



WHITE PAPER

Utility Field Workforce – Building the Agile Workforce

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IDC ENERGY INSIGHTS OPINION

Utilities are asset-driven companies that require a flexible and agile workforce to maintain their assets. Being agile involves being able to respond effectively and rapidly to unplanned events. Part of the complication for utility companies is the increasing push to rely more and more on third-party contractors. A foundational function of an agile workforce is giving field-workers the information they need at the point of activity, without adding extra trips to the truck or calls to the office.

Mobile workforce management brings structure to the unstructured parts of field operations. While the asset management and dispatch functions can operate at top efficiency, once the contractors, technicians, operators, and crews hit the field, the picture of effectiveness of what they are doing becomes much fuzzier. With a well-implemented mobile workforce management tool, a utility's operational office can have much closer to real-time visibility into the effectiveness of their workforce and asset plans. Mobile workforce management can be the unifying platform laying the foundation for an agile workforce.

IN THIS WHITE PAPER

This white paper examines what it takes for utility companies to build an agile workforce. It details how companies realize benefits from deployment of today's more sophisticated mobile workforce management applications. The particular focus for this paper is unifying the contractor experience with the experience of the organic field workforce. IDC Energy Insights draws on recent quantitative studies, conversations with companies deploying mobility solutions, and analyst insights for this document. Guidance is provided to utilities companies on success factors for the deployment of field-worker mobility.

SITUATION OVERVIEW

Assets are the core of any utility company. However, the people who maintain the assets not only contribute significantly to reliability but also have to respond to urgent situations such as weather anomalies or man-made events. Those people are one of the largest variable costs for a company. Thus a utility company must have visibility into and some control of the people associated with maintaining and optimizing the assets. Visibility and control are necessary whether the people are employees, contractors, or third-party crisis support personnel.

As to mobilizing the information that workers need, companies have deployed mobile applications for their field workforce for decades. Truck-mounted and ruggedized laptops were the first wave of mobility. These laptops were the first steps in bringing together operational technology (OT) from the

field and information technology (IT) from back-office systems. With the rapid advances in mobile and data analytics, there are now more opportunities to provide the utility's field-workers with access to a richer set of data, information, and tools to improve their work.

The challenge for construction, operations, maintenance, and IT at the utility is to come together to build a unified mobile workforce management strategy for their entire field workforce that will improve efficiency and information sharing while maintaining security. That approach will need to keep up with rapid advances in mobile technology while taking advantage of new emerging opportunities in areas such as analytics and cloud-based computing.

Asking Assets and People to Do More

Utilities are asset intensive, and those assets are primarily distributed. IDC Energy Insights has found that utility companies typically consist of over 50% field-workers, which is not a surprise. What makes mobile field-workers unique is their pattern of mobility. As cost, market, and regulatory changes bring new pressures on field operations, companies are relying more upon contractors for a wide variety of work, including construction, tower builds, meter installations, powerline maintenance, vegetation management, inspection, monitoring and verification, and engineering. Some of these pressures have the potential for frequently dropping service in and out and putting additional wear and tear on equipment. This requires more frequent deployments of field-workers. Again, those deployments will lead to an additional round of pressures on the utility's mobile workforce.

Reliance on Contractors Grows as Industry Ages

As noted previously, the reliance on contractors has increased in the industry over the past five years. Utilities continue to see an aging workforce and competition for skilled workers – especially those who have a greater technology skill set – from other industries. At the same time, the need for skilled workers is expected to increase for the following reasons:

- Aging infrastructure that requires greater attention for reliable operation
- New types of infrastructure for operations and deployment
- New construction for distribution and long-haul infrastructure
- Changing market expectations for service reliability
- Better and more frequent communications to customers that is driving increased work order backlog

A recent study by the Wisconsin Energy Workforce Consortium (Wisconsin Public Service [WPS], Alliant, Xcel, We, and Madison Gas and Electric) revealed that participating companies forecast a substantial need for over 1,200 FTE contractors in 2016 to meet their needs for new construction. This figure does not include backfilling for attrition of their current workforce.

More Frequent and Severe Weather Events

Utilities have historically relied on contractors and mutual assistance from other companies and territories to help them respond to major storms. The number of major storm events has risen and has had an impact on outages. According to Peter Larsen of Lawrence Berkeley National Laboratory, "Increasingly severe weather events are linked to a 5-10% increase in the total number of minutes customers are without power each year" (*Assessing Changes in the Reliability of the U.S. Electric Power System*, Lawrence Berkeley National Laboratory, August 2015).

Customer satisfaction is closely linked with outage frequency and duration. Dissatisfaction with service reliability provides one more reason for customers to move to a competitive company or technology. In the wake of severe storms such as Hurricane Sandy, regulators have placed greater emphasis on issuing fines and penalties related to storm performance. Another aspect of this issue is that our "always on" society expects outages to be addressed quickly and permanently. This particular pressure eventually leads to regulatory pressures on reliability as dissatisfied customers push public utility commissions (PUCs) to better regulate reliability.

MOBILIZING THE FIELD WORKFORCE

A workforce management system has to be aligned with any asset management system or process. The workforce management system, and the associated business processes, coordinates and optimizes the people in the office, but more critically, it optimizes the people in the field maintaining and fixing assets and systems. It makes sure that those critical people are where they need to be, when they need to be there, and have what they need to do the job at hand. One other function that is often overlooked is communicating the results and status of the field operations back to operations and dispatch. Mobilizing the utility's workforce puts the information in the asset management system at the point of activity for field-workers. The field-workers should have the information in their hands, not in a truck, not at a station, and especially not back at the operations office or depot. Some key aspects of field-workers having the information they need at the point of activity are:

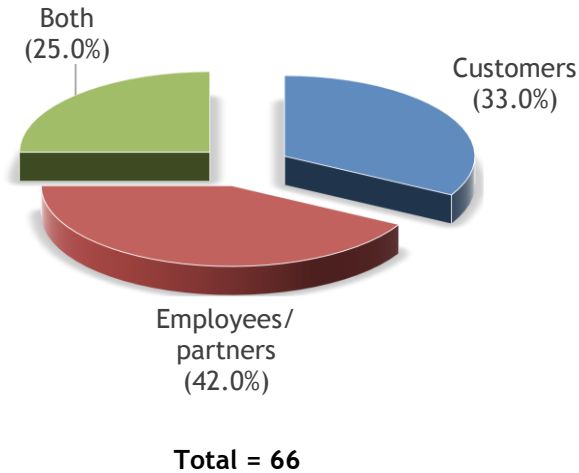
- Parts inventory for determining time to repair
- Safety lockouts
- Outage reports to help diagnose problems
- Work history from previous activity performed on assets and at customer sites
- Maintenance records to ensure all required maintenance tasks were completed
- Expertise and skill availability to respond to issues beyond the capability of the current response crew

According to IDC's February 2015 *U.S. Vertical IT and Communications Survey*, 59% of utilities in North America have deployed a mobile solution and another 38% are researching a solution. In that same survey, when utility respondents were asked about their top 2 investment priorities for 2015, 37.5% of them indicated that mobility (mobile, mobile devices, platforms, apps, and services) was on the list. Field force enablement was cited as one of the top 3 mobility initiatives of 2015 by 25% of survey respondents. Figure 1 illustrates the importance of utilities applying technology to their internal workforce. Almost half of the mobile apps deployed will be primarily directed at employees/partners (42%), with applications also being deployed for dual use by customers and employees/partners (25%).

FIGURE 1

Focus of Application Development at Utilities

Q. Of the new mobile applications that will be developed in 2015, what percentage will be developed for your customers/consumers versus employees/partners?



Source: IDC's *Vertical Insights Survey for Utilities*, 2015

Business Case-Related Benefits

Utilities invest in mobility for the field workforce for multiple reasons; however, the benefits differ by the type of work being performed (see Table 1).

The benefits of moving from strictly manual processes to mobile-enabled automated processes with built-in validation are well known: reductions in data entry time, clerical errors, and manager review time. One utility that recently implemented mobile workforce management reported a reduction of 70% in the amount of time from the completion of the work to the closing of the order. Another utility indicated that it has seen a 15% improvement in the efficiency of its field service operation and a 30% improvement in response time to emergencies.

TABLE 1

Benefits of Mobile Workforce Management in Utilities

| Type of Work | Description | Expected Benefits |
|----------------------------|--|---|
| Short cycle | Service orders (meter installation, meter connect/disconnect, meter exchanges, meter rereads, switch room setup, antennae replacement, line hookup, etc.) where multiple work orders can be completed by a single field engineer or crew in a single day | <ul style="list-style-type: none"> ▪ Improvement in jobs completed per day ▪ Customer satisfaction ▪ Fixed first time (FFT) increases |
| Outage management | Response to outages or other service disruptions | <ul style="list-style-type: none"> ▪ Reduced outage duration ▪ Communication of event status – to both dispatch and customers ▪ Customer satisfaction ▪ Regulatory reporting |
| Inspection and maintenance | Work involved with managing and maintaining assets (inspections, maintenance) | <ul style="list-style-type: none"> ▪ Reduced "wrench time" ▪ Integration of contractors ▪ Regulatory reporting |
| Long cycle | Complex work (new construction, tower buildout, retrofit, major repairs to multiple assets) that must be planned, designed, and executed over a long period of time | <ul style="list-style-type: none"> ▪ Reduced project delays ▪ Integration of contractors ▪ Concurrent project and downtime management ▪ Alignment of multiple crews/resources across all jobs/tasks |
| Common to all work types | All of the above | <ul style="list-style-type: none"> ▪ Improvement in environmental, health, and safety (EH&S) auditability and compliance ▪ Customer satisfaction ▪ Regulatory compliance ▪ Fieldwork productivity |

Source: IDC Energy Insights, 2015

Customer Satisfaction and Compliance

Customer satisfaction is a commonly underestimated component of applying any technology at a utility company. Where the work involves the customer – installing a meter, performing a gas relight, conducting inspections at the customer premise, and resolving a service disruption or outage quickly – improvement in customer satisfaction is an indirect benefit. An automated system provides an audit trail for environmental, health, and safety compliance.

APPROACH

In the sections that follow, IDC Energy Insights takes a look at what utilities need to consider to successfully select, implement, and operate a mobile workforce management system.

Worker and Third-Party Adoption

Worker and contractor adoption does not have to be an obstacle to achieving the benefits of mobile workforce management. Utility companies are increasing the use of contracted workers for the following reasons:

- A rapid response force for unplanned events
- A pool to support internal worker disruption
- Lower-cost labor for noncritical jobs

Managers need to support a field workforce that spans a wide demographic sample, from young to old and from tech savvy to manually oriented:

- **The tech-savvy worker.** Tech-savvy workers will compare their personal experience with mobile apps they encounter in daily life with apps that are provided at work. For digital natives, applications need to be continuously updated and intuitive to make the grade.
- **The manually oriented worker.** These workers will need user-friendly apps. The device should be perceived not as a tool that creates more data entry work but as a tool that makes their job easier by providing access to information.
- **The third-party crew.** Contract or third-party workers are an increasing and specialized case. They might not have the time to become familiar with a mobile app through muscle memory. An app that is simple to use, has the proper security access, and provides only the information needed for the job at hand is critical.

Access to the Right Amount of Information

It should be easy for all types of workers to get access to up-to-date information to complete their tasks. The level of information depends on the type of work being performed:

- **Internal field-workers.** For technicians performing maintenance work, the information includes areas such as parts lookup, equipment status, asset-related job history, or exploded equipment views. For technicians performing field service work, the information of most interest may be:
 - Routes to the next job
 - Recent customer interactions
 - Permit confirmation
 - Information on installed equipment and inventory

- Current maintenance records on an asset
- Manufacturer information, including manuals and service bulletins
- The status of current safety lockouts
- Nearby filler or compliance work that can be done while in a given area working on a job
- **Contract workers.** While contract workers and internal field-workers need similar information, security access must be carefully configured. Provisioning rapidly and effectively becomes a critical part of any workforce management system that employs contract workers.
- **Occasional field-workers.** These workers typically need only a limited amount of information, and a utility should focus information access on contractors and crisis support crews.
- **Office workers and supervisors.** Office workers such as supervisors, schedulers, planners, dispatchers, customer service representatives, and contract managers need access to information from the field (job status, geolocation, long-cycle work project status, etc.) and from internal applications (certifications, skills, availability, competencies, scope of work, etc.) to effectively manage the entire field workforce.

Ease of Use

Ease of use – how quickly information is processed and displayed to how easy apps are to use and navigate – is important for user adoption. For field-workers, there are three additional critical items to consider:

- **Form factor to match the typical projects.** The screen "real estate" of the smartphone is conducive to simple data entry, routing and delivery of simple dashboards, and basic transactional information. For field engineers, the larger form factor of a laptop allows for more detailed geospatial visualization, charts and graphs, and CAD drawings. Utility engineers may need to use the larger form factor of a tablet to work with a commercial/industrial customer's construction contractors to display electrical schematics of a service connection.
- **Ability to work offline.** Field-workers in utilities frequently perform work in remote locations with limited or sporadic connectivity. In cases where connectivity is unreliable, a field-worker should be able to work without disruption, perform uninterrupted data entry, and have the data captured and sent when a reliable connection is restored.
- **Workflow.** Managing how information and tasks flow up and down the chain is a hidden but critical function of any workforce management system. The workflow not only must be flexible but also must drive the user to perform the needed tasks within a compliant framework. From a mobility perspective, it must be about making sure the workflow presentation and operation fit the device.

Achieving Productivity and Managing Risks

Productivity

To achieve greater worker productivity, utility companies need to concentrate on achieving the expected benefits of their mobile workforce management initiatives. The companies that are likely to achieve the benefits are conscientious in tracking metrics related to business benefits and benchmarking against utility peers. For example, for short-cycle work, a utility will look at metrics such as number of service orders per field technician per day, percentage of service orders completed within the targeted response times, and percentage of service orders completed on the first visit. Tools and dashboards that make metrics visible to managers, with the ability to drill down to details around workers and assets, will contribute more than most people realize to getting a return on an investment.

Technology alone is not enough to deliver the benefits. With each mobile workforce management initiative, attention should be paid to what changes in utility business processes and subprocesses (work order to completion, procurement of materials, etc.) will achieve greater efficiencies and increase worker productivity. Whole steps in traditional business processes will likely be eliminated with enhancements in mobility. Workflows that are built into the process and supported by the technology further reduce the time it takes to complete a job or project.

The Risks: Support Costs

One of the biggest challenges is tying mobile applications back into enterprise systems. According to *Field Technologies* magazine's *Field Mobility 2015* report, the top criterion for the selection of a mobile workforce application is the ability to integrate to current back-office systems. For utilities, the lack of integration defeats the purpose of mobile initiatives. It means there is a time lag in the delivery of information to and from utility business applications and tools.

Integration of new mobile capabilities and interfaces to numerous legacy systems continues to be a significant point of consideration. Because of the integration to legacy systems, utility companies have historically built many of their own apps. That may be the reason, according to IDC's February 2015 *U.S. Vertical IT and Communications Survey*, that utilities have opted to build mobile applications in-house or rely on third-party help (73% of respondents) rather than use off-the-shelf mobile native apps (27%) that require work to integrate. However, IDC Energy Insights sees the change coming.

Typically, in-house systems are very narrowly focused on a specific task, and this leads to mobile workers having to use and learn, literally in some cases, dozens of different apps. These mobile apps tend to be built in silos and rarely share information. You can't be afraid of integration; it's a fact of life in any company. In the long run, the "integrate your own" approach is more costly. The cost comes not only from the initial development but in the ongoing support that is needed over the life of the application. An in-house system also increases the risk of getting locked into a labor force to support the code. Most mobile workforce management vendors have the experience and capabilities to make it work with minimal risk and cost.

The Risks: Ensuring Compliance Through SOPs

As a given, utilities must stay in compliance with regulations. Many utilities have adopted standard operating procedures (SOPs) that are driven by corporate objectives and/or compliance with regulations. Mobility provides a means to communicate SOPs to workers in the field, whether the workers are direct employees or contractors. Better yet, for contractors, configuration on the mobile device can help guide contractor technicians in performing work or capture information to the same level/quality as in-house technicians. Workflows ensure that activities are completed in a certain sequence for consistency.

The Risks: Securing Corporate and Customer Data

With many more access points to corporate data through the use of smartphones and tablets, it becomes more difficult to secure enterprise and, where applicable, customer data. It is an absolute requirement that mobile applications have built-in security. Partitioning multiple contractors' data and security protocols for access and rights is required when contractors are involved. Finally, it is important to limit the extent of enterprise and customer data available to occasional workers employed by outside contractors.

ESSENTIAL GUIDANCE

Mobile workforce management is a critical step for any utility company that is driving toward a more agile workforce. That "last mile" of the agile workforce marathon means getting information into the hands of the worker at the point of activity. The agile workforce also means that the days of a clean, all in-house workforce are gone. Companies have to be able to quickly provision for the rapid integration of third-party workforces, either because of business issues or because of unforeseeable events. But utility companies have been successful in taking steps toward the agile workforce. There are several points to consider when laying out a workforce management strategy for asset management:

- **Mobile workforce management is the unifying app.** Consider covering all types of work and all types of workers with one mobile workforce management application. In addition to reducing the cost associated with supporting multiple systems and integrations, a single application provides the flexibility to optimize resources. For example, a maintenance worker could be assigned to scan a barcode on equipment in the vicinity of the maintenance job in preparation for a pending inspection performed by others. In another case, there may be a requirement that mutual assistance crews be paired with the home utility, necessitating a dispatcher to easily access personnel to coordinate.
- **Integration.** Put ease of connecting and maintaining integration on your list of selection criteria and weight it heavily in the selection process. Vendors that offer applications such as enterprise asset management (EAM) and mobile workforce management often have integration with their own core applications. Companies that have focused only on mobile apps tend to not have the deep domain expertise of technology vendors that have spent years supporting utility systems. Ask vendors to validate integration between mobile workforce applications and enterprise asset management, geospatial information system (GIS), outage management system (OMS), inventory, automatic vehicle location (AVL), procurement, customer information system (CIS), and/or field service applications.
- **Design philosophy.** Look for vendors that have adopted a design philosophy in developing worker-facing applications. Mobile initiatives should be designed with active worker participation to arrive at what field-workers need to make their jobs easier and their work more productive. This requires spending time with workers in the field on both typical and atypical workdays. To ensure adoption of mobile applications in the field, utilities will need to give workers a simple, intuitive mobile experience in return for inputting information. This is especially true for contract and occasional workers who don't have the ability to develop muscle memory for critical tasks.
- **Scalability for flexible workforce.** Scalability becomes more important as companies take on more contracted work. The mobile workforce management application should allow the utility to manage multiple contractors, service-level agreements, and diverse contract types. In addition, the mobile workforce management application should be able to scale to handle more external workers during severe outages.
- **Provisioning flexibility for contractors.** Successfully supporting increasing contractor deployments is a capability that can't be overlooked or minimized. Being able to provision for app access, communications systems, and security access should be a top priority for selecting a mobile workforce management system. To be effective in rapid provisioning, utilities must pay attention to not only application-level security but also device-level and network-level security.
- **Analytics.** Invest in analytics that can be applied to mobile workforce management. At a basic level, analytics provide visibility into performance of internal crews to objectives and contractors to service-level agreements. Use more advanced analytics to optimize scheduling of personnel and required equipment and to simulate the need for resources for outage scenarios. One of the biggest benefits is improved forecasting for contract workers and crisis support crews.

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