaders in 2007. This framework is made up of ten *Attributes of Effectively Managed Utilities* and five *Keys to Management Success.* Each Steering Group member participated in an interview prior to meeting in person to review in detail the existing EUM framework and provide preliminary suggestions for modifying it. The Steering Group also convened two national webinars with over 200 participants each. These webinars were open to members of the collaborating associations, including utility managers, operators, consultants, and assistance providers.

The Steering Group thanks the Collaborating Organizations for supporting this effort. The review has been both timely and productive. The review explored how the operating context of water sector utilities has changed since the EUM initiative began in 2007, and to consider refinements to the EUM framework, along with future promotional activities in light of these changes.

The Steering Group identified key areas of change in the water sector since 2007. These changes were a driving factor behind the findings concerning changes to the Attributes and Keys described in more detail in this report:

- Accelerated Adoption of Automated and "Smart" Systems and Data Integration
- Growing Climate Variability and Extremes
- Enhanced Customer Expectations and Public Awareness
- Expanded Challenges Associated with Employee Recruitment and Retention
- Increased Focus on Resource Recovery
- Continued Regulatory Requirements and Operating Condition Changes
- Greater Consideration of Stormwater and Watershed Management

The Steering Group believes the findings detailed in this report concerning the Ten Attributes of Effectively Managed Water Sector Utilities and Keys to Management Success are responsive to all of these areas of change.

Key Messages from the Steering Group

In addition to the revisions to the EUM Attributes and Keys to Management Success detailed in the body of this report, the Steering Group has the following important messages for the leadership of the Collaborating Organizations as a result of this review:

- The Effective Utility Management Framework, as defined by the revised Ten Attributes and Five Keys to Management Success, remains highly relevant to the challenges faced by today's water sector utilities. EUM can serve as a foundational element of any utility's path to effective and sustainable operations.

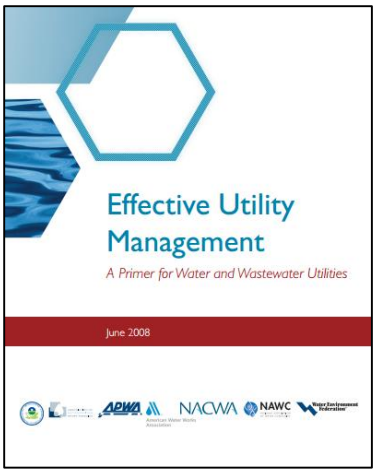
- The EUM framework is compatible with and can support other utility sustainability initiatives, like the Utility of the Future Blueprint, Partnership for Safe Water, and others related materials from the Collaborating Organizations.
- The EUM framework is also relevant to the needs of smaller utilities, and the Collaborating Organizations are encouraged to support EUM adoption by this part of the sector. More information on this is provided in the body of the report.
- Performance Measurement, as one of the Keys to Management Success, continues to be a critical piece of the EUM framework. Efforts to link the EUM Attributes with best practices and associated metrics can help utilities take full advantage of EUM.
- The work since 2007, both collectively and individually, by the Collaborating Organizations has helped establish a strong foothold for EUM in the water sector.
- Finally, the future success of EUM depends on regular and focused activities by the Collaborating Organizations to promote the greater use and uptake of EUM throughout the sector. The promotional activities described in this report provide a range of actions for consideration. More details on these activities is provided in the body of the report.

INTRODUCTION

A Brief History of Effective Utility Management

In 2007, the Environmental Protection Agency (EPA) and six national water and wastewater associations, including the Association of Metropolitan Water Agencies (AMWA), the American Public Works Association (APWA), the American Water Works Association (AWWA), the National Association of Clean Water Agencies (NACWA), the National Association of Water Companies (NAWC), and the Water Environment Federation (WEF) – collectively the "Collaborating Organizations" – signed a historic agreement to promote Effective Utility Management (EUM) based on the Ten Attributes of Effectively Managed Water Sector Utilities and Keys to Management Success.

Like the current review effort, the original EUM framework was driven by a group of leading water sector utility leaders, and a report detailed their findings. This group of leaders sought a common and understandable framework for utilities across the sector to assess the overall effectiveness of their operations and chart a course for improvement through implementation and measurement.



Since its inception, the Collaborating Organizations have promoted EUM through a series of efforts, including the development of the 2008 document, *Effective Utility Management: A Primer for Water and Wastewater Utilities* (the *EUM Primer*), case examples, and other supporting materials for utilities looking to implement the EUM framework.

Across the United States, EUM has become an integral part of long-term planning and management practices at utilities, and its concepts are implemented by trainers, technical assistance (TA) providers, and trade associations.

The Effective Utility Management Review Process—Why Now?

In light of the evolving opportunities and challenges facing today's water sector utilities, the Association of Clean Water Administrators (ACWA), the Association of Metropolitan Water Agencies (AMWA), the American Public Works Association (APWA), the Association of State Drinking Water Administrators

THE ORIGINAL TEN ATTRIBUTES

- Product Quality
- Customer Satisfaction
- Employee and Leadership Development
- Operational Optimization
- Financial Viability
- Infrastructure Stability
- Operational Resiliency
- Community Sustainability
- Water Resource Adequacy
- Stakeholder Understanding and Support

THE ORIGINAL KEYS TO MANAGEMENT SUCCESS

- Leadership
- Strategic Business Planning
- Organizational Approaches
- Measurement
- Continual Improvement Management Framework

(ASDWA), the American Water Works Association (AWWA), the U.S. Environmental Protection Agency (EPA), the National Association of Clean Water Agencies (NACWA), the National Association of Water Companies (NAWC), and the Water Environment Federation (WEF) requested a group of utility and state leaders in 2015 to review the EUM framework. The group discussed the ways in which the operating context of water sector utilities has changed since 2007, and to consider refinements to EUM materials and promotion strategies in light of these changes.

Key milestones in the review process included:

- A two day in-person meeting of the Steering Group to discuss potential modifications to the EUM materials;
- Two national feedback webinars with over 200 participants each, open to all utilities and other members of the water sector (e.g., TA providers, consultants); and
- A series of conference calls held between the Steering Group members

This report represents the findings of the Steering Group members based on the input gathered during the review process.

SECTION 1: KEY OPERATING CONTEXT SHIFTS

Since the inception of EUM in 2007, the water sector has experienced a number of shifts in the context in which it operates. These shifts in technology, policy, society, and the natural environment affect both the day-to-day operations of water sector utilities and planning efforts on a long-term scale. Steering Group members believe that these operating context shifts were key drivers for the proposed revisions to the current EUM framework.

The key operating context shifts identified through the review process are described below. They are not organized in an order to signify degree of shift or level of importance.

Automated and "Smart" Systems and Data Integration

There has been a substantial increase in the availability and deployment of real-time, automated systems. Utilities are increasingly integrating data across all operational and business areas. As a result, information technology has taken on a substantially increased role in operating utility systems and is driving new skills, training, and information management challenges.

- Smart systems deployment
- Database integration and management
- Automated devices utilization in the field
- Employee training needs
- Job reclassifications needed as technology changes operating context and employee duties
- Cybersecurity management
- Automated Power Management
- SCADA with integrated Control Charting for incremental process improvements and/or predictive notice of specification exceedance/or failure

Climate Variability and Extremes

Over the past decade, climate variability has become a much more pervasive challenge facing water utilities. Participants indicated that various climate-driven issues must be managed, including extreme weather events, sea level rise, and droughts. These challenges, and a shift in the underlying variability of weather patterns (e.g., 100 year floods occurring twice in a three-year period), have substantially increased the uncertainty in water resource management and infrastructure planning.

- Extreme weather events – frequency and intensity (e.g., flooding, droughts, tornados, wildfires)
- Sea level rise
- Greater uncertainty in infrastructure planning
- Greenhouse Gas effects and reduction targets as a best practice

Customer Expectations and Public Awareness

Historically, water utilities have sought to maintain a low profile within their communities and tended to interact with customers and the media mostly in response to service failures, emergency events, and in other challenging contexts. In recent years, customer expectations and interest in information have increased, and the water sector has become more proactive in its customer and media relations, sharing information about utility programs, the value of water, and the utility operating context helpful to achieving utility and community goals. Many participants stressed that this area of management has taken on substantially more importance and criticality to successful operations of a utility.

- Prevalence of social media
- Real-time meter data available to customers

- Establishing proactive, positive relationships with customers and community members
- Proactive media management
- Broader watershed management and green infrastructure initiatives demanding coordination with "outside of the fence line" community interests and institutions
- Increased public expectations for transparency by utilities
- Foundational to world class utilities successfully managing change is to stay engaged with their customers and recognize that customers' expectations and perceptions are important performance measures
- Developing, implementing, and communicating best practice customer feedback, communication tools, and measures are essential to continuous improvement

Employee Recruitment and Retention

In recent years, utilities have begun to experience a shift in workforce dynamics. In the past, workers tended to stay with organizations for the long-term, however, these employees have begun to reach retirement age, and the new generation of employees has tended to be more demanding of their workplace benefits and opportunities, and change jobs more frequently leading to higher rates of employee turnover than utilities have faced previously. High turnover has necessitated the creation of more explicit programs for succession planning, workplace training, and leadership development.

- Aging workforce, retirements, and buy-outs
- Young employees tend to change jobs more frequently than past generations
- Challenge of offering competitive salaries to attract and retain high talent employees
- New skills and more pressure on on-going training requirements associated with more rapid innovation in the sector
- Knowledge capture of retiring employees is a challenge (but this knowledge can be captured with documentation of processes and work instruction when document management and control processes are in place (an element of CI management framework)
- There is a need to communicate case studies of partnerships with local elementary, secondary and post-secondary schools for curriculum development and mentoring programs - providing information for students to make informed choices to work in the water industry

Resource Recovery

A substantial re-thinking of the water sector utility business model is underway, while innovations in technology are enabling substantial opportunities in the operations of and services provided by utilities. Leading utilities are repositioning themselves in their communities as resource recovery centers, establishing new sources of revenues, reducing environmental impacts, and supporting and leading overall community sustainability and resiliency.

- Nutrient recovery
- Materials recovery
- Water reuse and contribution to environmental flows
- Energy efficiency and generation
- Infrastructure investments' contribution to broader community livability
- Development and Communication of leading by example opportunities (case studies) in waste elimination (e.g., implementation of lean tools and techniques), use of alternative energy sources, and development of commercial by-products from waste treatment

Regulatory Requirements and Operating Conditions

More stringent regulatory requirements (e.g., nutrient limits, CSO and SSO control) and various shifts in operating conditions are increasing complexity, cost, and risks in the utility operating environment and placing substantial pressure on revenue needs and revenue generating capacity.

- Regulatory requirements that drive substantial shifts in infrastructure and operating needs (e.g., BNR in response to nutrient limits)
- Lower detection levels for pollutants and pathogens (e.g., pathogen occurrence and public awareness in drinking water distribution systems)
- Pressure on rates and revenue as an outcome of regulatory requirements and operating conditions
    - Declining revenue at both water and wastewater utilities due to water conservation
    - Stranded assets and declining revenue due to population or industrial shifts
    - Aging infrastructure continuing to drive the need for substantial funding requirements
    - Continuing public resistance to rate increases
    - Customer affordability (subset of customers who cannot afford to pay their bills)
- Reduced flows and associated operational impacts in distribution (e.g., increased water age) and collection systems (e.g., increased deposition and associated maintenance requirements) due to water conservation practices
- Increased pressure on finding opportunities and addressing needs for partnerships among individual utilities to improve technical, financial, and managerial (TFM) capacity
- Increased attention to negative externalities (e.g., fish, flows, toxics)
- Increased decentralization (e.g., by customers doing water harvesting and onsite residential, commercial, and industrial reuse)
- Emerging contaminants in an increasingly more closed water cycle (e.g., concentration of pharmaceuticals)

Stormwater and Watershed Management

Meeting permit requirements and assuring reliable and sustainable clean and safe water increasingly requires managing a watershed and the entire water cycle in an integrated and coordinated fashion. As stormwater management expectations have increased, an effective and affordable community response depends on explicit integration of water, stormwater, and wastewater needs and priorities.

- Implementing a “One Water” strategy
- Integrated planning – relationship between stormwater and wastewater management is becoming more intertwined
- Managing regulatory requirements across the water cycle and on a watershed basis (e.g., integrated temperature management strategies)
- Non-traditional partnerships and operating contexts (e.g., with agriculture sector)
- Deployment and management of green infrastructure outside of the typical utility span of control (e.g., stormwater flow management on private property)
- Impact of stormwater management practices on drinking water and wastewater operations (e.g., injection sites increasing the water table with impacts on infiltration and inflow in sewer systems)
- Increasing connection between watershed management and forest management (e.g., related to wildfires)

SECTION 2: THE TEN ATTRIBUTES OF EFFECTIVELY MANAGED WATER UTILITIES

The Ten Attributes of Effectively Managed Water Utilities (Ten Attributes) are the backbone of EUM. They were designed to provide a clear set of reference points to help utilities maintain a balanced focus on all important operational areas of utility management, rather than quickly moving from one problem set to the next. The Ten Attributes were also intended to represent a comprehensive framework related to operations, infrastructure, customer satisfaction, community welfare, natural resource stewardship, and financial performance.

Steering Group members believe that the Ten Attributes provide a widely-recognized and widely-utilized framework for water sector utilities throughout the United States. The group believes that it is critical to maintain the structure of "Ten Attributes" as the foundation of EUM because of this broad recognition throughout the sector.

In light of the key operating context shifts described in **Section 1**, and the recommendation that the structure of "Ten Attributes" be maintained, the Steering Group provides specific feedback on each Attribute below, followed by proposed text for how the modified Attributes should read in future EUM materials.

2.1 Specific Feedback on the Ten Attributes

The feedback described below represents perspectives on how the Ten Attributes should be modified to respond to the key operating context shifts described in **Section 1**. The feedback was gathered through interviews and discussions with the Steering Group, and further vetted during two national webinars; it is the basis for the recommended modified text for the Ten Attributes in **Section 2.2**.

Product Quality

- Include stormwater effluent and recovered resources as components of product quality.

Customer Satisfaction

- Address the role that new and evolving technologies play with customers (e.g., the availability of real-time data and how it has changed interactions between water sector utilities and their customers).
- Acknowledge the new types of customers that have emerged (e.g., high strength waste producers, energy providers, nutrient customers).

Employee and Leadership Development

- Incorporate the concepts of standard operating procedures (SOPs) and institutional knowledge management.
- Acknowledge the new generation of workers ("millennials") and how they differ from previous generations in their work styles and needs.
- Address strategic human resource management and the effect that emerging technologies have on jobs.

Operational Optimization

- Incorporate the role that automated ("smart") systems play in utility operations and management.
- Address the strategic reduction of waste of all types by water sector utilities.
- Include "near miss" performance monitoring as an optimization strategy.

Financial Viability

- Acknowledge the new business models and financing alternatives that utilities are employing.
- Address the balance between managing risk and taking on capital financing.

Infrastructure Stability

- Account for future planning, as opposed to a focus on maintaining current stability. This modification necessitates a change in name for the attribute.
- Acknowledge the role that evolving technologies play in infrastructure management.

Operational Resiliency

- Acknowledge the external component of managing resiliency (e.g., external partners, interdependencies).
- Address the emerging components of resiliency, such as cybersecurity.
- Expand the attribute's name beyond "operational."

Community Sustainability

- Include the concept of utilities as community leaders in sustainability and in partnerships with other organizations (e.g., transportation departments, electrical utilities, planning departments).
- Evolve the description to be framed around the triple bottom line (environmental, social, and economic sustainability).

Water Resource Adequacy

- Modify the attribute in a way that allows it to be more inclusive of wastewater utilities. This can be achieved by focusing on the utility's role in its watershed and the water cycle.

Stakeholder Understanding and Support

- Include the concept of the utility as a "good neighbor" to its community.
- Define "stakeholder" more broadly (a "stakeholder" is anyone who can affect or be affected by the utility, not limited to just customers).

2.2 Recommended Modified Text for the Ten Attributes

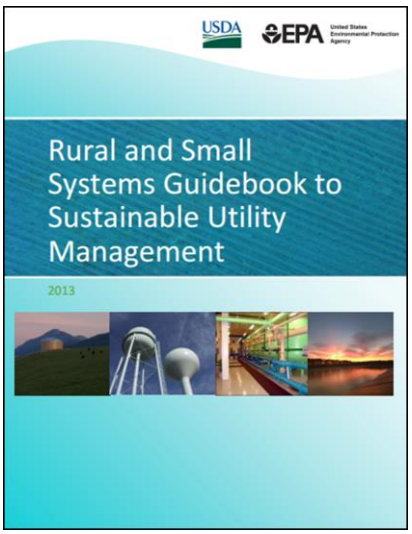
When conducting this review, the Steering Group sought to:

- Meet the goals of the original EUM Attributes;
- Maintain the original structure of EUM; and

SMALL UTILITIES AS AN AUDIENCE GROUP

In creating the recommended modified text in **Section 2.2**, the Steering Group discussed the issue of applicability of the Attributes to utilities of all sizes, specifically small utilities. The Steering Group believes that the Attributes remain accessible to utilities across an array of sizes, and that more work to help smaller utilities understand and adopt similar EUM approaches is needed.

Small utilities seeking to implement EUM are served by a variety of resources specifically designed for them, including the *Rural and Small Systems Guidebook to Sustainable Utility Management* (*Small Systems Guidebook*). The *Small Systems Guidebook* is a resource jointly developed by EPA and the United States Department of Agriculture (USDA), which adapts the Ten Attributes for use by small and rural utilities.



- Work from the original text.

Accordingly, the following titles and descriptions are provided as new text to be considered in place of the titles and descriptions of the 2008 Ten Attributes.

The Steering Group believes that the modified Attribute descriptions below fully support the changes in the operating context for utilities described earlier in this report, and meet the goals of the original Attributes as described in the 2008 *EUM Primer*:

> *The Ten Attributes of Effectively Managed Water Sector Utilities provide useful and concise reference points for utility managers seeking to improve organization-wide performance. The Attributes describe desired outcomes that are applicable to all water and wastewater utilities. They comprise a comprehensive framework related to operations, infrastructure, customer satisfaction, community welfare, natural resource stewardship, and financial performance.*

For the reader's reference, the text of the original Ten Attributes, as written in the 2008 EUM Primer can be found in **Appendix I**.

Text for the Ten Attributes of Effectively Managed Water Sector Utilities

Product Quality

Produces "fit for purpose" water that meets or exceeds full compliance with regulatory and reliability requirements and consistent with customer, public health, ecological, and economic needs. Products include treated drinking water, treated wastewater effluent, recycled water, stormwater discharge, and recovered resources.

Customer Satisfaction

Provides reliable, responsive, and affordable services in line with explicit, customer-derived service levels. Utilizes a mix of evolving communication technologies to understand and respond to customer needs and expectations, including receiving timely customer feedback and communicating during emergencies. Provides tailored customer service and outreach to traditional residential, commercial, and industrial customers, and understands and exercises as appropriate the opportunities presented by emergent customer groups (e.g., high strength waste producers, power companies).

Employee and Leadership Development

Recruits and retains a workforce that is competent, motivated, adaptive, and safety-focused. Establishes a participatory, collaborative organization dedicated to continual learning, improvement, and innovation. Ensures employee institutional knowledge is retained, transferred, and improved upon over time. Provides a focus on and emphasizes opportunities for professional and leadership development, taking into account the differing needs and expectations of a multi-generational workforce and for resource recovery facilities. Establishes an integrated and well-coordinated senior leadership team.

Operational Optimization

Ensures ongoing, timely, cost-effective, reliable, and sustainable performance improvements in all facets of its operations in service to public health and environmental protection. Makes effective use of data from automated and smart systems, and learns from performance monitoring. Minimizes resource use, loss, and impacts from day-to-day operations, and reduces all forms of waste. Maintains awareness of information and operational technology developments to anticipate and support timely adoption of improvements.

Financial Viability

Understands the full life-cycle cost of utility operations and value of water resources. Establishes and maintains an effective balance between long-term debt, asset values, operations and maintenance expenditures, and operating revenues. Establishes predictable rates—consistent with community expectations and acceptability—adequate to recover costs, provide for reserves, maintain support from bond rating agencies, plan and invest for future needs, and taking into account the needs of disadvantaged households. Implements sound strategies for collecting customer payments. Understands the opportunities available to diversify revenues and raise capital through adoption of new business models.

Infrastructure Strategy and Performance

Understands the condition of and costs associated with critical infrastructure assets. Plans infrastructure investments consistent with anticipated growth, system reliability goals, and relevant community priorities, building in flexibility for evolution in technology and materials, and uncertainty in the overall future operating context (e.g., climate impacts, customer base). Maintains and enhances the condition of all assets over the long-term at the lowest possible life-cycle cost and acceptable risk consistent with customer, community, and regulator-supported service levels. Assures asset repair, rehabilitation, and replacement efforts are coordinated within the community to minimize disruptions and other negative consequences.

Enterprise Resiliency

Ensures utility leadership and staff work together internally, and with external partners, to anticipate, respond to, and avoid problems. Proactively identifies, assesses, establishes tolerance levels for, and effectively manages a full range of business risks (including interdependencies with other services and utilities, legal, regulatory, financial, environmental, safety, physical and cyber security, knowledge loss, and natural disaster-related) in a proactive way consistent with industry trends and system reliability goals.

Community Sustainability

Takes an active leadership role in promoting and organizing community sustainability improvements through collaboration with local partners (e.g., transportation departments, electrical utilities, planning departments, economic development organizations, watershed and source water protection groups). Manages operations, infrastructure, and investments to support the economic, environmental, and social health of its community. Integrates water resource management with other critical community infrastructure, social, and economic development planning to support community-wide resilience, sustainability, and livability to enhance overall water resource sustainability.

Water Resource Sustainability

Ensures the availability and sustainable management of water for its community and watershed, including water resource recovery. Understands its role in the complete water cycle, understands fit for purpose water reuse options, and integrates utility objectives and activities with other watershed managers and partners. Understands and plans for the potential for water resource variability (e.g., extreme events, such as drought and flooding), and utilizes as appropriate a full range of watershed investment and engagement strategies (e.g., Integrated Planning). Engages in long-term integrated water resource management, and ensures that current and future customer, community, and ecological water-related needs are met.

Stakeholder Understanding and Support

Engenders understanding and support from stakeholders (anyone who can affect or be affected by the utility), including customers, oversight bodies, community and watershed interests, and regulatory bodies for service levels, rate structures, operating budgets, capital improvement programs, and risk management decisions. Actively promotes an appreciation of the true value of water and water services, and water's role in the social, economic, public, and environmental health of the community. Involves stakeholders in the decisions that will affect them, understands what it takes to operate as a "good neighbor," and positions the utility as a critical asset to the community.

SECTION 3: THE KEYS TO MANAGEMENT SUCCESS

The Keys to Management Success are also a critical component of EUM. They describe proven approaches to help utilities maximize their resources and improve performance under the Ten Attributes. The Steering Group believes the Keys to Management Success should be preserved as a necessary support structure for the Ten Attributes, but that they should be updated to better reflect the operating context and best practices of today's water sector. In addition, the Steering Group suggests that an additional Key be added to reflect the importance of "knowledge management" in the current utility operating context.

In light of the key operating context shifts described in **Section 1**, the modified text for the Ten Attributes in **Section 2**, and the belief that the structure of the Keys be maintained, the Steering Group developed specific feedback on each Key below, followed by text for the modified Keys in future Effective Utility Management materials.

3.1 Specific Feedback on the Keys to Management Success

The feedback described below represents perspectives on how the Keys to Management Success could be modified to respond to the key operating context shifts described in **Section 1** and the modified text for the Ten Attributes in **Section 2.** The feedback was gathered based on discussions among the Steering Group, and further vetted during two national webinars.

Leadership

- Incorporate the external components of leadership (e.g., within the community, with other external partners).
- Describe leadership's role in driving and implementing a long-term vision for the utility.

Strategic Business Planning

- Acknowledge new and emerging business models and opportunities.
- Incorporate the concept of "stress testing" a strategic plan in the face of increasing uncertainty in the utility operating context.

Measurement

- Incorporate the concept of "a limited number of critical control points."

Continual Improvement Management

- More clearly incorporate the concept of accountability and how this affects effective continual improvement management.

Organizational Approaches

- Eliminate this area and replace it with a new area, "Knowledge Management." Existing concepts in this area would be redistributed throughout the remaining Keys, including into the new "Knowledge Management" Key.
- "Knowledge Management" (new) to address:
    - Standard operating procedures;
    - Human resource management; and
    - Automated ("smart") systems data integration and management.

3.2 Modified Text for the Keys to Management Success

When conducting this review, the Steering Group sought to:

- Meet the goals of the original EUM Keys to Management Success;
- Maintain the original structure of EUM (Attributes and Keys); and
- Work from the original text.

The following titles and descriptions are offered for consideration as new text to be adopted in place of the titles and descriptions of the 2008 Keys to Management Success. The modified text seeks to maintain the structure of the original Keys, and utilizes much of the previously-written text.

The Steering Group believes that the modified Attribute descriptions below meet the goals of the original Keys, as described in the 2008 *EUM Primer*:

> *The Keys to Management Success are comprised of frequently used management approaches and systems that experience indicates help water and wastewater utilities manage more effectively. They create a supportive climate for a utility as it works towards the outcomes outlined in the Attributes, and they can help integrate the utility's improvement efforts across the Attributes.*

For the reader's reference, the text of the original Keys to Management Success, as written in the 2008 *EUM Primer* can be found in **Appendix II**.

Text for the Keys to Management Success

Leadership

Leadership must respond to both internal organizational and broader external community imperatives. It is critical to effective utility management, particularly in the context of driving and inspiring change within an organization and in its surrounding community.

"Leadership" refers both to individuals who can be effective champions for improvement, and to teams that provide resilient, day-to-day management continuity and direction. Effective leadership establishes and communicates a long-term vision for the organization, embodies a commitment to cultivating the organization's culture, helping to ingrain the methods to achieving the utility's vision into the organization's day-to-day operations.

Leaders have an important responsibility to engage proactively with stakeholders and community decision makers, promote the utility as a valued, competent, and trustworthy environmental steward and community asset, and collaborate with external partners (including new and nontraditional partners, like the agricultural sector). Leaders should drive an awareness and commitment to workplace safety, organizational diversity, ethical conduct, and positive morale. Leadership further reflects a commitment to organizational excellence, leading by example to establish and reinforce an organizational culture that embraces positive change, providing new opportunities for emerging leaders, and planning for and assuring a seamless transition to new leadership when required. Organizational improvement efforts require a commitment to continual improvement from the utility's leadership, including the celebration of small and large victories for the utility.

Strategic Business Planning

Strategic business planning directs and helps to achieve balance and cohesion across the Ten Attributes. A strategic plan provides a framework for decision making by:

- Assessing current conditions, strengths, and weaknesses;
- Characterizing a continuum of possible and likely future conditions;
- Assessing underlying causes and effects of future conditions; and
- Establishing vision, objectives, strategies, and underlying organizational values.

A successful strategic business plan is dynamic and adaptable, allowing the utility to capitalize on new and emerging opportunities. It is made more robust by engaging with staff and external stakeholders, and by utilizing planning methods that can accommodate and address a variety of future operating scenarios (e.g., managing for uncertainty through "stress testing" a plan's ability to hold up during extreme events, such as extended drought).

A strong plan reflects specific implementation steps that will move a utility from its current level of performance to achieving its vision. Preparation of a strategic business plan involves taking a long-term view of utility goals and operations and establishing a clear vision and mission. The plan, through engagement with external stakeholders, should reflect key community values, needs, and interests. When developed, the strategic business plan should drive and guide utility objectives, measurement efforts, investments, and operations. A strategic business plan can also help explain the utility's conditions, goals, and plans to staff and stakeholders, stimulate change, and increase engagement and support for improvement efforts. After developing a strategic business plan, it is important that the utility integrates tracking of progress and clear accountability into its management framework, and revisits the plan on a regular basis.

Measurement

Measurement is critical to management improvement efforts associated with the Attributes and is the backbone of successful continual improvement management and strategic business planning. A measurement system serves many vital purposes, including focusing attention on key issues, clarifying expectations, facilitating decision making, supporting learning and improving, establishing and maintaining accountability, and, most importantly, communicating effectively internally and externally. Always keep in mind the management adage, "You can't improve what you don't measure." Successful measurement efforts should be:

- Carefully focused on a limited number of performance measures that are used to drive the utility's strategic business plan;
- Viewed as a continuum starting with basic internal tracking, and moving to more sophisticated baselining and trend analysis as necessary, development of key performance indicators, and inclusion of externally oriented measures which address community sustainability interests;
- Informed by staff input, driven by and focused on answering questions critical to effective internal management and external stakeholder needs, including information needed to allow governing bodies to comfortably support large capital investments; and
- Supported by a well-defined decision framework assuring results are evaluated, communicated, and responded to in a timely manner.

Continual Improvement Management

Continual improvement management is usually implemented through a complete, start-to-finish management system, also referred to as a "Plan-Do-Check-Act" framework. Continual improvement plays a central role in effective utility management and is critical to making progress on the Attributes. Continual improvement management includes:

- Conducting an honest and comprehensive self- assessment – informed through staff engagement – to identify management strengths, areas for improvement, priority needs, etc.;
- Conducting frequent sessions among interested parties (stakeholders) to identify improvement opportunities;
- Following up on improvement projects underway;
- Establishing and implementing performance measures and specific internal targets associated with those measures;
- Defining and implementing related operational requirements, practices, and procedures;

- Defining supporting roles and responsibilities to derive clear accountability for conducting assessments and implementing performance improvements;
- Implementing measurement activities such as regular evaluation through operational and procedural audits; and
- Responding to evaluations through the use of an explicit change management process.

Continual improvement management is further supported by gap analysis, establishment of standard operating procedures, internal trend analysis and external benchmarking where appropriate, best practice review and adoption, and other continual improvement tools. It can be used as a framework to help utilities understand improvement opportunities and establish explicit service levels, guide investment and operational decisions, form the basis for ongoing measurement, and provide the ability to communicate clearly with customers and key stakeholders.

Knowledge Management (New)

Knowledge management is another cornerstone of effective utility management, and is critical to ensuring reliable utility operations. It spans standard operating procedures, human resource management, business systems and operating systems data integration and utilization to support dependable operations and continual improvement across the Ten Attributes.

By ensuring that processes are well documented through writing down "this is how we do things," regularly updating standard operating procedures and creating shared knowledge among various employee categories, a utility protects is able to respond effectively to the inevitable knowledge loss brought on by employee turnover or unexpected absences. An effective knowledge management system is flexible to the use of new and evolving technologies, and should be updated on an ongoing basis. Automated "smart" systems and data integration/management capabilities are an increasingly important aspect of efficient and effective continual improvement management. These systems and capabilities are available across all areas of utility management, and can substantially improve the ability of utilities to track performance in real time, identify variability, and manage performance more effectively and precisely.

SECTION 4: PROMOTING EFFECTIVE UTILITY MANAGEMENT IN THE WATER SECTOR

The Steering Group believes that the success of EUM in the water sector depends on regular activities to promote the use and uptake of EUM by water and wastewater utilities. The Steering Group and supporting staff from the Collaborating Organizations compiled a list of the key promotion activities for EUM that are taking place currently, or have taken place in the past. Based on this initial list, the Steering Group created a list of potential activities for consideration to build an overall strategy to most effectively promote EUM in the water sector.

Current and Past Promotion Activities

A range of promotional activities for EUM have been undertaken by the Collaborating Organizations and others since its inception in 2007. The major activities are listed below.

- Development of the document, *Effective Utility Management: A Primer for Water and Wastewater Utilities*, and corresponding case studies by the Collaborating Organizations.
- Distribution of the *EUM Primer* by the Collaborating Organizations and others
- Development of EUM-based recognition programs by NACWA and AMWA
- Development of the EPA document, *Moving Toward Sustainability: Sustainable and Effective Practices for Creating your Water Utility Roadmap.*
- Development of the WaterEUM.org website.
- Development of the EUM Performance Benchmarking Tool by the Water Research Foundation.
- Multiple EUM-focused sessions held at association annual conferences.
- Development of the EPA and USDA document, *Rural and Small Systems Guidebook for Sustainable Utility Management* and it's use in workshops for small systems managers supported by EPA and USDA

Activities for Consideration to Support Ongoing and Future Promotion

Foundational Activities

For future promotional activities, the Steering Group envisions a phased, stepwise approach to be taken by the Collaborating Organizations. The Steering Group recognizes that these activities must be considered in light of available funding and other priorities and should complement existing promotional activities for EUM already underway.

The Steering Group believes that two foundational activities need to be undertaken before any other promotional strategies are implemented:

1. **Update the *EUM Primer* document.** This update would reflect the changes to the Ten Attributes and Keys to Management Success described in this report, and should also include a review of other modifications that may be needed in the document to respond to the operating context changes described in this report.
2. **Hold a "re-launch" ceremony for EUM, sponsored by the Collaborating Organizations.** This "re-launch" would bring renewed water sector attention to EUM and lay the groundwork for any additional future activities.

Other Activities for Priority Consideration

In addition to the two foundational activities, the Steering Group has identified a set of additional promotional activities for consideration by the Collaborating Organizations. The Steering Group believes that these activities would reach key audiences throughout the water sector, and many may also capitalize on or link to existing water sector programs and resources.

The Steering Group believes that promotional activities for EUM should begin in 2016, starting with the Foundational Activities, and followed by additional activities as defined by an outreach strategy (which may include the activities outlined in this report).

- **Create a promotional strategy for EUM.** This strategy would identify the key audience groups to reach, important messaging points for each group, and an outreach strategy for each.
- **Provide education and promotion for EUM at the state and local levels.** The Steering Group believes that two key audiences to target in the promotion of EUM are state administrators and associations, and local elected officials (e.g., mayors, city council members, utility board members). Steering Group members believe that generating support for EUM at these two levels will lead to the implementation of EUM at the utility level. Activities in this area may include:
    - Get "buy-in" from state regulatory bodies to recognize EUM and engage state associations in the promotion of EUM.
    - Educate elected officials and board members about EUM leveraging existing meetings (e.g., ICMA, NLC, Conference of Mayors, ACCG meeting).
- **Conduct state, regional, and local-level EUM-based workshops.** These workshops would introduce attendees to the EUM materials, including the Ten Attributes and Keys to Management Success, and would provide an opportunity for utilities of all sizes to access EUM training.
- **Create a joint EUM-based utility management award or certification/accreditation program.** The Steering Group recognizes that there are a number of individual EUM-based management awards administered by various associations and organizations throughout the country at present. The group believes that these types of programs are of high interest to utilities throughout the water sector, and that they act as a driver for implementation of EUM at the utility level. The Steering Group believes further consideration of either a joint awards program, and/or consideration of creating a more explicit link between existing certification/accreditation (such as APWA or AWWA) could further boost uptake of the EUM Framework. Any new or modified program of this type must not detract from the value of any existing EUM-based recognition programs.

Additional Promotional Activities

The following represents a list of additional promotional activities that the Steering Group identified throughout the review process. The items below are not listed in any particular order.

- Educate elected officials and board members about EUM using existing meetings (e.g., ICMA, NLC, National Conference of Mayors, ACCG meeting, etc.).
- Consider returning the AWWA/WEF Utility Management Conference to be organized around the EUM Attributes and Keys.
- Have large utilities mentor smaller utilities in EUM (e.g., organized through state associations).
- Conduct a joint survey of association members to determine "market adoption" of EUM amongst utilities. Survey would cover awareness and implementation.
- Identify similar programs that could compliment EUM.

- Do outreach to states and state associations – state-level promotion is critical.
    - Get "buy-in" from state regulatory bodies to recognize EUM.
    - Leverage existing state association meetings (e.g., ASDWA and NRWA meetings, AWWA local sections and WEF local associations).
- Expand "train the trainer" efforts to include EUM (e.g., operator training, state licensing programs).
- Promote continuous improvement tools and continuous improvement trainings related to EUM during association conferences, at leadership academies, and in technical publications.
- Encourage utilities to pursue recognition for sustainable community programs related to EUM (e.g., SMART Communities).
- Establish training programs to instruct senior and mid-management utility leaders on the elements of a continuous improvement management framework and how to do a gap analysis of these elements with the goal of becoming compliant with or having their utility certified to a CI management standard
- Promote and instruct on the development of continuous improvement management frameworks and the necessary elements of these frameworks with a multi- association grant funded traveling workshop much like the workshop funded by OSHA to integrate the ANSI Z10 Continuous Improvement Safety Management System elements into the ISO Environmental Management System used by utilities.

CONCLUSION

The Steering Group would like to thank the Collaborating Organizations for the opportunity to review this critical water sector resource. The Group hopes that the findings in this report will be valuable to the Collaborating Organizations as they plan future activities related to Effective Utility Management, and to the water sector as a whole.

The Steering Group would like to reinforce the conclusion that Effective Utility Management, including the Ten Attributes and Keys to Management Success, remains a highly valuable and widely recognized resource within the water sector. To remain valuable and relevant to the ever-evolving sector, Effective Utility Management should also be an evolving and widely-promoted resource.

APPENDIX I: THE TEN ATTRIBUTES OF EFFECTIVELY MANAGED WATER SECTOR UTILITIES – AS WRITTEN IN THE 2008 *EUM PRIMER*

Product Quality

Produces potable water, treated effluent, and process residuals in full compliance with regulatory and reliability requirements and consistent with customer, public health, and ecological needs.

Customer Satisfaction

Provides reliable, responsive, and affordable services in line with explicit, customer-accepted service levels. Receives timely customer feedback to maintain responsiveness to customer needs and emergencies.

Employee and Leadership Development

Recruits and retains a workforce that is competent, motivated, adaptive, and safe-working. Establishes a participatory, collaborative organization dedicated to continual learning and improvement. Ensures employee institutional knowledge is retained and improved upon over time. Provides a focus on and emphasizes opportunities for professional and leadership development and strives to create an integrated and well-coordinated senior leadership team.

Operational Optimization

Ensures ongoing, timely, cost-effective, reliable, and sustainable performance improvements in all facets of its operations. Minimizes resource use, loss, and impacts from day-to-day operations. Maintains awareness of information and operational technology developments to anticipate and support timely adoption of improvements.

Financial Viability

Understands the full life-cycle cost of the utility and establishes and maintains an effective balance between long-term debt, asset values, operations and maintenance expenditures, and operating revenues. Establishes predictable rates—consistent with community expectations and acceptability—adequate to recover costs, provide for reserves, maintain support from bond rating agencies, and plan and invest for future needs.

Infrastructure Stability

Understands the condition of and costs associated with critical infrastructure assets. Maintains and enhances the condition of all assets over the long-term at the lowest possible life-cycle cost and acceptable risk consistent with customer, community, and regulator-supported service levels, and consistent with anticipated growth and system reliability goals. Assures asset repair, rehabilitation, and replacement efforts are coordinated within the community to minimize disruptions and other negative consequences.

Operational Resiliency

Ensures utility leadership and staff work together to anticipate and avoid problems. Proactively identifies, assesses, establishes tolerance levels for, and effectively manages a full range of business risks (including legal, regulatory, financial, environmental, safety, security, and natural disaster-related) in a proactive way consistent with industry trends and system reliability goals.

Community Sustainability

Is explicitly cognizant of and attentive to the impacts its decisions have on current and long-term future community and watershed health and welfare. Manages operations, infrastructure, and investments to protect, restore, and enhance the

natural environment; efficiently uses water and energy resources; promotes economic vitality; and engenders overall community improvement. Explicitly considers a variety of pollution prevention, watershed, and source water protection approaches as part of an overall strategy to maintain and enhance ecological and community sustainability.

Water Resource Adequacy

Ensures water availability consistent with current and future customer needs through long-term resource supply and demand analysis, conservation, and public education. Explicitly considers its role in water availability and manages operations to provide for long-term aquifer and surface water sustainability and replenishment.

Stakeholder Understanding and Support

Engenders understanding and support from oversight bodies, community and watershed interests, and regulatory bodies for service levels, rate structures, operating budgets, capital improvement programs, and risk management decisions. Actively involves stakeholders in the decisions that will affect them.

APPENDIX II: THE KEYS TO MANAGEMENT SUCCESS – AS WRITTEN IN THE 2008 *EUM PRIMER*

Leadership

Leadership is critical to effective utility management, particularly in the context of driving and inspiring change within an organization. "Leadership" refers both to individuals who can be effective champions for improvement, and to teams that provide resilient, day-to-day management continuity and direction. Effective leadership ensures that the utility's direction is understood, embraced, and followed on an ongoing basis throughout the management cycle. Leadership has an important responsibility to communicate with the utility's stakeholders and customers. It further reflects a commitment to organizational excellence, leading by example to establish and reinforce an organizational culture that embraces positive change and strives for continual improvement. Organizational improvement efforts require commitment from the utility's leadership.

Strategic Business Planning

Strategic business planning is an important tool for achieving balance and cohesion across the Attributes. A strategic plan provides a framework for decision making by:

- Assessing current conditions, strengths and weaknesses;
- Assessing underlying causes and effects; and
- Establishing vision, objectives, and strategies.

It establishes specific implementation steps that will move a utility from its current level of performance to achieving its vision. Preparation of a strategic business plan involves taking a long-term view of utility goals and operations and establishing a clear vision and mission. When developed, the strategic business plan will drive and guide utility objectives, measurement efforts, investments, and operations. A strategic plan can help explain the utility's conditions, goals, and plans to staff and stakeholders, stimulate change, and increase engagement in improvement efforts. After developing a strategic business plan, it is important that the utility integrates tracking of progress into its management framework.

Organizational Approaches

There are a variety of organizational approaches that contribute to overall effective utility management and that are critical to the success of management improvement efforts. These include:

- Actively engaging employees in improvement efforts (helping to identify improvement opportunities, participating in cross-functional improvement teams, etc.);
- Deploying an explicit change management process that anticipates and plans for change and encourages staff at all levels to embrace change; and
- Utilizing implementation strategies that seek, identify, and celebrate early, step-by-step victories.

Measurement

Measurement is critical to management improvement efforts associated with the Attributes and is the backbone of successful continual improvement management and strategic business planning. A measurement system serves many vital purposes, including focusing attention on key issues, clarifying expectations, facilitating decision making, and, most importantly, learning and improving. As one utility manager put it, "You can't improve what you don't measure." Successful measurement efforts often are:

- Viewed as a continuum starting with basic internal tracking, and, as needed and appropriate, moving to more sophisticated baselining and trend analysis, development of key performance indicators, and inclusion of externally oriented measures which address community sustainability interests;

- Driven by and focused on answering questions critical to effective internal management and external stakeholder needs (e.g., information needed to allow governing bodies to comfortably support large capital investments); and
- Supported by a well-defined decision framework assuring results are evaluated, communicated, and responded to in a timely manner.

Deciding where to start and what to measure can be challenging. Measures can also be taken out of context. Therefore, while an essential tool in the self-improvement process, measurement is not the only tool and should be approached, structured, and used thoughtfully. Section V includes sample performance measures that can be used in conjunction with utility-specific baselines and targets.

Continual Improvement Management Framework

A continual improvement management framework is usually implemented through a complete, start-to-finish management system, frequently referred to as a "Plan-Do-Check-Act" framework. This framework plays a central role in effective utility management and is critical to making progress on the Attributes. Continual improvement management includes:

- Conducting an honest and comprehensive self-assessment to identify management strengths, areas for improvement, priority needs, etc.;
- Conducting frequent sessions among interested parties to identify improvement opportunities;
- Following up on improvement projects underway;
- Establishing and implementing performance measures and specific internal targets associated with those measures;
- Defining and implementing related operational requirements, practices, and procedures;
- Establishing supporting roles and responsibilities;
- Implementing measurement activities such as regular evaluation through operational and procedural audits; and
- Responding to evaluations through the use of an explicit change management process.

This "Plan-Do-Check-Act" continual improvement framework is quite effective when applied internally. It can also be enhanced by using gap analysis, establishment of standard operating procedures, internal trend analysis and external benchmarking, best practice review, and other continual improvement tools. The framework can help utilities understand improvement opportunities and establish explicit service levels, guide investment and operational decisions, form the basis for ongoing measurement, and provide the ability to communicate clearly with customers and key stakeholders.

The Resource Toolbox described in Section VI, Utility Management Resources, provides links to resources that support utilization of the Keys to Management Success.