
Metrics, Best Practices, and Process:

Three
Complementary
Benchmarking Tools

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Abstract

Benchmarking, as a common and formal practice, is only now emerging as a mainstream element of strategic business planning for some water and wastewater utilities. In fact, it lags behind the adoption of the practice of formal deployment of strategic planning by less than a decade for many utilities. For this group of utilities that are adopting formal strategic planning and formal benchmarking (outreach comparison measurements) with others in the same decade, what are the challenges in “catching up” and “adopting” best practices?

For utilities engaging in any benchmarking efforts, it is not always clear “what kind” of benchmarking is appropriate to conduct to achieve the insights or goals they have in mind (determined by the strategic plan). Recently, I facilitated several regional “top performer” workshops for AWWA (American Water Works Association), where participants shared and discussed insights from the popular QualServe annual metric survey. In each, participants expressed frustration about the difficulty finding “apples to apples” comparisons within the metric data.

The logic they were all searching for centered around: “Is the “best performer” really “better” than me, or just different than me? Will we ever be able to characterize and normalize all the explanatory factors that make “best performer” or “top performer” metrics suspicious to us?

Part of the answer to be covered in this presentation is that metric benchmarking is not always adequate when used alone to answer all the questions a utility might have about comparable performance. Understanding the strengths of a broader suite of benchmarking tools, and the appropriate application of these tools to the goals of the utility can lead to more powerful insights, and a better use of improvement resources.

Other benchmarking tools that will be discussed and illustrated in this paper include “best practices” benchmarking, where a defined set of industry standard best practices form the basis of a survey among comparable utilities for evidence of adoption. The evidence of adoption is measured on a scale in at least five dimensions: emphasis, formality, frequency, results, and systems (technology). The more mature the practice adoption in each of these dimensions, the better the correlation is expected to be with various metric performance indicators.

In other words, in an area such as maintenance management, if a utility has strong emphasis on, formality of, frequency of, good systems for, and proven results for, maintenance planning, tracking, reporting, then the metric scores for O&M costs per MGD, O&M costs per employee, systems renewal and replacement rate, etc. should be positively affected.

The third type of benchmarking is process benchmarking. It is the most labor intensive and intimate of the types of benchmarking. It entails definition of one specific business process. The purpose of that process is then explicitly defined, and then mapping – in flow chart form – from start to end, occurs by each participant utility. Once mapping is complete, an analysis of the process for each utility occurs. This analysis includes definitions and distinctions of data collection points, customer interface points,

calculation of process performance in terms of cycle time, quality indicators, and customer/employee satisfaction measures. Comparisons of processes provide opportunities for utilities to redesign work, optimize process performance, and standardize where practical.

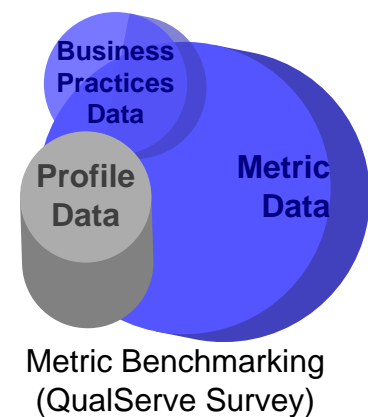
Opportunities for process improvement are shared with each benchmarking participant, while at the same time, comparisons of process performance, process structure, process purpose, governance, and outcomes are evaluated. Many of the optimization ideas center on “leap frog” opportunities that each participant takes back to their respective organization in the form of technology enhancements, staffing changes, workflow optimization, and organizational changes.

Since the results are very specific, any very localized in the actualized process of the utility (versus the overall performance of the process), the feedback can be readily applied. The outcomes for each participant are standardized processes, best practices, and improved metrics.

About Metric Benchmarking

It seems clear that metric benchmarking is the most common of benchmarking techniques, and is valued for the simplicity of its presentation, bias toward numbers or value comparison, and the perhaps misleading idea that it is “easy.” Metric benchmarking, simply described, requires selecting metric indicators reflecting the basic functions of the business. These might include:

- Throughput (water produced or delivered, and wastewater processed) typically as a ratio to total customers served, total FTEs required to serve them.
- Cost to perform operations of the business such as operations and maintenance and capital work.
- Cost to produce the throughput (water produced or delivered, and wastewater processed) as a ratio to total customers served, total FTEs required to serve them.
- Business performance indicators such as return on assets, debt ratio, bond rating, etc.
- Employee operations indicators such as training per FTE in a period and safety performance rating.
- Customer satisfaction measures, such as complaints per 1000 customer accounts, billing accuracy, quality ratings, outage performance, etc.
- System integrity indicators such as failures per miles of pipe per period, outage ratings, sewer outages, sewer overflows, water quality ratings, etc.
- Organizational performance indicators such as implementation of asset management, strategic planning, performance assessment, etc.



The common thread of all these indicators is that they are indicators of the overall “health” of the organization. In effect they are the “vital signs” of a well performing utility.

The best that can be said of these indicators as a set, as in any set of vital signs, is that there are “bands of good,” and there are “directions of good” depending on the type of utility to which they are applied. As such, to date, there are no one set of numbers that indicates excellent performance. However, for a utility with a given profile, for example, a water only utility that buys all its water, distributes only, has about 50,000 customers, and has a District governance structure – it might be expected to operate within some band of metrics given its particular geographic, tax and regulatory environment. In essence, there is a “band of good” but not a precise target that can account for unique local conditions, or specific explanatory factors that fit the organizations strategic or asset management plan.

With this in mind, we do metric-only benchmarking with several caveats in mind. One is that clear and well-segregated profile data that correlates well to the metric data is essential. The result is information that enables us to segregate some of the more obvious explanatory factors. In other words, the more we know about the profile of a given utility (size, governance structure, customer and employee profile, etc.), and the more seamlessly and elegantly we are able to segregate utilities into profile groups as the metrics are evaluated, the more useful any comparisons will be.

For example, if I can separate all utilities that are owned by municipalities, and do not pay taxes, and have all support services provided by their municipality (HR, Fleet, Purchasing, Finance, Warehousing, Etc.), that would make a big difference in how I viewed their MGD/FTE ratio!

The second caveat of metric-only benchmarking is that a larger sample of respondents is highly desired. This is an obvious need because there are so many possible profile variations that, in order to arrive at a reasonable grouping of “like” utilities in each profile we need to have a large number so as to limit the number of outliers.

Finally, we need to have valid, and well understood operational definitions¹ for all terms used in collecting metric data. I have learned over the years how varied the practices and even language can be in each utility, regardless of the similarity of the industry.

For these reasons, establishing a valid metric benchmarking survey and report is an onerous and long term process. Using the results of it-- is another step entirely.

Using Metric Benchmarks

So, let’s assume we get it right. What does it take to use the data from metric benchmarking in a way that actually provides insight that leads to value, and eventually helps us cause change?

¹ Operational Definition: A common definition for the use of a term, especially in the use of measurement. In this case, an example might be “O&M”. All participants must include and exclude the same things when reporting “operations” activities and costs and “maintenance” activities and costs.

I can't pretend that's not a tall order. In fact, by itself, metric benchmarking doesn't do much more than help you ask better questions than you might have been asking. For most organizations, that's a tremendous benefit. The price of better questions is often significant, so don't discount it. Rarely will metric benchmarking alone help you answer questions, such as what to do about performance.

If performance metrics in your category of a utility profile tell you that you're overburdened with staff, with debt, with errors (quality, billing, complaints, integrity), with failure (safety, integrity, overflows, etc.), first look to your strategic and asset plan. Do you have one? Is it sound and well implemented? Is it funded by rates? Is your maintenance plan subordinate to it? Do you have good data to understand how the utility performs from the customer perspective (how long and frequently are they out of service? What is the customer experience like?). If you don't know these things, your system is "OUT OF CONTROL."² The first order of business is to get it under control so that you know the reason and source of variation. When you know, measure again, and then plan for action.

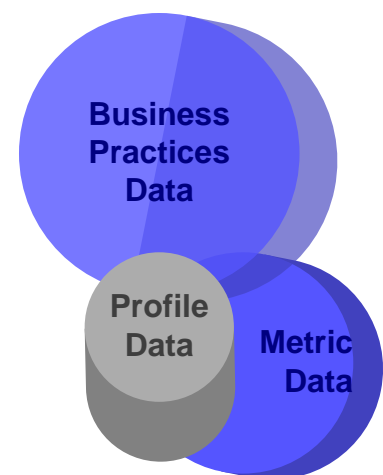
This is the value of vital signs. In the framework of another metaphor (health care) you've just been told you're about to have a heart attack, and you have to change your life style. As you do, measurement becomes a critical part of that new life style. (Much like the diabetic that measures glucose regularly.)

Since the best metric benchmarking efforts do usually include a few business practice indicators as part of the profile data collection effort, they also set the stage for the next level of improvement effort. The distinction to be made about business practice indicators are that they measure the dimensions of an organizations application of various business practices that are selected because they are considered to be "best practices." These range from basic strategic planning, financial management, and maintenance practices to technology implementation. Use of this type of benchmarking is discussed in the next section.

About Business-Practices Benchmarking

This is a less used benchmarking technique than metric-only benchmarking because it requires more investment of time, typically involves smaller participant groups, and focuses on targeted practice areas. By selecting more focused areas of the business to study, practices benchmarking begins with defining best or industry standard business practices for that area of business (such as maintenance, or inventory, or fleet) and selecting metric indicators for the area of focus.

Best practices benchmarking, however, is a useful follow on to a metric-



Business Practice or "Best" Practice Benchmarking (WRWUBG Survey) (1996-2003)

² A statistical term, meaning that the amount of variation in the system is either unknown or more likely unpredictable by measurement.

only study that has successfully provided a utility some insight or direction to an area for further process or practice improvement. The metrics included in these type of studies are both overall utility metrics, and “drill-down” indicators focused on the area being studied.

For example, if the area of practice chosen for benchmarking were maintenance management, a set of well-established “best practices” are readily available. From this information a survey is created to assess the extent to which these practices have been adopted, and to determine the correlation these practices have to better metric performance of the organization overall. Assessments I have done focus not just on adoption of the practice but on a more holistic view of business practices as they are employed. To achieve a broader view, I devised an approach that has five dimensions of inquiry that are hierarchal in importance. Beginning at the lowest level:

1. **Frequency** – (shows activity, not results or management attention) --the frequency with which given businesses practice is done is an indicator of the extent of adoption, but only an indicator. It does not, however, indicate effectiveness or results. It does show attention to a practice, and thus, is an important question to ask about maintenance planning, frequency of failure, reporting efforts, etc.
2. **Emphasis** – (shows some activity, and some management attention) --the amount or level of emphasis placed on a given business practice is an indicator of adoption. If a practice is performed, but not emphasized as a critical business practice, but rather an optional activity, two different pictures emerge about the extent to which the “best practice” is adopted.
3. **Formality** – (shows activity, management attention and systems investment) -- the degree or level of formality employed or applied to the business practice is another indicator of business emphasis, typically in the form of policy or standard operating practice. If a business practice is very formal, or has taken the form of policy and is strictly adhered to, then it is likely well adopted.
4. **Systems** – (shows management attention, activity, training, policy, frequency, and systems investment) --the integration of the practice into existing systems, such as technology, process, communication, facility, etc. is a very strong indicator of the adoption of the practice. Since these systems are the backbone of the organization, integration of business practices into systems is a tool of adoption.
5. **Results** – (shows outcomes from some kinds of investment) -- the ultimate measure of adoption of a practice is the assessment of results gained from the practice. Questions here are focused on degree or extent of results or shifts measured due to adoption of the business practice.

Each of these survey questions is designed around a Likert type scale – I use a one to six scale – unique to each of the focus areas (emphasis, frequency, results, etc.). The idea is to assess each participating organizations profile of business practices, in this case related to maintenance management. For this work, “A” utilities had customer base of 100,000 to 150,000, “B” utilities served 50,000 up to 100,000, and “Z” utilities were our outliers, Z2 and Z3 serving larger than 300,000 customers; Z4 was transmission only, not distribution, and Z1 wholesale only. Dollars are not stated in 2008 dollars, and practices are as reported in 1998.

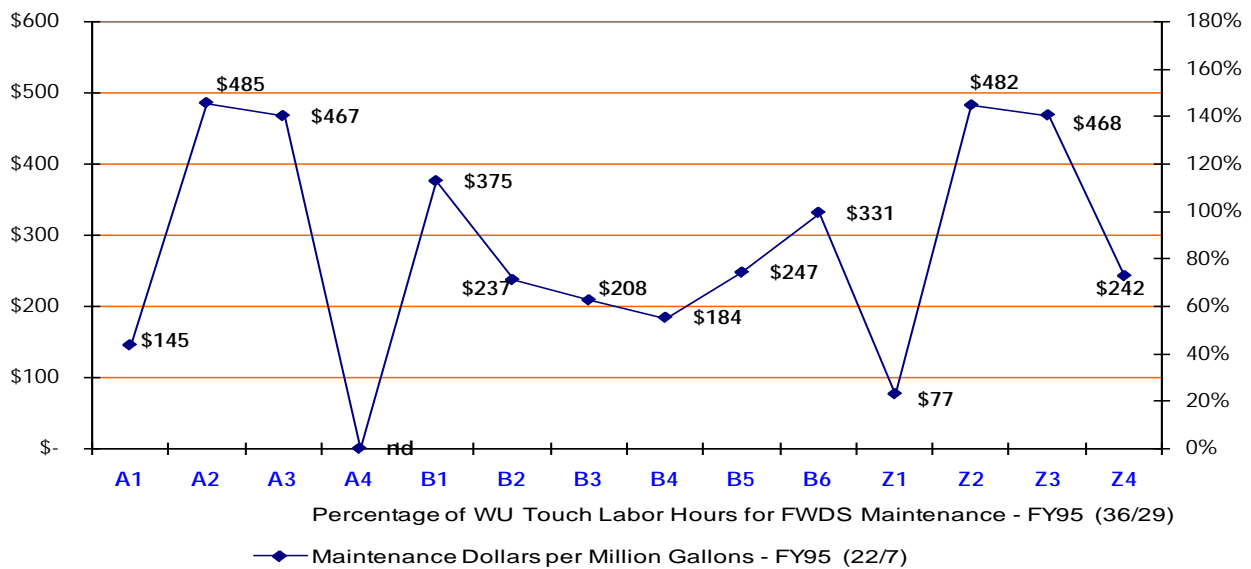
Several examples of the outcomes of this type of survey work are provided below. Essentially the charts represent a series of histograms depicting the bell curves illustrating participant maturity in adopting any given set of business practices.

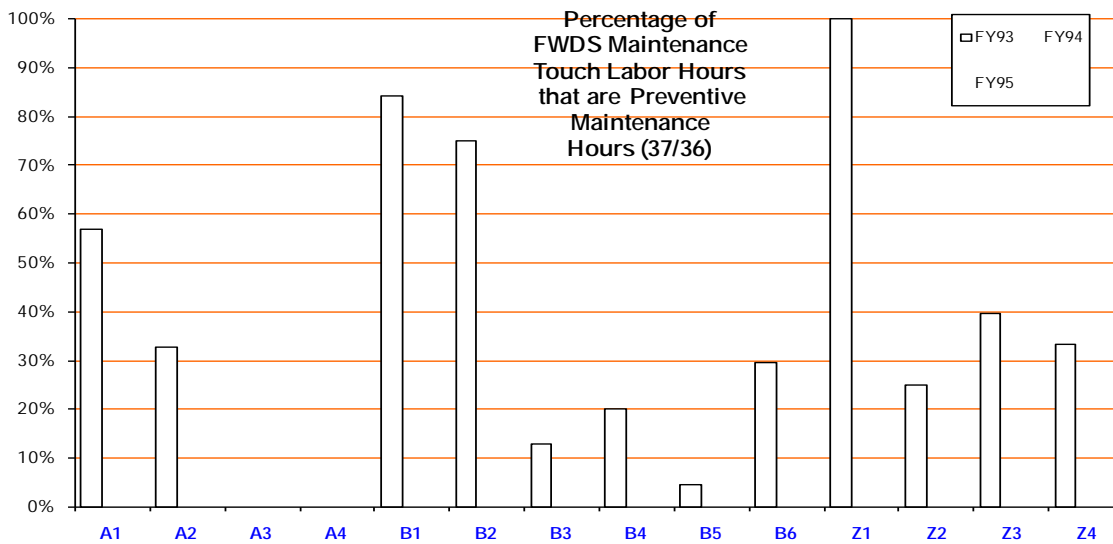
64. Frequency -- To what extent are the following practices used to handle Finished Water Delivery System equipment asset field failures and breakdowns:	a. Failed part/system undergoes laboratory testing						
Never do this - 1	Z1	B1	Z2	Z4	A1	Z3	
Done on an as-needed basis for critical programs and activities - 2	B3	B4	B2	B5	B6	A3	A2
Sometimes do this, an aspect of numerous programs and activities - 3							
Typically do this, on many programs - 4							
Often do this, omitted only in exceptional circumstances - 5							
Always do this; standard operating procedure - 6							

64. Frequency -- To what extent are the following practices used to handle Finished Water Delivery System equipment asset field failures and breakdowns:	b. Accurate, detailed failure history is maintained						
Never do this - 1	A3	A2					
Done on an as-needed basis for critical programs and activities - 2	Z1	B4	Z4				
Sometimes do this, an aspect of numerous programs and activities - 3	B1	Z2	Z3				
Typically do this, on many programs - 4	B3	B2	B6				
Often do this, omitted only in exceptional circumstances - 5	B5	A1					
Always do this; standard operating procedure - 6							

64. Frequency -- To what extent are the following practices used to handle Finished Water Delivery System equipment asset field failures and breakdowns:	c. Failure data is on-line & accessible to all ops/maintenance crews						
Never do this - 1	B3	B5	Z2	A3	Z4	A1	A2
Done on an as-needed basis for critical programs and activities - 2	Z1	B4	B1	B2			
Sometimes do this, an aspect of numerous programs and activities - 3	B6						
Typically do this, on many programs - 4	Z3						
Often do this, omitted only in exceptional circumstances - 5							
Always do this; standard operating procedure - 6							

70. Percent Used -- Estimate the extent to which total operations and maintenance touch labor staff have working access to the computer-based maintenance information system.							
1-5% - 1	B3	B2	B5	A3	A1	B1	A2
6-25% - 2	Z1	Z2	Z3				
26-50% - 3							
51-75% - 4	B4						
76-95% - 5	B6						
96-100% - 6	Z4						





Essential to the survey methodology is the approach each participating organization used to complete the survey. We designed (and in some cases, facilitated) a diagonal cross-functional team of knowledgeable individuals from each participating organization to participate in a workshop to complete the survey. The idea was that they needed to arrive at some agreement about how to rate their organization on the 1 to 6 scale for each question. Using a team was important, we found, because the front line employee saw the maturity of a given business practice in terms of emphasis, formality, results and systems differently than did a business manager or executive. Almost universally, executive management will rate the organization higher than will the front line employee, and sometimes for very good reasons. So, a good balance and education process for both is helpful, as some understanding of adoption of a practice throughout and across an organization is understood.

Many teams reported significant discussion, learning and compromise during these sessions. Further, that these team processes proved to be among the most valuable parts of the benchmarking process. Outcomes of just these internal sessions yielded goal and objective setting as individuals realized they had not completed or started work on adoption of practices, just by completing the survey.

Upon getting the results of all participants, and having set these goals and objectives, utilities were then able to make contact with others that were farther ahead in adoption of selected business practices, ask questions, conduct site visits, and evaluate performance metrics. Several chose to move into specific process benchmarking for limited and selected projects.

Using Business-Practices Benchmarking

As mentioned previously, business practices benchmarking is also referred to as “best practices” benchmarking. This is because the practices that are assessed through survey techniques are considered to be the best industry standard. The theory and method supporting this type of benchmarking is more comprehensive than that of metric-only benchmarking in that it includes and requires a complement of comprehensive profile, business practice and metric data. A goal is to

understand the relationships between all three of these pieces of data, presuming that organizations of certain types that invest in and get results from certain business practices will show better metric performance both overall, and in certain areas.

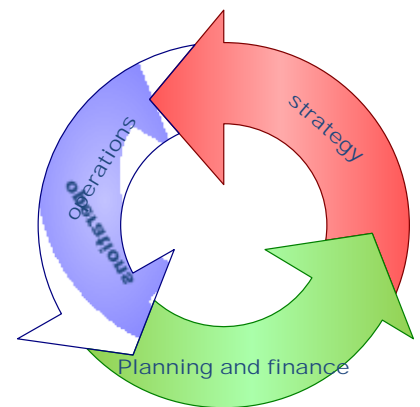
On a practical level, those organizations of a certain profile that wish to gain better performance in certain areas do well to understand the particular business practices that support and drive that excellence. In our comprehensive, about six year business practice benchmarking effort, the focus was on maintenance practices in distribution water utility systems, covering the components of pipes, meters, hydrants, valves, and PRVs. Approximately fifteen utilities participated in the effort, whose customer base ranged from 50,000 to 300,000.

Using the information gained was a learning process as we discovered the challenges with creating metrics with meaningful operational definitions and relevant explanatory factors for the profile descriptions. Terminology among utilities proved to be different enough that a glossary was required, and definitions of meanings and measures were consistently in work.

All participating utilities provided subject matter expertise to design each survey, develop all metric indicators and links between the metrics and practices. The role of the consultant was to conduct best practices research, facilitate design workshops, create the survey tool, gather data, analyze findings, present and facilitate findings, and revise.

The outcomes of this work, however, as previously mentioned, created a foundation for the following utility benefits:

- For goal setting; each utility created goals and objectives, or renewed or revised existing ones as they responded to the survey ranking themselves on the extent of adoption of best practices in their current reality. This was especially true when a conflict arose between what a utility leader believed was a current practice, and what evidence revealed were actual practices.
- For identifying best business practices that drive better performance. The tie between best practices at some utilities and their performance metrics was not statistically strong due to the size of our data set by profile type. However, the tie between the practices and the stated results from those utilities that had adopted the practice were strong, and supported by site visits and activity measures. More work needs to be done to create ties between business practices and overall utility metrics relative to profile groups.
- For identifying the value of a balanced set of investment in improving practices to all the “layers” of the business. In other words, some practices had significant value to the executive and managerial layers of the business, others to the planning and financial layers, and others to the functioning or operations layers of the business. When there is more investment in one



layer at the expense of another, such as no investment in strategy (the executive layer), or conversely, lots of investment in strategy at the expense of no investment in the practical operations layer, then the utility didn't get much value overall from the "state-of-the-art" business practice.

Process Benchmarking

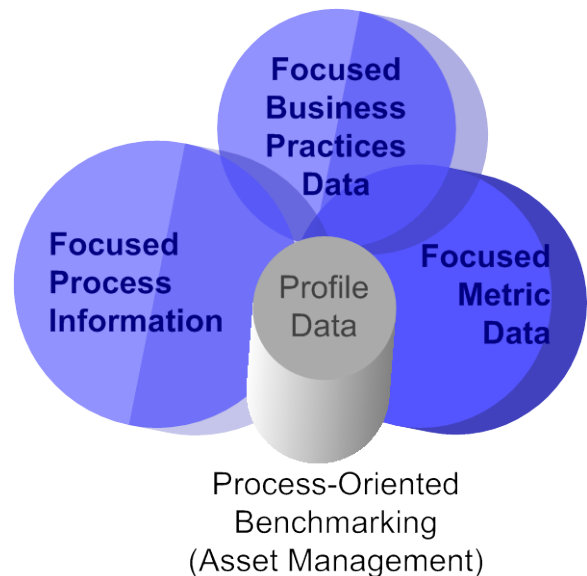
The individuals who have engaged in a project of process benchmarking will almost universally respond that the effort was tedious, time-consuming, and targeted at the activities involved with a particularly defined process. Once the process is defined – its beginning and ending point – all the detailed steps required to accomplish the work of that process are mapped in a flow chart by each participating utility.

Each step that involves customer interface, that represents measureable value added to the process, that illustrates redundancy or rework, that captures a data collection point, or that illustrates a data collection point needs to be highlighted. Handoffs between departments or groups should also be captured. Once all these points are identified, an attempt should be made to capture the data between these points, and qualify the accuracy if possible. Such information will be used to "baseline" the performance of the existing process.

Additionally, the elements of the business practices, procedures, policy, staffing, technology tools, service levels and metric performance of the process in question will be captured as part of the study. This part of the data collection is typically done using the same or similar tools used for metric and business practice benchmarking, so that comparisons can be made between participants.

Finally, as with all benchmarking efforts, the profile data remain important, as it is the basis for comparison, providing the explanatory factors between participants.

Once all the relevant data are collected, using subject matter experts who know and understand the process in question for the mapping portion, then using a cross functional team of internal and perhaps external customers to assess the adoption of the business practices, followed by complete utility-wide metrics and the process-related "drill-down" metrics, the study can be submitted with the profile of the utility.



Using Process Benchmarking

Consultants typically analyze the wealth of information from process studies and engage the participants in numerous workshop formats to help each utility evaluate the best options for process improvement. Often there are “best process” models that emerge, though these may not be a “best fit” for a given utility at a given time, based on cost and investment to implement. However, each utility can develop an implementation plan, or strategy of improvement.

On a more detailed level, in the workshops, each participating utility will compare and contrast their mapped process to look for overall performance differences. These differences are compared versus the stated purpose of each process by each utility, and the funded resource allocations (FTEs, costs, system investments, etc.) for each. Once those overall, high-level differences are identified, the individual steps of each process may be analyzed for opportunities. Reviewing processes in this way helps utilities with comparable processes understand how specific business practices, systems, and investments yield significantly different performance in similar environments.

Summary

As mentioned, each benchmarking technique -- from metric to best (or business) practice to process -- offers successively more data, and hence more insight. By necessity then, each requires a greater investment of time, resources and effort on the part of the participant to gain that insight. The results for any utility participating in benchmarking work are at minimum, the following:

- You'll improve your data collection systems, and your ability to define performance in comparable terms.
- You'll gain insight about your utility relative to others, in spite of the “fruit thing.”³
- You will gain partners/associates, some of whom will be ahead of you in adopting business practices that add efficiencies and opportunities. You'll also be a source of learning for others.
- A shift in culture will begin to occur within your utility; e.g.:
 - “It doesn't have to be invented here to work better.”
 - “Data isn't always used in a punitive way, and we can leverage data with decision makers to make positive impacts.”
 - “Being the best in every indicator isn't always the right thing to do.”
 - “Having a thoughtful plan for performance that meets agreed service levels and improvement strategies is a better ideal.”

³ Almost all participants of benchmarking work go through a frustration in looking at data (especially metric data) when they realize they are not looking at “apples to apples.” This should be somewhat expected. The stronger or more comprehensive the profile data are, the better able we are to sort participants into like groups. Compromises on profile information will yield less ability to sort the fruit.

For information about any of the studies referenced here, please contact: Dr. Linda Paralez, Demarche Consulting Group, Inc., 800 Fifth Avenue, Suite 4100, Seattle, WA. 98104-3100. 206.505.5800
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