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# Optimizing Operations Using Mobile and Wireless Technology

**T**here's no question that the recent economic crisis and resulting government stimulus funding for energy and water infrastructure are having a significant impact on utilities of all types and sizes. Now more than ever, managers are challenged to prioritize resources and to improve operational efficiency without sacrificing customer response.

As water utilities continue to face the challenges of outdated infrastructure, an aging workforce, supply and demand challenges, and migration to smart metering and advanced infrastructure automation, the use of technology for customer, asset, and workforce management will become increasingly important.

Nearly every conference, publication, and discussion about the utility industry these days includes commentary about the smart grid and using technology to optimize workflow, increase efficiency, and better serve customers. Until recently, however, little formal research had been done on the topic.

## REPORT HELPS READY UTILITIES FOR TECHNOLOGY

To help water and wastewater providers navigate the options available, Trimble Utilities Field Solutions business group (Long

Beach, Calif.) teamed up with Frost and Sullivan Mobile & Wireless Communications Group (San Antonio, Texas), and several US water utilities to develop the Water Research Foundation-sponsored "Field Computing Applications and Wireless Technologies for Water Utilities" report.

The purpose of the study was to understand the current state of wireless and field computing applications across the water utility industry, as well as the future needs likely to be generated by these applications' increasing use, and to provide case studies and tools for helping utilities effectively prioritize, plan, and implement these programs.

Over the course of 18 months, the research team conducted extensive primary and secondary research, including online utility surveys and tracking market developments, technology innovations, and industry trends, as well as developing detailed case studies about the current use of wireless technology by five US water utilities (see the sidebar on page 21).

Of the 55 utilities participating in the survey, 98% were publicly owned, and 45% served a population between 100,000 and 500,000 people. All of the utilities provided drinking water, and 56% also pro-

vided wastewater treatment services. The majority of the respondents were chief information officers, information technology staff members, and operations and customer service managers.

## INCREASED EFFICIENCIES GENERATE COST SAVINGS

Overall, the survey revealed a strong business case for adopting the use of wireless and mobile technologies for water utilities. If implemented properly, enterprise mobile computing systems were shown to deliver up to a 30% annual improvement in efficiency in service as well as to improve security, health, and safety and to help with regulatory and compliance reporting. Direct cost savings were shown to be available through improved resource productivity, reduced fuel costs and corresponding greenhouse gas emissions, and improved asset management.

Although many utilities acknowledge that mission-critical mobile applications could be a valuable asset to their businesses, the research shows that complexity, confusion, and uncertainty about the return on investment are creating significant barriers to entry for most water utilities. In fact, survey results indicated that more than 58% of utilities aren't

using wireless technologies at all. During this research, utilities ranked the importance of a number of factors that were evaluated when making a determination about whether to deploy wireless technologies for field service employees. The results of this ranking are shown in Figure 1.

“This research provides great value to water utilities looking to extend critical technologies such as geographic information systems [GIS] and asset management to the field,” said Lori Armstrong, water and wastewater industry manager for ESRI, a provider of GIS software solutions for water utilities. “The trend of utilities deploying software and wireless systems to support smart-metering and field operations continues to accelerate. This report provides a great reference guide to help utilities navigate their course when it comes to choosing and implementing wireless technologies.”

### SOLUTION HIGHLIGHTS

The research conducted for this study shows several highlights related to the adoption of field computing applications and mobile resource management (MRM) solutions by water utilities. Some of the highlights are:

**MRM solutions are becoming increasingly important.** In evaluating the industry and technology trends, the research identified MRM as the emerging category encompassing technology solutions designed to help organizations efficiently manage their mobile resources and field work processes. MRM incorporates a variety of technologies, including wireless communications, sensors, mobile computing equipment, in-vehicle technology, field application software, and automated workflows. MRM solutions also significantly leverage locating and spatial technologies such as global positioning systems (GPS) and GIS to automate and streamline utility field operations. Together, these technologies make it easier to manage mobile assets and

## Utilities Having Case Studies Featured In Report

- Honolulu Board of Water Supply, Honolulu, Hawaii
- City of Tallahassee Water Utility, Tallahassee, Fla.
- City of Phoenix Water Services Department, Phoenix, Ariz.
- East Bay Municipal Utility District, Oakland, Calif.
- San Francisco Public Utilities Commission, San Francisco, Calif.

give decision-makers greater visibility into field activities.

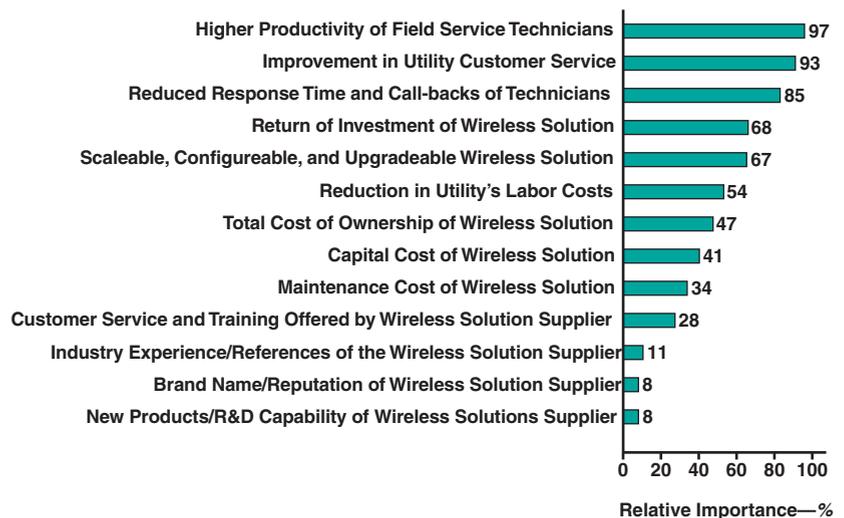
Equipping mobile workers with wireless technology makes it easier for them to access necessary data, communicate with each other and the office, more efficiently complete work orders and documentation, and reduce the number of trips between the field and office. The research findings showed that these benefits can provide substantial improvements in efficiency and customer service.

“We’ve seen a huge benefit from extending our enterprise applications to the field,” said Brian McKee, chief information officer at Honolulu Board of Water Supply, one of the utilities featured in the report. “The same tools that mana-

gerial staff members have had at their fingertips for years can now be leveraged out to where crews are working and representing your organization. Better decisions can be made, and better service can result from having more information in the hands of the people on the front lines.”

Just as utilities view and manage critical office solutions such as enterprise asset management and customer information systems, MRM was identified as the emerging strategic solution category that delivers value in the largest segment of the utility workforce—the mobile workers. Research suggests that the adoption of MRM technologies is likely to increase rapidly in the coming years, as more utilities adopt smart grid

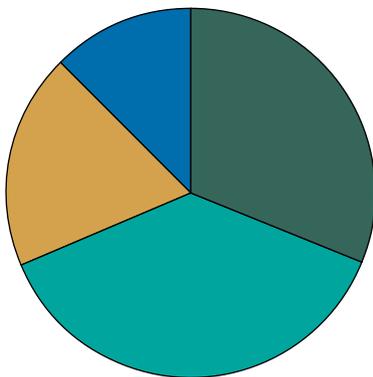
**FIGURE 1** Factors considered for wireless technology deployment



R&D—research and development

**FIGURE 2** Likelihood of wireless technology deployment in next one to two years

Very likely  
 Likely  
 Not at all likely  
 Don't know/can't say



*Percentages are based on 32 utilities surveyed that have not deployed wireless technologies for field service technicians.*

field solutions and better understand the costs and benefits of integrating location and mobility capabilities into their core applications.

**Regulatory requirements are a driving force.** Easing the process of adhering to regulatory and environmental requirements is one of the biggest benefits of field computing technology for the utility industry. A key finding of the study is that reporting requirements are among the biggest factors driving the adoption of mobile technology. Tools that provide enhanced asset management and monitoring capabilities—such as enhanced supervisory control and data acquisition systems, GIS, and GPS—are helping ease demands of regulatory compliance and reporting for the water utilities that have adopted them. Smart metering and wireless solutions continue to gain popularity across the industry as they ease the process of collecting and storing large amounts of dynamic data.

**Utilities see myriad tangible and intangible benefits.** Utilities list access to real-time, mission-critical data as the most important tangible benefit to mobility. Additional tangible benefits include:

- better data quality, transparency, and control;
- enhanced overall visibility into field activities;
- more effective asset life-cycle management;
- reduced response time for unplanned activities;
- regulatory compliance and reporting;
- time savings in meter management and other field tasks; and
- time savings in the field and in optimized work scheduling.

Significant intangible benefits of field computing applications have also been identified, including improved customer perception, more consistent business processes, improved communication, increased morale, and

improved worker skills, knowledge, and abilities.

### KEY CHALLENGES

Although the research report addresses significant tangible and intangible benefits, there are also significant barriers to entry for water utilities exploring their technology options. One of the key challenges unveiled during the course of the research was that limited understanding slows adoption. The research findings revealed several reasons why water utilities have been slow to adopt the use of wireless technology, one of the most important being an overall lack of understanding about options available, the benefits, and how to use the equipment.

**Introducing technology and change in the field.** In fact, the potential reluctance of staff to use a mobile computing system is often perceived as the single greatest risk to mobility deployment. In many cases, managers are concerned about field workers' individual reaction to change or use of technology they are not familiar with. Their concerns are valid. Nearly 70% of the utilities that have deployed wireless technologies report that fewer than half of their field service technicians actually use the technology.

**Incompatible network standards create challenges.** Another significant challenge to the adoption of mobility solutions for utilities is the lack of a definitive network standard in the United States. The vast array of incompatible network standards, operating systems, browsers, and devices make large-scale wireless convergence too complex for many organizations. Slowly, technology providers are beginning to work together to eliminate the plethora of incompatible platforms and standards that currently exist. Overcoming this challenge will require the cooperation of all market participants.

**Few are using mobile computing; fewer are quantifying their results.**

Industry surveys show that fewer than 15% of field service workers are using real-time mobile computing devices. Of those who are, many have no formal method in place for measuring the value of the technology. Although most adopters become evangelists for mobile technology, the majority are not tracking, measuring, or reporting time and cost savings of its use.

**FUTURE OUTLOOK**

Although there are substantial challenges to overcome, primary and secondary research show that field computing and wireless technology will become a critical component of water utilities' daily operations in the coming years. In fact, nearly 70% of survey respondents indicate that they are "very likely"

or "likely" to deploy wireless technologies in the next one or two years (Figure 2).

One thing is certain: technology will play an important role as utilities across the United States meet the challenges—and opportunities—of maintaining the nation's infrastructure with an aging workforce in an uncertain economy.

"There are those [who] are reluctant to implement wireless computing applications at water utilities, but the time of the early adopter is over," McKee said. "The technology has been proven now for years. Great strides have taken place in available bandwidth, coverage, price points of

equipment, and service, and it's definitely where our industry is headed."

—Chris Stern is director of Utilities Field Solutions with Trimble, [www.trimble.com](http://www.trimble.com), in Long Beach, Calif., and principal investigator for the Water Research Foundation's Field Computing Applications and Wireless Technologies for Water Utilities research project. He can be contacted at [chris\\_stern@trimble.com](mailto:chris_stern@trimble.com). Brent Iadarola is the global research director for Frost and Sullivan's Mobile & Wireless Communications Group, [www.frost.com](http://www.frost.com), San Antonio, Texas. He can be contacted at [biadarola@frost.com](mailto:biadarola@frost.com).

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